

Logistics and Transport Management

Master Thesis No 2003 : 8

# THE COST, THE MODEL AND THE LOGISTICS



*A Cost Measurement System at Volvo Logistics Corporation*



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ISSN 1403-851X

Printed by Elanders Novum

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## Abstract

The changing prerequisites in the business environment today, forces companies to focus increasingly on inbound and outbound flows of goods and services in a cost-effective manner.

The information concerning the financial resources plays an important role since it is used to plan, evaluate and control the daily businesses processes. This research project deals with modelling methodology, concerning conceptual model building. The model created is a cost measurement system of logistics services, at Volvo Logistics Corporation Inbound division (VLCI).

The creation of the model is based on the Activity Based Costing concept and has taken place parallel with knowledge building of VLCI and their processes. The model itself has been created using spreadsheet software. The model is adaptive and can easily be adjusted to organisational changes. An Activity Based Costing system enables allocation of costs to processes and cost objects that consume organisational resources.

The model can identify where and how resources and cost are consumed both at process and cost object level. Further the model can be used to obtain financial information that has the potential to benefit VLCI in their managerial decisions concerning, e.g. pricing and evaluation of customers and logistics solutions.

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Keywords: Activity Based Costing, cost measurement model, cost allocation, logistics services, resource consumption, Volvo Logistics

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## ACKNOWLEDGEMENTS

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This research project has presented us with many challenges over the duration of the project spectrum, this thesis represents the closure of our Master of Science degree in Logistics & Transport Management. Economic analysis will always be of great interest and play an important role for companies. We are grateful for being offered the chance to put our newly acquired knowledge into practice at Volvo Logistics Corporation.

We would like to thank all the staff members at Volvo Logistics Corporation, Inbound Division for their support and patience with our recurring questions. Their assistance has served as an enabler for this research project.

A special thanks to our tutor Björn Möller at Volvo Logistics Corporation who always had the time to spare to help and guide us in our quest for new and accurate information.

Finally we would like to thank our tutor Arne Jensen, Professor at the School of Economics and Commercial Law, Gothenburg University, for his guidance, ingenuity and invaluable assistance.

Last but not least we would like to thank those in our near surroundings who have encouraged and supported us throughout this project.

Thank you for showing interest and enjoy your reading!

Gothenburg, January 2004



Martin Hansson



Per Ottosson





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## Definitions and Abbreviations

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*A list of commonly used definitions, concepts and abbreviations in this research project are defined below.*

### ***Activity/Process and Activity Centre***

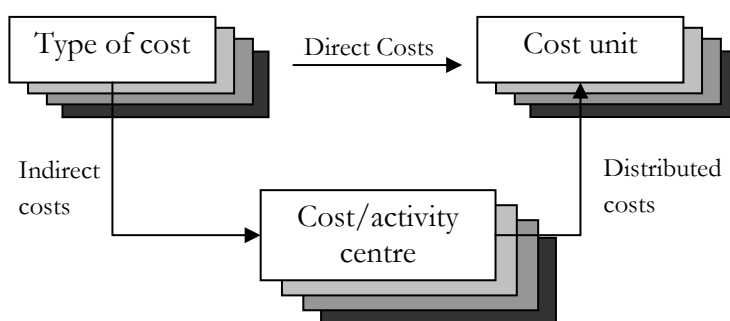
An activity is a specific function that exists to achieve an aim, it is what somebody does or takes part in. A process is a series of activities (tasks, steps, events, operations) that takes an input, adds value to it and produces an output (product, service, or information) for a customer. An activity centre consists of several activities/processes bundled together that forms an activity centre or in the case of this research project a department.

### ***Direct cost and Indirect cost***

The direct costs are those costs that easily can be identified with specific departments, products, or processes.<sup>1</sup> The direct costs without any intermediate link can directly be assigned to the cost units.<sup>2</sup>

The costs that logically cannot be allocated to a cost unit are allocated to a cost unit through a distributor.

The relationship of Direct and Indirect cost is illustrated in the figure below:



(modified Andersson, G., (1997))

### *Type of cost*

The costs that are of similar type or sort that can be assigned to the same type of cost. The number of different types of costs and their implications is adapted to the situation.<sup>3</sup>

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<sup>1</sup> Johansson, H. & Kaplan, R., (1987)

<sup>2</sup> Andersson, G., (1997)

<sup>3</sup> Ibid.

### *Cost unit*

Cost unit is that object that should carry or charge the cost. The cost unit is the final cost object in the cost estimation and can e.g. be a product, order, a customer, segments, market or other objects<sup>4</sup>.

### *Cost/Activity Centre*

A cost/activity centre is a department or function within a company that represents a limited and resource utilisation of similar kind. At a cost/activity centre some part of the businesses value adding process is performed. This performance demands a certain resource utilisation that incurs a certain cost. In this thesis a cost/activity centre is an organisational unit with its own cost responsibility.<sup>5</sup>

### ***Consultants***

Staff members that are rented over a period of time by recruitment companies and are not part of the employee base, are in this research project referred to as consultants.

### ***Cost Object***

The cost object is the product, customer or market that is the final output in the model. In this research project the cost objects are the profit centres which also can be labelled as the markets.

### ***General Ledger***

Definition:<sup>6</sup> “Accounting “book” of final entry where transactions are summarised in separate accounts, especially business activities and money received or paid. The book contains debits and credits and is posted to transcribe financial records from “books” of original entry.”

In this research project the “book” utilised is the computerised accounting system that Volvo Logistics Corporation enters all their economic data into. Economic figures presented in this research project all stem from this system which will be referred to as the ledger in *chapter 2*.

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<sup>4</sup> Andersson, G (1997)

<sup>5</sup> Ibid.

<sup>6</sup> Cambridge International Dictionary of English

**ABC** – Activity based Costing

**HR** - Human Resource

**VBC** - Volvo Bus Corporation

**VCC** - Volvo Car Corporation

**VLC** - Volvo Logistics Corporation, a sister company within the Volvo Group

**VLCI** - Volvo Logistics Corporation Inbound Division

**VLSO** - Volvo Logistics Scandinavia and Overseas

**VTC** - Volvo Truck Corporation





## Chapter One

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# THE INTRODUCTION

*This chapter will give an introduction to the subject of this research project. The introduction will discuss the subject, the purpose, the company analysed and the aim of the research project.*

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## 1.1 Background

The rapid changes in the business environment have created new obstacles for companies, which in turn imply a change in the business functions adequately to stay competitive in the emerging global market. Businesses must look beyond traditional ways of doing business and envision themselves to accomplish new, earlier not known, conquests. Recently the potential for logistics management has grown as an enabler to reach better understandings. The development of logistic management has been sped up by the increasing focus of co-operation in value chains, and increased decision-making capabilities through financial- warehousing- and inventory management principles.

Logistic management is defined by the Council of Logistic Management as the process:

*“... that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point-of-origin to the point-of-consumption in order to meet customers’ requirements”<sup>7</sup>*

From this broad definition it can be discussed that logistic management involves several different inputs to be planned, implemented and controlled in various forms.

One input is the financial resource that plays an important role in businesses today. Financial oriented information are used to plan, evaluate, and control as well as to assure appropriate use of resources. Discussions in management accounting literature accentuates that the most important role for financial information is the accurate identification, measurement, and allocation of costs.

It is of high importance for businesses to understand their true cost to be able to gain profits. This because the traditional well established profit-equation states:

$$Profit = Revenues - Expenses$$

In other words businesses must know their expenses so they can charge the customer the right price to cover their costs and expenses in order to gain profits. It is argued that different departments within an organisation often neglect this fundamental relationship of revenues and expenses.<sup>8</sup> From the perspective of sales and marketers, sales should be maximised without any concern for the expenses,

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<sup>7</sup> Council of Logistics Management

<sup>8</sup> Daly, J. L (2002)

on the other hand financial accountants often focus on cutting costs in order to fulfil the budget.

The financial resources have been identified as one of the future logistic challenges and potentials for improvement.<sup>9</sup> It is discussed that the necessary cost data has not been available in many companies, which have prevented the financial departments from having a true notion of their cost structure. Stock & Lambert<sup>10</sup> identify the development of logistic cost information for decision making and control, as one of the most critical tasks that today faces an organisation. This because the changes in the business prerequisites have prompted companies to focus increasingly on inbound and outbound flows of goods and services in a more cost-effective manner.

## **1.2 The importance of accurate cost data**

Most firms today use some sort of accounting system that assigns fixed costs to individual segments or products. This type of system does not provide the management with adequate decision support. The costs common in multiple segments may, according to Stock & Lambert<sup>11</sup>, be allocated to segments according to an arbitrary measure of activities. If this is the case vital cost information about the controllability and behaviour of segments are lost. Kaplan<sup>12</sup> refers to this dilemma when arguing that the identified costs usually have no relation to the true resource utilisation that is consumed to design, produce, market, and deliver the product or service. Careful cost analysis have shown that these non-related cost allocations within companies product lines have been considered to break even, when they actually have been among the company's most profitable. This distortion within product costs has in many cases led management to incorporate a strategy that may result in losing their competitive edge. The strategy can result in overpricing products that are profitable and incorrectly focusing on handling issues within non-profitable products. This is a situation that will lead the company into losing customers and their competitiveness will be reduced.

The traditional standard cost system focuses on accounting and tracing cost to cost centres using the traditional cost drivers such as labour and machine hours.

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<sup>9</sup> Stock J., R., & Lambert, D., M., (2001)

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Kaplan, R. (1988)

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Kaplan and Cooper<sup>13</sup> argue that these systems do not have the capability to accurately provide costs of resources used by activities, business processes, products, and customers. The traditional system is also accused of not providing accurate, timely, operational, process focused, and team-based measurements. It is also discussed that there is a focus on the performance of isolated and unlinked tasks and machines, concentrating on controlling costs to preset standards. These failures and lack of measurements prevent the essentials driving the continuous improvement and learning that are crucial for the business today with changing prerequisites and business environment.

It has been recognised that the general financial accounting methods are insufficient to provide the accurate cost information. Johnson and Kaplan<sup>14</sup> introduced an approach that challenged this dilemma called Activity-Based Costing. The notion of the concept is, according to management accounting literature, to reveal the true cost of businesses by allocating costs to the activities that actually consume resources to produce the product or service from the organisation. Thereby the knowledge of the cost and profitability of individual processes, products, services, customers, and operating units can be revealed.

### 1.3 Value-Perspective

It is discussed by Bowersox et. al.<sup>15</sup> that managerial accounting methods such as Activity-Based costing have potential to improve understanding of internal and external functional activities and thereby support the strategic and tactical decisions in the company. The author referred to argues that value-based management is an enabler towards this financial sophistication.

Bowersox et. al. state that the key is

*“...to identify and support activities that create value as contrasted to those that only increase revenue or decrease costs”<sup>16</sup>*

The different activities in a company can be categorised into primary and support activities according to Porters<sup>17</sup> concept of the Value Chain, the different activities are illustrated in *Figure 1.1*.

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<sup>13</sup> Kaplan, R. S. & Cooper, R. (1998)

<sup>14</sup> Johnson H. T. & Kaplan R. S.(1987)

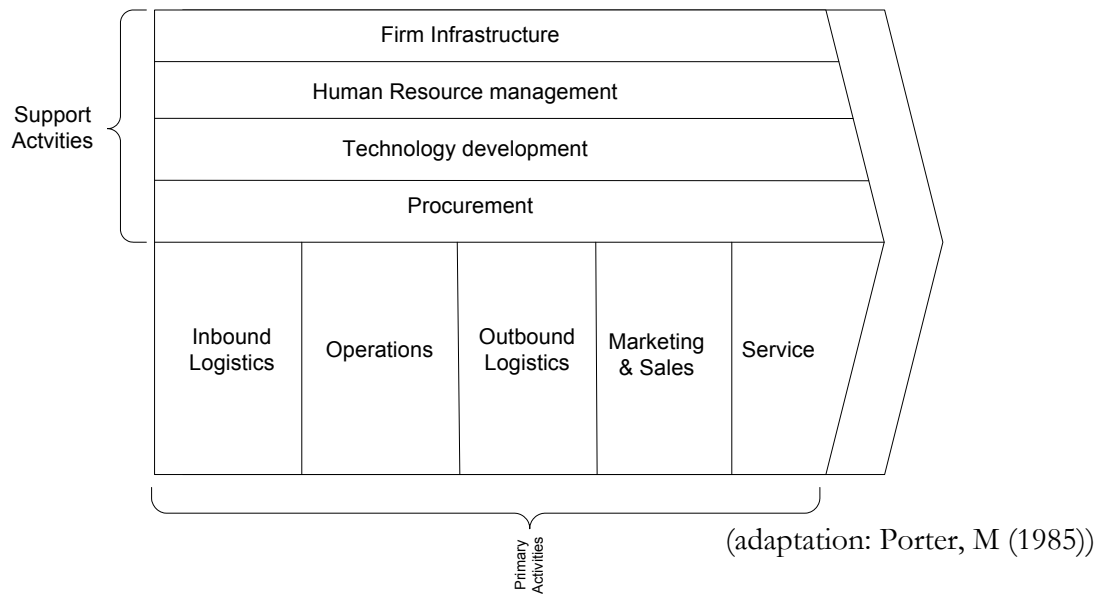
<sup>15</sup> Bowersox, D., J., et. al. (2002)

<sup>16</sup> Ibid. p 593

<sup>17</sup> Porter, M., E., (1985)

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Figure 1.1: Value Chain



Businesses today has to focus more and more resources on adding value to the products and services they provide, since the competition between corporations is fierce. This is discussed by Christopher<sup>18</sup> who states that the activities performed must deliver value to customers by performing the activities effectively and efficiently. It is therefore a necessity for companies today to focus on the value adding process and eliminate the non-value adding activities.

## 1.4 The Research Arena

This research project was initiated by Volvo Logistic Corporation who has identified a problem within their cost structure at their Inbound Division in Gothenburg. During discussions with the company an ABC analysis came up as a potential solution to the problem. The objective of this research project is to evaluate if the methodology will provide Volvo Logistics Corporation with valuable cost data that can be utilised in future business solutions. VLC has provided the necessary resources for this research project which will exclusively deal with the inbound department at Volvo Logistics Corporation. Thus the inbound logistics activities in Porters Value Chain will solely be focused on in this research project.

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<sup>18</sup> Christopher, M., (1998)

## 1.5 Presentation of Volvo Logistics Corporation

*This section will provide a description of Volvo Logistics Corporation, a detailed description of the different departments will be presented in chapter 5 and how they are linked to the company as a whole. The chapter will start with a short description of the Volvo Group of which Volvo Logistics Corporation is a subsidiary.*

## 1.6 The Volvo Group

Volvo, the largest industrial company in Sweden, started its business as a car manufacturer in 1927 and is today a broad enterprise within the transportation manufacturing industry. The Volvo Group have evolved into several different business areas, trucks, buses, construction equipment, marine and industrial engine manufacturing, civilian and military aviation engine equipment and financial services.

On the 6<sup>th</sup> of September 1925, two men Assar Gabrielsson, the businessman and Gustaf Larson, the technician had a mutual idea of starting a car manufacturing company. Both of them had investigated the possibility of establishing car manufacturing in Sweden. The name Volvo is Latin and stands for “I roll”. A year and a half later on the 14<sup>th</sup> of April 1927 the first car, “Jakob” rolled out from the factory in Gothenburg<sup>19</sup>. The first car was a success and a year later the first truck was shown to the public.

The years that followed, Volvo saw opportunities to start manufacturing in various fields within the transportation sector. Aircraft engines for both civilian and military use, construction equipment such as articulated haulers and excavators were introduced to the marketplace.

Volvo quickly became known for its innovation ability, and hold several patents that have revolutionised the industry. Volvo invented the seat-belt and became the first car manufacturer to install seat-belts as standard equipment. Volvos focus has always been on safety and environmental care for their customers in whatever field they produce products. This has led to the fact that the name is synonymous with safety and reliability.

In 1999, Volvo sold its car manufacturing company to Ford Motor Corporation. Volvo felt it could not keep up with the fierce competition within this field themselves and felt that the car manufacturing company would need the support

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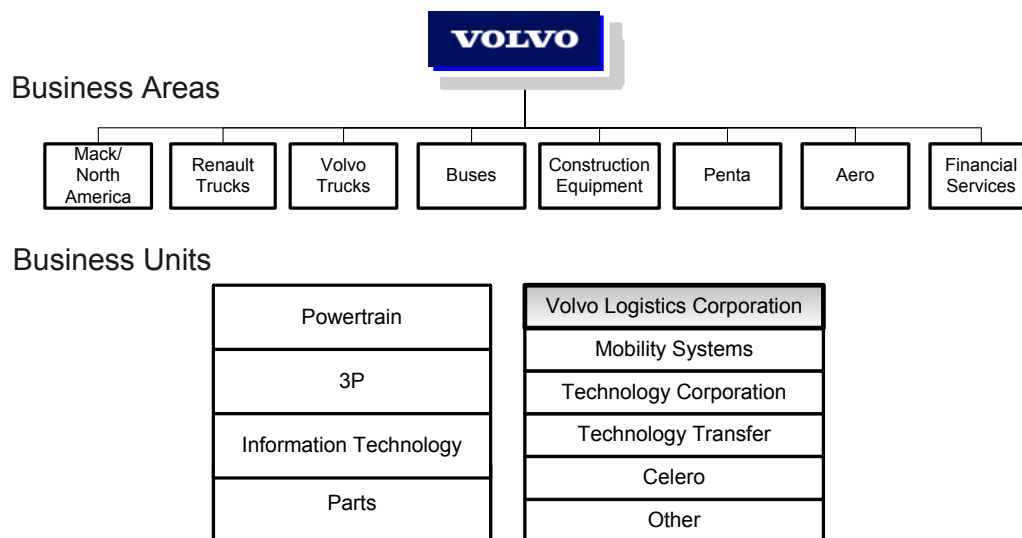
<sup>19</sup> Olsson, C. & Moberger, H., (1995)

of a larger owner. The cost of developing new models was something that prompted the sale. Volvo Car Corporation (VCC) is now a subsidiary of Ford Motor Corporation.

Even though the car manufacturing company and Volvo companies do not belong to the same corporation anymore, there exists collaboration on the technical and service side. One such collaboration is between Volvo Logistics Corporation, which is a sister company to AB Volvo, and Volvo Car Corporation. Volvo Logistics Corporation handles all the material movements to all the car manufacturing facilities. VLC also handles the shipments from the factory to the end consumer. Volvo Car Corporation is considered to manufacture premium cars, the corporation is now included in Ford Motor Company and contributes some 120,000 million SEK<sup>20</sup> to Ford and employs 27,000 people.

The turnover for the Volvo Group in 2002 was 177,080 million SEK<sup>21</sup>, which was a decrease of 2% from the previous year. The group employed 70,546 people during 2002 which is an increase of 500 staff members from the year before.

Figure 1.2: AB Volvo structure



(Volvo internal material)

## 1.7 Volvo Logistics Corporation

Volvo Logistics Corporation is a sister company within the Volvo Group as can be seen in *Figure 1.2*, the company develops and provides transport and logistics solutions for the Volvo Group as a whole. Its main customer is Volvo Car Corporation, which now is owned by the Ford Motor Company. When VCC was

<sup>20</sup> Dagens Industri, available 2003-08-25

<sup>21</sup> The Volvo Group – Financial Report 2002

sold, VLC went from having its main customer within the Volvo group, to having an external customer from the group. Having its main source of business external of the Volvo group, means that VLC is very dependent upon VCC. In 2001 VCC stood for 49% of the total turnover. Therefore VLC now concentrates on minimising its dependence on the car corporation, by handling more of the material movements for the different sub companies within the Volvo Group. There is also a great deal of concentration on trying to find customers external to the Volvo Group. An illustration of the various customers that VLC has within the Volvo Groups as the external customers can be found in *appendix 1*.

Today VLC employs around 800 staff members worldwide. In North America and Europe there are around 120 staff members respectively. In 2002 the total turnover for the corporation was SEK 6 billion which was an increase from SEK 4 billion in 2000. The reason for the big increase is because of the transition of handling more of the material movements for the entire group.<sup>22</sup>

Volvo Logistics Corporation is divided into three major business areas, Volvo Logistics Scandinavia & Overseas, Volvo Logistics Europe and Volvo Logistics North America. An organisation chart of the entire corporation can be found in *appendix 2*.

Within Volvo Logistics Scandinavia & Overseas (VLSO) there are three subdivisions, Inbound, Outbound and Packaging and wrapping. Inbound handles all the material movements between the factories within the Volvo Group, there are 130 factories and warehouses in total that are supplied with material from the inbound division. Outbound handles the movement of the finished products from the factories such as cars, trucks and buses to the end customer. Packaging & wrapping handles all the surrounding material required to ensure that a correct and safe transfer of the goods is conducted. A complete organisation chart of Volvo Logistics Scandinavia & Overseas can be found in *appendix 3*.

### ***Volvo Logistics Corporation Inbound Division***

Inbound division, henceforth VLCI, is responsible for delivering material, information and inventory from suppliers across the world to all of Volvos production plants and warehouses. Inbound is an integrated part of their customers Value Chain and the work is to constantly improve the total logistic solution in both monetary terms and flexibility which enables precision and minimises the impact on the environment. As the inbound department can focus

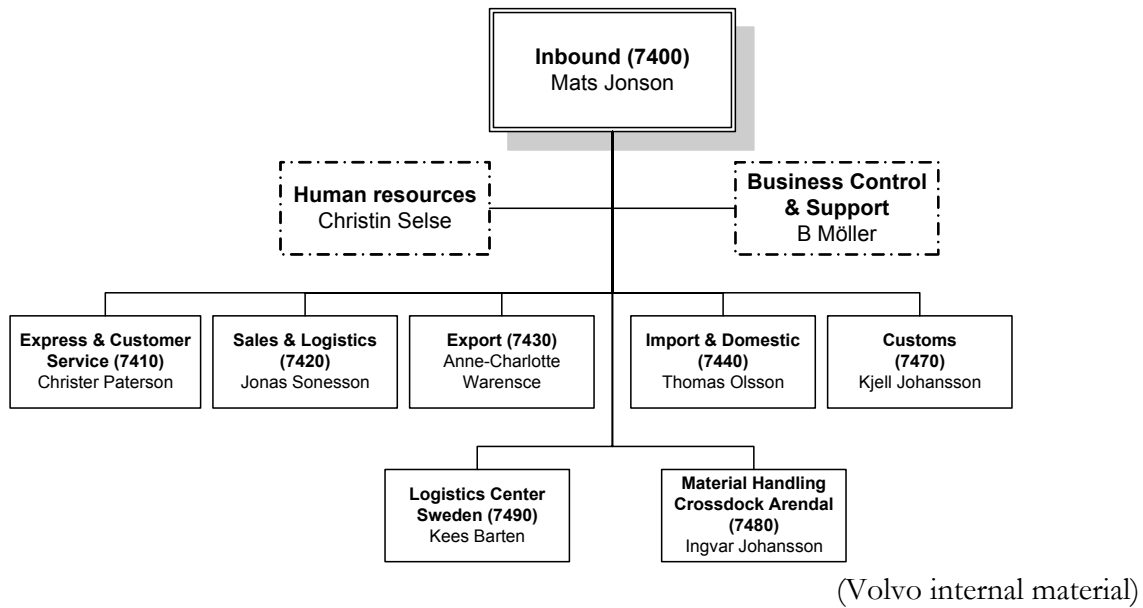
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<sup>22</sup> Volvo Internal Presentation Material (2002)



on their customers logistics, the result of the total work should contribute to strengthening the customer's position in their respective field of business.

*Figure 1.3 Volvo Logistics Corporation, Inbound division*



Inbound within Volvo Logistics consists of seven departments as can be seen in *Figure 1.3*, the respective departments will further be presented in terms of their function and how the departments are inter-connected in more detail in chapter 5.

These departments handle annually 3 500 material suppliers across the globe. This demands an organisation that is structured and consistent. There are over 250 different locations globally that goods are sent to. All in all around 950 000 shipments take place per year which equates to 2 600 shipments per day counted on every day of the year. VLC have to be available to their customers around the clock every day in order to guarantee the best logistics solutions possible and to eliminate stops in the production plants.

Some of the services that VLCI are able to provide for their customers and future business prospects are material planning, traffic management and material control, warehousing, express services, customs services as well as sequencing directly into production. This means that Volvo Logistics can fulfil most of the activities required by a customer within inbound activities in a company's value chain. This is something that the staff at VLC is aware of and continuously improves upon.

## 1.8 The problem

This research project will focus on the financial recourses since there is a need for investigating the potential for obtaining sufficient costs information at Volvo Logistics Corporation Inbound division (VLCI).

The company, VLCI, has today limited knowledge of their costs for individual logistic processes and the resource utilisation of these.

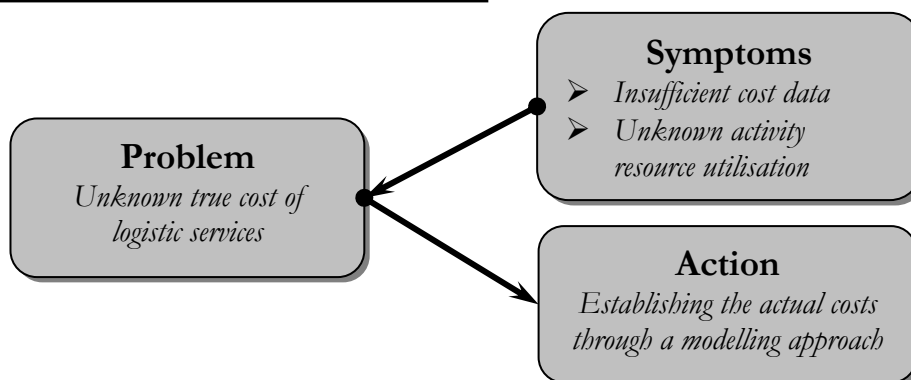
At present there is a lack of a comprehensive cost model at VLCI that assists the daily business in a satisfying manner. The cost distribution today to the different departments is inaccurate, and it is questioned if the costs are reflecting the true resource consumption of each logistic service process preformed. In other words VLCI lacks insufficient cost data to reveal the true cost of business and thereby do not utilise the possible true potential in profit maximisation for their logistic services.

The underlying problem is that the resource utilisation of the different processes is partly unknown concerning the cost for a specific logistic service. This results in uncertainty when it comes to cost structure assumption for a certain product/services or customer market.

VLCI desires to obtain knowledge of the true cost of business to be able to evaluate present and future products, services or customers from a cost structure perspective. Further there is a need for a cost measurement system can create a foundation for pricing policies. The cost and resource utilisation for each profit centre has to be known in order to achieve profitability.

The problem structure is illustrated in *Figure 1.4*

*Figure 1.4: Problem Structure*



## 1.9 Purpose and scope of the research project

The general purpose of the research project is to provide an understanding of how a cost measurement system at a logistic service provider, such as VLCI, can be established through cost modelling methodology. This general purpose consists of two sub-purposes.

- The first sub-purpose is to provide VLCI with a cost measurement system that makes sufficient cost data available. That together with revealing the level of resource utilisation of their different logistic service processes at market level.
- The second sub-purpose is to analyse what form of benefit and potential an accurate cost model can provide VLCI with. This will provide information regarding processes that potentially can be improved.

The scope is to define a cost measurement model for logistic services and resource utilisation through an ABC analysis in a conceptual model framework. The goal is to allocate the true costs to the right cost objects that enable VLCI to identify where costs are incurred. The intention of the framework is that it could be used when evaluating present and future customers or business solutions.

## 1.10 Research Questions

The introductory section thus far discussed has enabled a precision of the research questions to be investigated. The research questions reflect the purpose and scope and will specify the direct issues to be investigated in detail throughout the research project. The specified answers obtained during the research project will be concretised in detail in the concluding section.

***How is it possible through a conceptual cost model to reveal the cost of logistic services at a logistic service provider?***

- What determines the difference between the resource utilisation of the profit centres?

***What benefit and potential can a cost model provide Volvo Logistics Corporation?***

- What is the significance of accurate cost information for the processes at Volvo Logistics Corporation?
  - Will there be any consequences of revealing the true cost at Volvo Logistics Corporation?
-

### **1.11 Limitations**

This research project will focus on the direct costs, departments specific overhead and the indirect costs which are overhead costs. These costs will be allocated to each profit centre, in this case the different markets. The direct costs for the transports are excluded since VLCI already have sufficient cost data for these at market level.

Further the activities studied are solely the inbound activities in the value chain inbound process. The possible influence from external forces is not taken into consideration when allocating the costs.

The modelling will be performed solely for Volvo Logistic Inbound, and this research project will only deal with development of the actual cost model. The implementation process into the organisation is not considered other than as an introductory discussion of how it can be utilised.

According to theory used in this research project, Activity Based Costing should investigate activities performed in detail. We have limited this research to group activities into processes that form the activity centres. This is to be able to provide a holistic viewpoint of all activity centres and to avoid complexity of the model.

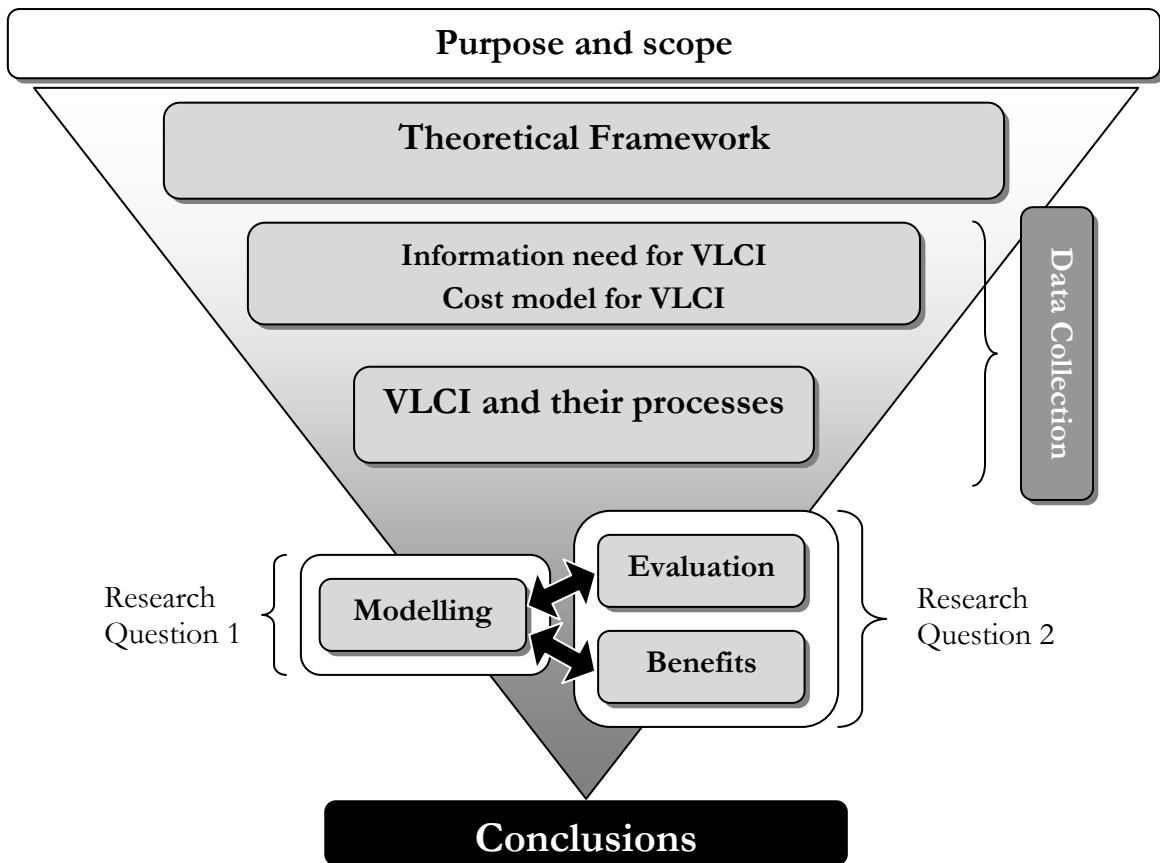
We have chosen to use certain statistics available at VLCI since it already is valid, this because when creating a cost measurement model the data collection process is time consuming.

According to company secrecy all figures presented in the research project have been altered and does not in any aspect reflect the true figures at VLCI.

### **1.12 Research project outline**

The research approach and the structure of the research project is illustrated in *Figure 1.5* to provide an understanding of the research approach and where the research questions are answered. Further a brief presentation of the content of each chapter will be presented to introduce the reader to each chapter's contents. To obtain knowledge of how the actual cost modelling at VLCI is done we recommend chapters 3, 5, 6 and 8 to the reader. To acquire a theoretical view of how a cost model can be concretised we suggest chapters 2, 3, 6, 7 and 8.

Figure 1.5: Research structure



***Chapter 1 The Introduction***

This introduction chapter introduces the reader to this research project. The purpose and the research questions are stated as well as the limitations.

***Chapter 2 Theoretical Framework***

Appropriate theories are presented in order to provide understanding of the subject studied. These theories state the information needs and support the analysis process to be able to fulfil the purpose.

***Chapter 3 Cost model at Volvo Logistics Inbound***

The theories presented in the previous chapter are adapted to suit cost modelling at VLCI. The information need in the different phases for the cost model at VLCI is stated.

***Chapter 4 Research Design Methodology***

The methodology for collecting the appropriate data in order to fulfil the information need is presented.

***Chapter 5 Phase I VLC Inbound and their processes***

The result from the data collection is presented in this empirical chapter, how the different departments function, and the resources to be allocated in the ABC model.

***Chapter 6 Phase II Analysis and model application***

Through this analysis the development of the model and the allocation of the different resources takes place. This chapter serves as the foundation to the first research question.

***Chapter 7 Phase III Evaluation and discussion***

The model is evaluated, discussed and analysed from a holistic perspective. The benefits and potential of the model are discussed. This chapter serves as the foundation to the second research question.

***Chapter 8 Conclusions***

The conclusions are drawn from the analysis process and output from the model. The conclusions reflect the research questions stated in the introductory section and are presented in a conclusion framework.

***Chapter 9 Final Discussion***

The validity of this research project as well as our final reflections and suggestions for further research are discussed in this chapter.

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## Chapter Two

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# THEORETICAL FRAMEWORK

*The theoretical chapter will discuss the relevant theories required to fulfil the purpose and scope of this research project. The theories are presented in sequence in order to provide a foundation for further investigation. The theories are consciously presented at a higher level and the most elementary knowledge about logistics and economics is a prerequisite. In order to obtain a deeper knowledge about theories please refer to the reference list for adequate literature.*

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## 2.1 The challenge of economic modelling

A model is a simplified version of a more complex reality and can be used to understand a certain phenomenon or provide an understanding of the businesses in a company. A model can also give the opportunity to evaluate and develop the business by allowing different scenario testing to investigate different cause-and-effect relationships. According to Hicks<sup>23</sup> an economic model can describe a simplification of a business cost behaviour that will take place under the reality of everyday business. The referred author also discusses that an economic model can take different forms and a phenomenon can be described in many different ways depending on each specific situation's prerequisite. It is therefore important to understand that a model suitable for one company can be totally inappropriate for another. Since a model is a simplification of the reality, the validity for a model is important as well as the trade-off between complexity and usefulness. Griful-Miquela<sup>24</sup> discusses that the usefulness of a model depends on its capacity to generate and illustrate the right information to make the right managerial decisions. If the model is too complex it might not be used and if the model is too elementary the information output from the model may not give the best decision-making grounds. The dilemma is illustrated by Albert Einstein's famous words:

*"...Everything should be done as simply as possible - but no simpler than that..."*<sup>25</sup>

A cost model can be defined as the tool that companies use in order to understand the cost which runs their business. This definition can be traced from Kaplan and Cooper's<sup>26</sup> discussions of the main functions for a cost model, these are:

- Valuation of inventory and measurement of the cost of goods and services sold for financial purposes.
- Estimation of the cost of activities, products, services and customers.
- Provide economic feedback to managers and staff in general about process efficiency.

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<sup>23</sup> Hicks, S. T. (1999)

<sup>24</sup> Griful-Miquela, C (2001)

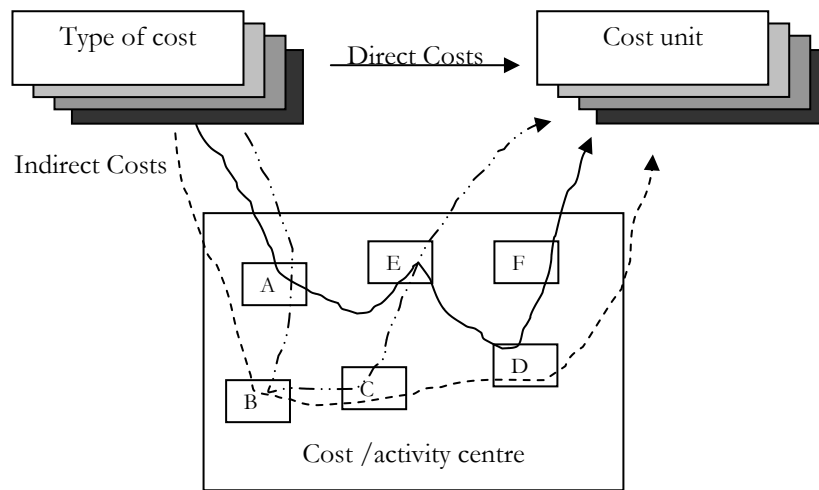
<sup>25</sup> Nilsson A G., et. al., (1999), p. 151 ff

<sup>26</sup> Kaplan, R. S. & Cooper, R. (1998)

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Figure 2.1 Function of a cost model



(modified Andersson, G., (1997))

Figure 2.1 illustrates the complexity of the distribution of indirect costs in a company. According to Andersson<sup>27</sup> the cost unit can involve several different, up to many hundreds, cost centres (A-F) and for every cost centre there is a unique distribution key. By this the cost unit incurs cost for the utilised cost centre. The author argues that the more cost centres there are, the easier it is to structure them to gain a more an equal and true picture. It is, though as literature in the subject argues, of great importance to consider the trade-off between exactness of the model and the simplicity of it.

Traditional management accounting were claimed to not give managers adequate support for decision making that they required to efficiently operate and measure costs in the late 1980's. Johnson and Kaplan<sup>28</sup> argue that traditional accounting systems provided few benefits to organisations and even encouraged bad decisions. One important reason was that the evolution of cost systems had not kept up with the changing business environment and that the traditional accounting system was an obsolete tool in the extremely different, complex, and competitive environment that existed now.

One other important consequence of the failings in the traditional accounting system is according to Johnson and Kaplan that the system fails to provide accurate product costs. Costs are often distributed to products by direct labour, which does not represent the true resource utilisation of the product. Thereby the

<sup>27</sup> Andersson, G. (1997)

<sup>28</sup> Johnson H. T. & Kaplan R. S.(1987)

true cost is unknown and Griful-Miquela<sup>29</sup> argues that because of this companies do not know whether their products or services or even their customers are profitable.

To deal with these problems a new theoretical approach was introduced by Johnson and Kaplan<sup>30</sup> thereby the traditional accounting system was challenged by the later known concept of Activity-Based Costing. The essence of the concept is, according to management accounting literature, to reveal the true cost of businesses by allocating costs to the activities that consume resources to produce the product or service from the organisation. Thereby the knowledge of the cost and profitability of individual products, services, customers, and operating units can be revealed.

## 2.2 Activity-Based Costing

The notion of Activity-Based Costing (*henceforth ABC*) is, according to management accounting literature<sup>31</sup>, as the name suggests, a concept to identify and trace the cost of the activity performed in the sense that all costs are regarded as indirect. This is in contradiction to traditional accounting where the direct or indirect costs are allocated to the product or service, using volume based measures such as direct labour, and machine hours.

Johnson and Kaplan<sup>32</sup> were considered the founding fathers of the ABC concept in the late 1980's when they challenged the traditional management accounting system with their theoretical approach of allocating cost. Since then the concept has been widely discussed in literature and has had many different definitions. The definition of ABC methodology used in this project is Hicks<sup>33</sup> definition, which has certain fundamentals, which is frequently used :

*“Activity-based costing is a cost accounting concept based on the premise that products require an organisation to perform activities and that those activities require an organisation to incur costs. In activity-based costing, systems are designed so that any costs that cannot be attributed directly to a product flow into the activities that make them necessary and that the cost of each activity then flows to the product(s) that make the activity necessary based on their respective consumption of that activity.”*<sup>34</sup>

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<sup>29</sup>Griful-Miquela, C (2001)

<sup>30</sup> Johnson H. T. & Kaplan R. S.(1987)

<sup>31</sup> For example Johnson H. T. & Kaplan R. S., (1987), Hicks, D.T., (1992), Kaplan, R.S., & Cooper, R.(1998)

<sup>32</sup> Johnson H. T. & Kaplan R. S.(1987)

<sup>33</sup> Hicks, D. T (1992)

<sup>34</sup> Ibid. p 33

The meaning of the product in this definition is the good or service that the organisation offers for sale. These products require certain activities that are performed within an organisation that in turn consume resources. The cost can either be directly attributed to product or indirectly attributed by charging the cost to the activity that causes the cost and then to the product that makes the activity necessary.<sup>35</sup>

According to Kaplan and Cooper<sup>36</sup> a proper ABC model should address the following questions:

- What activities are being performed by the organisational resources?
- How much does it cost to perform organisational activities and business processes?
- Why does the organisation need to perform activities and business processes?
- How much of each activity is required for the organisation's products, services, and customers.

By answering these questions the ABC model illustrates an economic map of the organisation's expenses and profitability based on organisational activities. The map provides companies with an understanding for their operations as Cooper and Kaplan expresses it:

*"... by revealing the existing and ... forecasted cost of activities and business processes, which, in turn, leads to knowledge of the cost and profitability of individual products, services, customers, and operating units."*<sup>37</sup>

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<sup>35</sup> Hicks, D. T (1992)

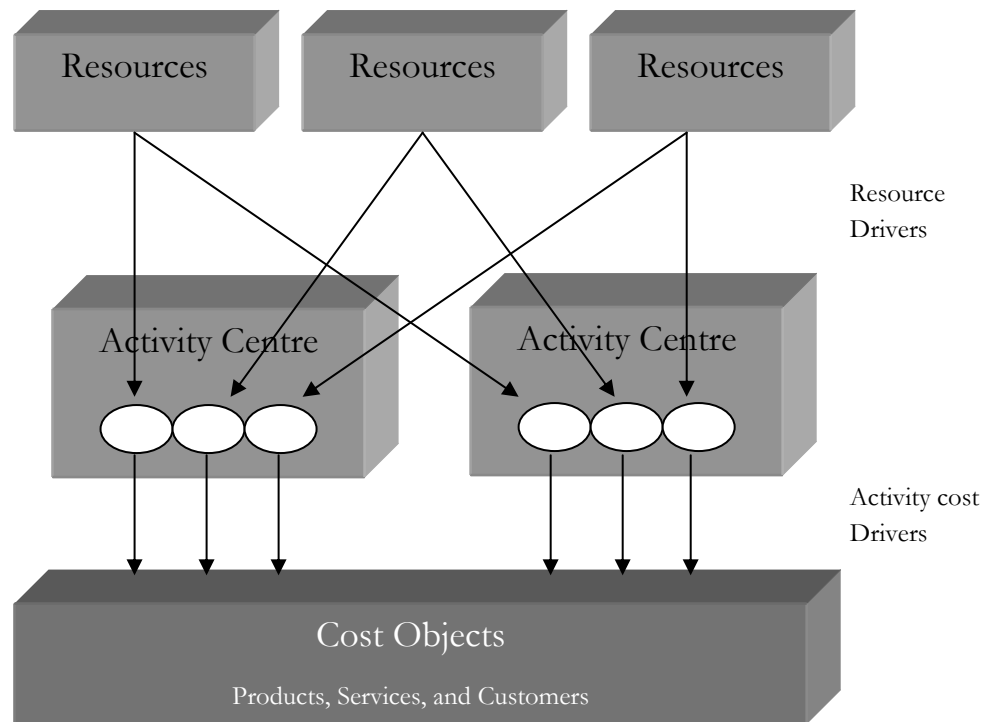
<sup>36</sup> Kaplan, R. S. & Cooper, R. (1998)

<sup>37</sup> Ibid. p. 80

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Pohlen & La Londe<sup>38</sup> argue that the assumption is that an activity causes costs, allows the ABC approach to be divided into two stages (see *Figure 2.2*) when allocating costs to the cost object / product or service.

*Figure 2.2 ABC illustration of the distribution of resources to cost objects*



(adaptation Pohlen & Lalonde (1994),  
and Anderson G, (1997))

First the focus is to trace and determine the costs of resources to the activity within the organisation. The resource drivers trace the consumption of resources by activities. It can be stated that the activities consume resources through the resource drivers or the work performed in the company. The costs of performing specific activities are then combined into cost centres at activity level.

The second stage uses activity cost drivers to trace the activity to cost objects that consume the activities. The activity cost driver traces the activity costs to the products, or cost objects.

<sup>38</sup> Pohlen T., & La Londe, B., (1994)

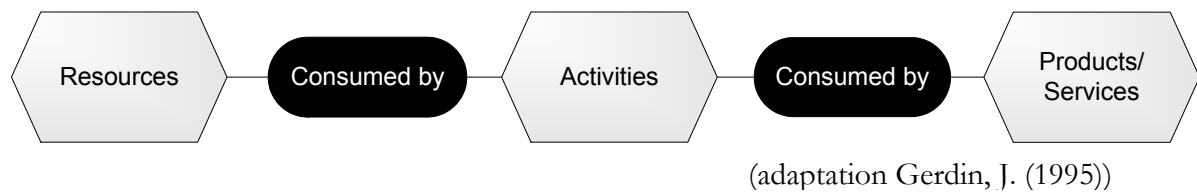
### 2.3 Resources for enabling ABC

The resources are those production factors that are required to perform an activity. Stock & Lambert<sup>39</sup> state that most resources in any company can be divided into the following major categories:

- Labour
- Equipment
- Property
- Material
- Facilities
- Capital

By using an illustration of the truck driving activity in the delivery process, resources that are used include: labour, the driver's compensation, equipment in the form of a truck, and capital the money used to pay the price of gasoline and oil. According to Griful-Miquela<sup>40</sup> all of these resources and others depend on how the activity is performed, and can be identified with the activity of driving the truck. *Figure 2.3* illustrates how products consume resources:

*Figure 2.3: Consumption of resources by cost objects*



### 2.4 Activities and Cost Drivers for ABC

An activity is usually defined as processes or procedures that create work and together form an activity centre.<sup>41</sup> Andersson<sup>42</sup> states that an activity concerns a limited assignment for example stuffing a container, or inspection or goods reception.

Each activity consumes, as stated previously, resources. A cost driver can trace the cost for each activity to the cost object. The cost data from the ledger must be allocated to specific activities. Lin et. al.<sup>43</sup> point out that in order to allocate the cost of labour to an activity, each employee's time and pay rate must be determined and traced to that activity. Some of the costs will be traced directly

<sup>39</sup> Stock J., R., & Lambert, D., M., (2001)

<sup>40</sup> Griful-Miquela, C., (2001)

<sup>41</sup> Hicks, D. T (1992)

<sup>42</sup> Andersson, G., (1997)

<sup>43</sup> Turney, P., (1996)

from the ledger to the activity, while others will require interviews with employees and the conducting of on-site observation in order to determine how much of a resource is consumed in the activity.

An example of this is that one member of a staff might spend 100 percent of his/her time on a specific activity, which makes cost tracing from the ledger easier, another member might only spend small amounts of time on one task at a time making the tracing process difficult. Due to the indirect nature of the costs this can be a difficult step in the implementation process.

Within ABC, the concept of cost-drivers is used in order to identify the cause and effect relationship between consumption of resources and performance of activities. A cost-driver is simply a factor that causes or influences costs. Griful-Miquela<sup>44</sup> mentions that when selecting cost drivers, three factors should be taken into account:

- How easy is it to obtain the data required by the cost driver?
- How does the actual consumption of the activity correlate with the consumption implied by the cost driver?
- What behaviour does the cost driver induce?

Griful-Miquela<sup>45</sup> discusses that it is important to identify the most relevant cost drivers for each activity. Lin et. al.<sup>46</sup> agrees and discusses that each cost object has at least one cost driver, some cost objects may have numerous drivers. The most relevant cost driver can often be determined by questioning those members of the staff that are the most familiar with the activity to indicate which factor causes an increase or decrease in the time and effort spent on the activity.

Lin et. al.<sup>47</sup> mention that the cost driver should have a direct relationship with the amount of effort required to perform the task. A description of this would be for example an order-picking situation, the number of cases per order would be a better cost driver than the number of orders if each case for an order has to be handled, because an order with more cases requires more effort and time and thus more resources and costs to perform. Another way of finding the true cause and effect relationship of a cost driver is to run correlation analysis on a spread sheet software program. A driver whose level of activity is more highly correlated with the amount of resources consumed is a more relevant cost driver.

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<sup>44</sup> Griful-Miquela, C., (2001)

<sup>45</sup> Ibid.

<sup>46</sup> Lin, B., Collins, J., & Su, R., (2001)

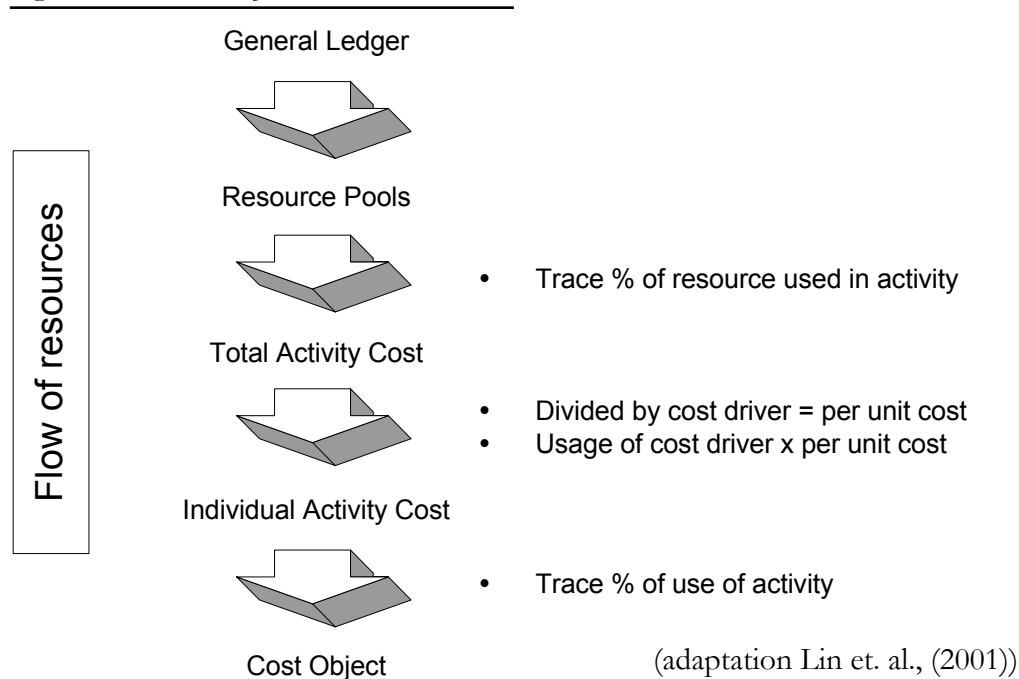
<sup>47</sup> Ibid.

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A cost driver is usually expressed as a cost per unit basis. Lin et. al.<sup>48</sup> argue that the cost driver could be expressed as a monetary amount per object handled, derived by dividing the total cost of resources used by the activity, such as the labour hours spent or equipment utilised in the activity, by the number of cases handled. Activity Based Costing multiplies the usage amount of a cost driver in performing an activity by the unit cost of the driver to determine the total cost of the activity for a cost object. Therefore Lin et. al. stress that each activity would be assigned a different cost proportionate to the number of objects handled.

The notion of cost drivers are illustrated in *Figure 2.4*

*Figure 2.4: Resource information in ABC*



## 2.5 Potential of ABC in a Service industry

As discussed ABC provides information for the cost of activities, business processes, products, and customers. In the service industry the demand for this cost information arises from, according to Cooper and Kaplan<sup>49</sup>, three broad categories of managerial decision.

First of all, the managing of products and customers since service companies often offers a high diversity of products. For example a logistic provider offers different logistic services solutions to different markets to different destinations. The variation of possible combination of activities is significant. Each of these

<sup>48</sup> Lin, B., Collins, J., & Su, R., (2001)

<sup>49</sup> Kaplan, R. S. & Cooper, R. (1998)

service packages can be seen as one unique product with different demands on the organisation's resources. Therefore it is of high importance to investigate the cost structure for each of these products to be able to evaluate the price, quality and profitability for the individual products. Furthermore, the authors state that service companies operating costs are determined by the customer behaviour and that the customers completely determine the quantity of activities demanded. This is since different customers have different requirements and the variation in profitability may vary from customer to customer. There might be customers that are highly profitable but utilise modest resources and in contradiction customers that utilise significant resources with low profitability.

An ABC system will provide information about customers that can be used in intelligent decision making for individual customers over time. It might be difficult for a service company to investigate at individual customer levels since a company can have a considerably number of different customers. Therefore a company must group the customers in manageable market segments. The ABC system might calculate cost at segment level and thereby provide an understanding of which segments are the most important to target and retain, and which to de-emphasise.<sup>50</sup>

Secondarily, ABC can provide information of the preference of different customers in different segments and thereby offer potential to configure the customer service delivery chain. The company can tailor their offerings and the method of delivery to achieve the demands of the different customers. The ABC analysis can also investigate the opportunities reengineering business processes that are valued for each segment. The ABC analysis in combination with information about attributes and features valued by customers in different segments give a powerful foundation for the best decision making possible.<sup>51</sup>

Thirdly, ABC will facilitate decisions on the appropriate supply of resources. This since ABC links the organisational spending to the resource capabilities to the activities performed to the demands of individual products or customers.<sup>52</sup>

Other rationales, discussed in management accounting literature, for using ABC can be that ABC can increase the visibility that management has into how products, customers, or supply channels consume work and resources. The non-financial information produced by the ABC model facilitates the development of

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<sup>50</sup> Kaplan, R. S. & Cooper, R. (1998)

<sup>51</sup> Ibid.

<sup>52</sup> Ibid.



performance measures and continuous process improvement<sup>53</sup>. Grifol-Miquela<sup>54</sup> argues that by using ABC it is possible to analyse costs by areas of managerial responsibility and customers. ABC helps to recognise the way in which customers directly affect the cost structure of the business and therefore helps to analyse customer profitability.

A reduction in uncertainty provided by ABC will ensure a more solid basis for strategic decisions. Consequently the success of ABC might not depend only on the results of the analysis, but on the ability to provide a correct diagnosis of the situation that the company might be in at present.<sup>55</sup>

## 2.6 Value aspect of ABC

The value aspect of an activity is important for businesses to understand in order to be able to improve their future business and gain competitive advantages over their competitors. The value of an activity can be analysed established on the better information basis that the ABC-analysis provides. The use of the ABC information is referred to by Kaplan & Cooper<sup>56</sup> as Activity-Based Management (ABM). ABM has an objective to accomplish the organisation to achieve the same or better outcomes at a lower total cost by spending at the lower level of the organisational resources. ABM focuses on actions to do things the right way (e.g. increase efficiency or lower cost) and doing the right things by for example altering the demand to more profitable products or services.<sup>57</sup>

The definition of what value adding activities are varies and depends on the purpose of the value assessment of the activity. According to Kaplan & Cooper<sup>58</sup> a common definition of what value adding activities are, is an activity that adds value from a value chain perspective or that the activity is performed as efficiently as possible, or that the activity supports the objectives of producing the output. Issues to regard when analysing value:

- People cannot define consistently what a value- or non-value activity is. For example an activity by itself may not be value adding, but in combination with other activities it is a necessity in order to produce the product or service required. E.g. charging of the truck battery.

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<sup>53</sup> Pohlen, T., Londe, B., (1994)

<sup>54</sup> Grifol-Miquela, C., (2001)

<sup>55</sup> Pohlen, T., Londe, B., (1994)

<sup>56</sup> Kaplan, R.S, Cooper, R. (1998)

<sup>57</sup> Ibid.

<sup>58</sup> Ibid.

- The assessment gives no clear guidelines of the best opportunities to improve the business and reduce costs. It is discussed whether a non – value adding activity can be eliminated without reducing the product or serviced value delivered to customers. This in turn can lead to delays and thereby decreasing value of the product or service.
- The perception of the employees. If an employee is informed that he/she is performing a non-value adding activity the employee would in most certainly be insulted, and the productivity of the individual might decrease.

To measure value is very difficult since value is not built on any specific numbers, value is perceived and therefore companies have to estimate how much value they possibly can deliver to their customers. Value can be measured by a supplier for example in the form of fulfilled deliveries, a supplier can only measure how good they are at achieving what they have promised, they can not measure what level of value the customer feels they are getting.

Two approaches to improve the worth of a product are:

- Create improvements in the product or service so that the perceived worth is increased whereby value has been created or
- Reduce the production cost throughout the entire value chain, thereby the price can be set lower which results in the worth relative to the price being increased.

## **2.7 Disadvantages and Predicaments with ABC**

There exist reasons to doubt the excellence of the ABC approach as it is thought of as the solution to all problems within profitability at a company. Jensen<sup>59</sup> stresses coherently that the ABC model does not aim to allocate all resources consumed. It is argued that if 75-80 % of a company resources are allocated to the right cost objects, this as is adequate. Otherwise there is a risk of the whole ABC-model acting a cost driver itself.

One qualification within ABC is that the entire organisation can be divided into activities. If the cost for the different activities is to be distributed to the activity centres, the activities have to be conducted regularly and in the same manner over time. This means that activities within a specific project are not well suited for ABC. Another objection against ABC according to Gerdin<sup>60</sup> is that the

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<sup>59</sup> Jensen M., (1994,)

<sup>60</sup> Gerdin, J., (1995)

calculations model barely gives a basis for management decision, since ABC gives nothing more than a moment's glance at previous occurrences within the organisation. If however the calculation is to be used in the future, then it should reflect future costs which most probably will be the result from a plan of action.

Further Gerdin<sup>61</sup> argues that ABC is cost fixated and does not take into consideration the connection that exists between the income and the expenses. Some income is obtained by providing a customer with other less profitable activities and services. Therefore it is more interesting and better to calculate on the entire package than to focus on single activities. If too much focus is given to profitability of each activity, there is a risk that the company prioritises those which are just that and do not consider those which the customers actually demands.

Griful-Miquela<sup>62</sup> argues that the disadvantages extracted from a study based on the answers of several companies after one year of using ABC is that, a great deal of work is involved, difficulties in collecting data, cost management is difficult because of several activities having cross department boundaries. Additionally implementation is time consuming, requiring not only gathering and processing of data but it is also difficult according to Griful-Miquela to interpret the results correctly. These are some of the problems within ABC, nevertheless the methodology provides for the possibility of producing a good base for future development.

Lin et. al.<sup>63</sup> point to the fact that there are several managerial implications concerning ABC. Some drawbacks are the lack of perfect cost data, loss of customer focus, and the potentially negative effect of internal politics.

### ***Lack of perfect cost data***

In every cost accounting system there are flaws because of the near impossibility of tracking and attaching every resource cost to a particular activity. Some activities might not be identifiable or measurable without a significant amount of effort and cost. Lin et. al.<sup>64</sup> then mean that the cost of such activities may not be calculated for practical reasons. The ABC system does help bring true costs to light, managers should always now to consider the fact that perfect cost data does not exist.

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<sup>61</sup> Gerdin, J., (1995)

<sup>62</sup> Griful-Miquela, C., (2001)

<sup>63</sup> Lin, B., Collins, J., Su, R., (2001)

<sup>64</sup> Ibid.

***Loss of customer focus***

The entire output of the logistics function is customer service, the cost information provided by the ABC system should be used to focus better on customers as well as improve the profit potential. When analysing the results from the ABC analysis there is a chance that management only focus on the costs and do not consider the implication a cost reduction might have on customer service.

***Effect of internal politics***

Since ABC provides answers to questions concerning the performance of a company some answers might not be well received. Some changes may have to be made, which could result in job losses or reorganising the entire company. People can be hesitant to changes that inevitably have to be made therefore there can be internal problems. Therefore it is very important that the possible result handling of ABC is stated at the beginning of the project so that misunderstandings can be avoided.

**2.8 Principles for model building**

There are problems according to Lin et. al.<sup>65</sup> that apply to any major change in information systems other than cost and time. The authors mention that these factors often can be offset by the advantages obtained from the new system. There are several techniques to help defy the disadvantages of the ABC system, these are:

- Keep it simple – there is no end to the number of activities and cost drivers within an organisation. Do not over analyse as this might not provide any benefit for the study as a whole. Only use relevant information.
- Set a reasonable time frame – a realistic, aggressive time frame is six months to a year depending on the scope. If the time frame is extended the work will lose its momentum and support from those involved.
- Induce management to change – make sure that the management supports the project. ABC requires a fresh perspective and outlook for all parties. If support is lacking point out the potential benefits in order to secure the support to 100%.
- Start where it matters – ABC will not affect all areas of a company in the same way. Start where it really matters, where management feels that most

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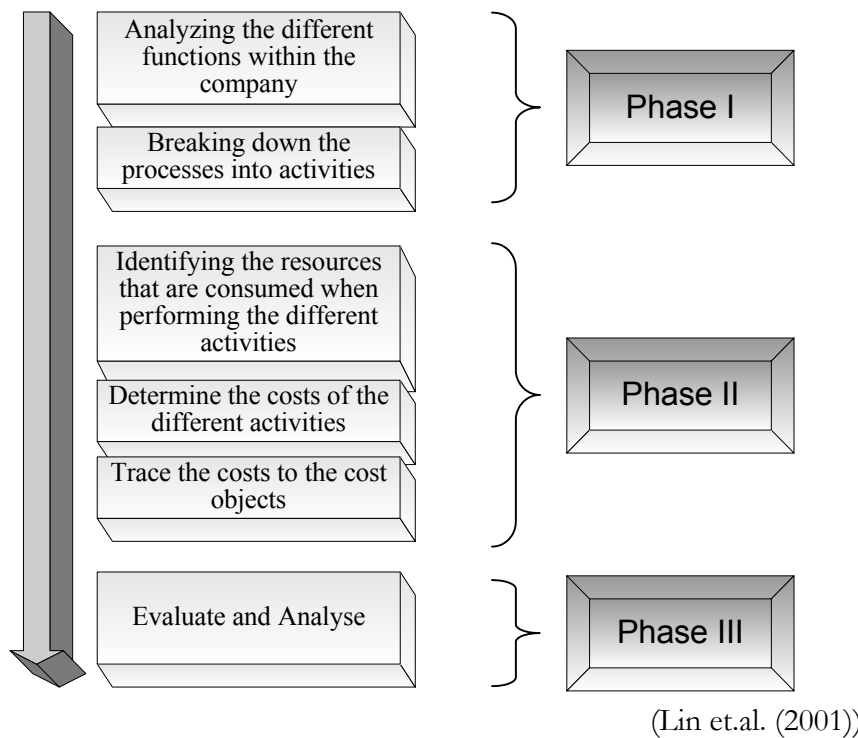
<sup>65</sup> Lin, B., Collins, J., Su, R., (2001)

of the potential benefits can be obtained. This can then be the initial starting point for other areas of the company.

## 2.9 ABC model building

The vast process of creating an ABC model for an organisational structure can be broken down into the following three distinct phases:

Figure 2.5: ABC model building



### *Analysing the different functions within the company*

Lin et.al.<sup>66</sup> points out that by scrutinising the logistics functions, identifying and classifying the major processes within a company a process map can be created. This is needed when conducting and implementing ABC within any organisation. The map is needed in order to visualise the different functions, to be able to establish a starting point for the complicated work process. Griful-Miquela<sup>67</sup> argues that the first step in any ABC model is to get a good understanding of the company, how it works, the daily routines and which activities are performed by its staff. Therefore it is necessary to observe all the activities carried out within the company. To observe is one of the necessary data collection methods among others such as interviewing managers and staff.

<sup>66</sup> Lin, B., Collins, J., Su, R., (2001)

<sup>67</sup> Griful-Miquela, C, (2001)

After the processes have been identified they should be put into a flowchart/process map so that an illustration of the chain of processes can be obtained. Once this has been conducted Lin et. al.<sup>68</sup> recommend that the different processes can be differentiated by activities.

***Breaking down the processes into activities and choosing which are to be studied***

This step according to Lin et. al.<sup>69</sup> distinguishes specific, resource-consuming business activities within each process. Breaking down each process into as many as possible well defined activities allows better analysis of the cost of the process. If the category is too general, an underlying activity that may consume the majority of the resources may not be uncovered. The object in this research project according to the set limitations is to form the activities into processes.

Nevertheless, if the further sub-divided activities provide no significant additional cost information or consume no substantially increased amounts of resources as opposed to the cost of ordinary receiving activities, the process according to Griful-Miquela<sup>70</sup> does not have to be broken down further. It is at this stage in the process very important to weigh exactness against simplicity as discussed previously.

Different ways of choosing which activities are to be studied can be through interviews and observations. The important thing to focus on according to Lin et. al.<sup>71</sup> is not to choose all activities just because they exist but to analyse them for the significance that each one can bring to the research as a whole. If limitations are not set then the possibility of creating an extremely complex model that potentially never can be solved might exist, this does not serve a purpose to anyone, therefore choosing those that are significant is of vital importance.

***Identifying the resources that are consumed when performing the different activities***

Lin et. al.<sup>72</sup> argue that in order to discover the true costs of each process, the resources that each process consumes must be pinpointed. Depending on which activity and how it is performed in the organisation different types of resources are consumed.

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<sup>68</sup> Lin, B., Collins, J., Su, R., (2001)

<sup>69</sup> Ibid.

<sup>70</sup> Griful-Miquela, C., (2001)

<sup>71</sup> Lin, B., Collins, J., Su, R., (2001)

<sup>72</sup> Ibid.

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Lin et. al.<sup>73</sup> mention that no matter how great or small the resource consumed is, theoretically it should be included in the cost of that process/activity.

***Determine the costs of the different activities***

According to Kaplan and Cooper<sup>74</sup> once the resources for each process/activity are identified, the cost of the processes/activities can then be determined. The traditional general ledger system aggregates the costs of these resources in a few large accounts for financial purposes. To be useful in the ABC process, different accounts must be broken down into meaningful cost data to show the relationship between the activity and the consumption of the resources.

***Trace the costs to the cost objects***

Once the cost of performing each process/activity is determined for a cost object, the profit potential of the cost object can be better understood. The cost object is selected depending upon the corporate decision-making needs. The persons in management might be interested in identifying the cost differential between customers, market segments, products, territories, or distribution channels.

Tracing resources directly to processes/activities and specific cost objects that utilise the processes/activities is what managers base their work upon and is the ultimate outcome of the ABC system.

When all the costs are examined and identified an analysis of what has been obtained should be conducted, to see what significance it has on the overall company.

Lin et. al.<sup>75</sup> argue that the ability to trace costs to specific cost objects has immeasurable benefits in corporate decision-making roles. From product costing and production setup and design to negotiation of transportation contracts and hiring of personnel, cost data is the core element in decision-making processes. Tracing resources directly to activities and specific cost objects that utilise the activities, is what managers base their work upon and is the ultimate outcome of the ABC system.

***Analyse and evaluate the final cost information from a total cost perspective***

The final step in the implementation process according to Stock & Lambert<sup>76</sup> involves analysing the feedback from the ABC system. Although the ABC system

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<sup>73</sup> Lin, B., Collins, J., Su, R., (2001)

<sup>74</sup> Kaplan R.S., Cooper R. (1998)

<sup>75</sup> Lin, B., Collins, J., Su, R., (2001)

<sup>76</sup> Stock J., R., & Lambert, D., M., (2001)

provides critical cost data for specific activities, the management must not focus on individual activities alone. That is, the goal of the organisation should be to reduce the total cost of their activities instead of individual activity costs.

When conducting ABC, focusing on just one area within logistics as an example might cause inefficiencies in other areas. The cost savings realised by implementing a new warehousing technique may be more than offset by a corresponding increase in transportation costs or inventory holding costs. The management must view every feasible solution to reducing total logistics costs and consider the important tradeoffs that must be made between the costs of the separate activities.



## Chapter Three

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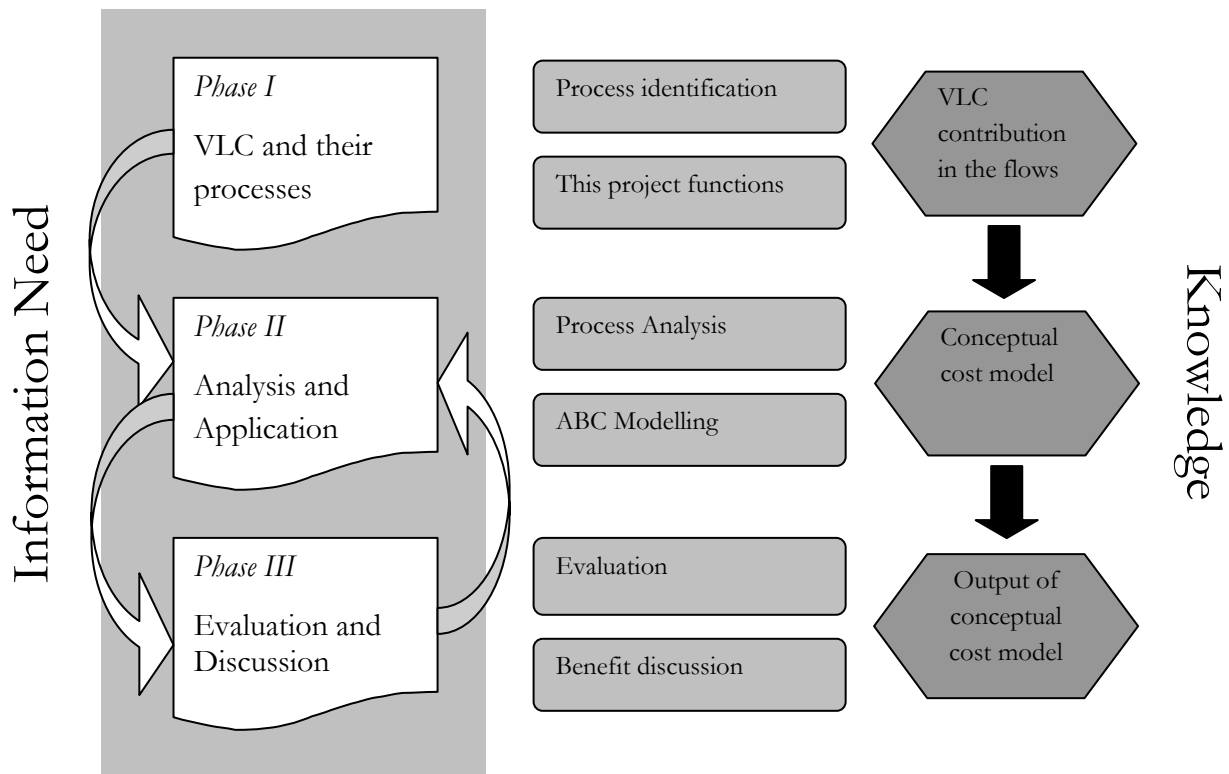
# COST MODEL AT VOLVO LOGISTICS

*From the theories regarding ABC presented in chapter 2 a company specific model which has been adapted to suit VLCI will be discussed in this section. This in order to define the information need required to fulfil the purpose and to create knowledge.*

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A company specific model of how the cost should be divided is a necessity<sup>77</sup>. This because each company differs from each other and to serve as a guarantee that the end result will be as valuable for the company studied as possible, in this case VLCI. The theories presented in the previous chapter have been concluded in the following schematic figure to suit the situation, ABC modelling for VLCI. The information need of each *Phase* will be discussed in order to form the cost model.

*Figure 3.1 Schematic figure over model building*



### 3.1 Phase I

As the first step in implementing an ABC analysis suggests, analysing the different processes and activities, an investigation of VLCI and their processes has been carried out. This is conducted through investigation of the different activities that are included in each process in order to obtain holistic information about the organisation. When breaking down the processes, a foundation of which functions to be investigated are chosen.

<sup>77</sup> Lin, B., Collins, J., Su, R., (2001)

The information need in *phase I*:

- Knowledge about the present processes and the activities at VLCI, which provides a foundation of which activities, and processes to investigate. This to enable the allocation of the resources and costs to the respective activity centres and then later to each profit centre where possible.

### **3.2 Phase II**

The knowledge of the different activities and processes that have been obtained in *phase I* will be analysed in order to identify the resources consumed when performing the activities. The actual cost modelling will also take place in order to fulfil the information need in *Phase III*.

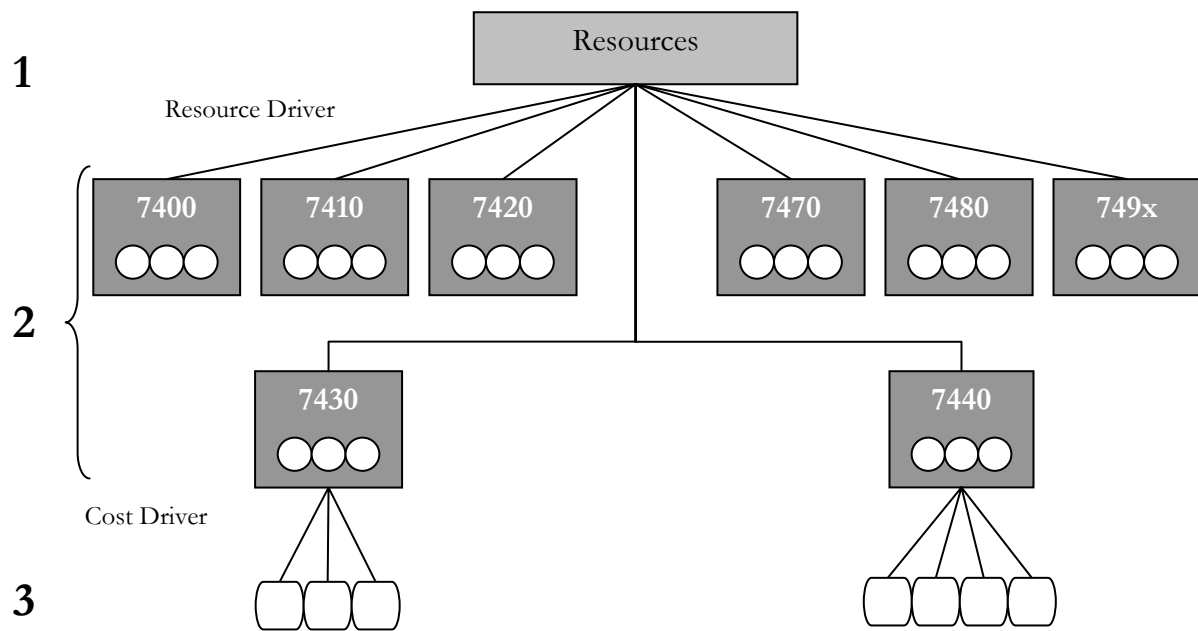
The cost modelling builds on identifying the resources that are consumed when performing the different activities and the determination of the resource and cost driver to the different activities.

The resources are traced to the different activity centres through resource drivers, this to determine which activity consumes which costs. The cost of each activity is then traced to the cost object through an accurate cost driver that is determined in each flow. The cost model for VLC builds upon the framework illustrated in *Figure 3.2*.

Information need in *Phase II*:

- The resource consumption of the desired processes and activities obtained through statistics and interviews.
  - Cost information of the desired process and activities.
  - Model building theory.
-

Figure 3.2: Framework for VLC model



#### Model Clarification:

1. Initial allocation to activity centres through a resource driver chosen individually depending on the resource allocated. The initial allocation concerns the overhead resources common for the departments at VLCI.
2. The resources initially allocated to the activity centres combined with the specific overhead for each individual department are ready for allocation to the cost objects, that is profit centres.
3. At the respective profit centres level, the profit centres consumption from the processes performed are represented.

The tool used for creating the VLCI model is spreadsheet software. The model is built upon the guidelines for model building utilising spreadsheet software which is recommended by Griful-Miquela<sup>78</sup>. The VLCI model has been created in Microsoft Excel.

Further Griful-Miquela<sup>79</sup> mention that the spreadsheets do not require complex mathematical calculations and should be built by avoiding too many advanced functions as can be provided by software of this kind. For this specific model we have tried to keep the complexity of the formulas to a minimum. This has meant that the calculations might have to take two or three more steps than if advanced formulas were used. The main reason for this is that future development and

<sup>78</sup> Griful-Miquela, C., (2001)

<sup>79</sup> Ibid.

usage of the model or spreadsheet can be adapted fairly easily while the functionality remains intact.

A model that is built within this sort of software should be differentiated by different sorts of worksheets<sup>80</sup>. Where data is supposed to be input to the system and where the output is illustrated. These two are kept apart in order to avoid any mistakes in input and changes in the formulas as theory recommends<sup>81</sup>. This to reduce the possibility of confusion by the user, as the user is not always the constructor and is not aware of all functions and linkages. A short presentation of the model can be found in *appendix 6*.

The most important thing when creating a model for an ABC analysis is that construction is carried out thoroughly and correctly from the beginning as the data collected determines the result. The model may turn out to be useful or not for the company at hand.

### 3.3 Phase III

Analyse the final cost information from a total cost perspective as the theory recommends. The analysis will provide VLCI with information about the different cost allocation methods. These methods and the information that the model provides have to be analysed and validated from a holistic viewpoint, does the information provide benefits for VLCI? Have the ABC analysis provided any additional information which is of value for VLCI?

Information need in *Phase III*:

- Output from cost modelling methodology.
- Theories that facilitate analysis.

### 3.4 Model information requirements

The model that will be created reflects the company studied, in this case VLCI. Therefore the information needs have to be fulfilled. The information needed in more specific terms in order to make the model operational are:

- Available Resources
  - Overhead
  - Labour, number of employees and jobs

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<sup>80</sup> Griful-Miquela, C., (2001)

<sup>81</sup> Ibid.

- Facilities
  - The organisational structure
    - Activities and activity centres
    - Profit Centre / Markets
  - Relationships between activity centres
    - Cross resource utilisation between departments
  - Economic information from general ledger system
    - Inbound specific information
    - Activity centre specific overhead
  - Statistics
    - Administrated orders on an annual basis
    - Total volume shipped
    - Time spent administrating various activities
    - Number of parcels
-

## Chapter Four

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# RESEARCH DESIGN AND METHODOLOGY

*This section will discuss the methodology that is required to fulfil the information need for this research project. Relevant scientific methods and concepts will briefly be discussed, to provide an understanding of the methodology approach.*

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## 4.1 Research approach

In a research project there are several methods available to analyse the data. The choice of an appropriate method depends on the research questions and will affect the result. Thietart et. al.<sup>82</sup> argue that one method is not superior to another in terms of choice. The researcher may have different results by using different methods and it is therefore important to choose the method suitable for the purpose and scope of the research project. In this research project the activity-based costing concept, as discussed in chapters 2 and 3, is an applicable methodology.

Since the methodology for ABC is well-developed and is specified as procedures (*see chapter 2.9*), in order to fulfil the information need data is needed in order to make the method functional. In order to make sure that the model fulfils its purpose, methodology theories have to be applied when gathering the data.

The information need in this research project arises from the theories and the need for information for the cost model at VLCI presented in previous chapters. Before discussing the research process to obtain knowledge of the problem stated, it is important to understand the notion of information itself.

Once the information need is established, the research process can commence. The distinction of what is information, data has to be made, and in what way they correlate. According to Sekaran<sup>83</sup>, information is what stems from data. Information is not something that exists, it becomes available, when raw data is evaluated, analysed, and synthesised. Further the author discusses that useful, timely, accurate, reliable and valid data is essential to run business or in other words to gain knowledge about a phenomenon. Data should be structured to be able to provide information and that the information should be analysed, interpreted and modelled to gain knowledge

Information in short is processed data that provides value to the task studied at hand. In order to conform to the research problem, data that serves no real purpose for a specific research project should not be evaluated and processed as it serves no scientific value. Within any scientific research a research design should be created up in order to illustrate how the flow that stems from the information need evolves into knowledge and valuable information. The data gathered must be

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<sup>82</sup> Thietart et. al., (2001)

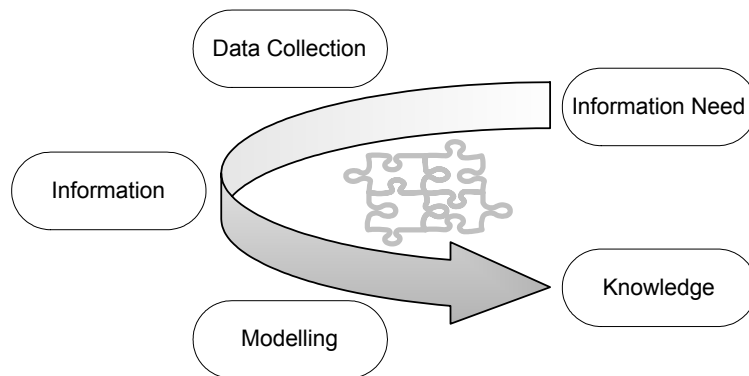
<sup>83</sup> Sekaran, U., (2003)

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up to a certain standard in order to be applicable in the latter part of the project. As such everything must be analysed when obtained as data. There has to be a validation of the data gathered to certify that the data is correct. To be able to give knowledge of the cost structure for VLCI in this research project the following research process, illustrated in *Figure 4.1*, will be followed.

*Figure 4.1: Research process*



## 4.2 Data Collection

Within any research project the distinction between information has to be made. Qualitative and quantitative research reveals the purpose of how data is collected and analysed<sup>84</sup>. The difference between the two has to do with precision of measurability. Data with a rough estimate is qualitative while data that has a precise estimate are quantitative.<sup>85</sup>

Quantitative research refers to empirical research whose purpose is to chart, analyse or explain the research area in the form of variables and quantitative relationships. The qualitative approach is the approach of finding a totality, personal experiences form a more comprehensive understanding.<sup>86</sup>

The quantitative method means that the object can be studied on a broad base. Questionnaires are most commonly used within quantitative research, these are sent out to selected groups within a general population. Quantitative research provides the possibility of drawing up general conclusions about a population.<sup>87</sup> It is used when conducting statistical conclusions that are necessary to achieve the objective.<sup>88</sup> This method is used when conducting observations and interviews.

<sup>84</sup> Creswell, J.W., (1994)

<sup>85</sup> Starrin B., & Svensson P-G., (1994)

<sup>86</sup> Befring, E., (1994)

<sup>87</sup> Starrin B., & Svensson P-G., (1994)

<sup>88</sup> Holme, I. & Solvang, B. (1991)

There does not exist a data gathering technique that can be quantified into raw data in the form of numbers and figures. Qualitative research has the purpose of understanding and analysing an overall picture.

The real question, according to Starrin & Svensson<sup>89</sup> is, can a researcher obtain the scientific knowledge by only using a qualitative approach or is a quantitative necessary as well in order to guarantee satisfying results. Within this research project both quantitative and qualitative methods have been used, in order to guarantee that as much information as possible is obtained.

### 4.3 Primary sources

In any scientific research, data collection serves as the basis for reaching the needed results. The data is the base for an examination of a stated problem. There are several sources of data, primary and secondary data.

Primary data is acquired through qualitative and quantitative methods such as interviews and questionnaires. Hence primary data is obtained from the persons that deal with the research problem first hand. Generally speaking there are three strategies for gathering primary data according to Befring<sup>90</sup>, these are observations, interviews and questionnaires. The purpose is to create a basis for analysis for a specific research project. In this research project the observations and interviews are the source for primary data collection. This since the actual data from the employee that perform the activities works as a foundation for fulfilling the information need in *phase I*. The actual staff member that performs the activities has estimated the resource utilisation for each profit centre in the form of the number of jobs. This estimation of the consumption data is regarded as the best possible as there exists no absolute truth of how much a single activity consumes from a staff member perspective.

#### **Observations**

Through observations the researcher is able to use himself as an instrument for measurements. When conducting observations the researcher can look, feel and experience what truly is going on in a systematic way so that valid and reliable data can be obtained.<sup>91</sup> Befring<sup>92</sup> argues that self-criticism has to be present when conducting observations. This is something that has been kept in mind during this

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<sup>89</sup> Starrin B., & Svensson P-G., (1994)

<sup>90</sup> Befring, E., (1994)

<sup>91</sup> Ibid.

<sup>92</sup> Ibid.

research project as those issues such as expectations and preconceived opinions can affect the outcome of the observation. The observations conducted within this research project have focused on how each activity is performed to obtain a holistic picture of the different activities conducted at each activity centre. This helps to fulfil the information need in *phase I*.

### ***Interviews***

Interviews can be conducted virtually anywhere, the important issue with scientific interviews is that they have to be structured in some way. The interviews can be structured as open with a template of subjects to be discussed without pre-defined questions or interviews that are strict following a predefined order of questioning.<sup>93</sup>

In this research project open interviews with a template of questions to be discussed are used since the goal of these interviews has been to obtain as much information about each flow as possible without losing the topic. This since Befring<sup>94</sup> recommends using a template when conducting an interview to keep the process as smooth and on the topic as possible. Otherwise it is easy to swerve from the subject topic and irrelevant data would be the result. The interviews are a continuous data source that will serve to fulfil the information need for empirical study in *phase I*. Further they serve the function of providing information in the analysis section where the relationships between variables have to be identified in *phase II*.

## **4.4 Secondary sources**

Secondary data is data that already exists such as literature, published articles and statistics. The secondary sources do not have to purposely be written for a particular problem but can have the purpose of providing information about a problem for a particular research study. Secondary data is data that already has been gathered for another purpose than the task such as literature and articles. Therefore the researchers have to take this into consideration because the data has been collected for other reasons. It is important here that the researchers always have a critical approach<sup>95</sup>. Different sources of data have to be compared, in order to secure that what is collected is correct and actual to the specific study. The business systems at VLCI have provided the necessary costs data required that

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<sup>93</sup> Sekaran, U., (2003)

<sup>94</sup> Befring, E., (1994)

<sup>95</sup> Ibid.

conforms to model specifications in *phase II*. The information provided is regarded as accurate since they are based on the actual output at VLCI. Therefore any thorough investigation of the reliability of this data is not performed.

Secondary data for this project has provided the necessary background information to acquire knowledge of the different theories and methods used to reach the result. The study of literature and articles has been extensive and we have tried to utilise primary sources where available, to ensure that the information gathered conforms to the set standards.

#### **4.5 Evaluation of data and research**

In research methodology literature reliability and validity refers to the credibility and the usability of the research project findings. In other words if the measurements that are used in the research give a true and reliable picture of the variable the researcher has tried to quantify.<sup>96,97</sup>

During any form of research there are two central concepts, validity and reliability. Validity refers to what extension the researcher measures what the objective was with the study, reliability refers to the measure of the authenticity of the instrument of measurement.<sup>98</sup>

Reliability determines to what degree the results from an instrument of measurement or method (observations, interviews) have not been affected by circumstances or expressed in another way, how secure what has been measured actually has been measured. It is the accuracy and precision of a measurement that reliability determines if the instrument of measurement gives the same result at different occasions.<sup>99</sup>

Validity determines how secure an instrument of measurement measures what is meant to be measured<sup>100</sup>. Reliability is necessary but not enough of a prerequisite in order to achieve validity. If the instrument of measurement does not measure without any doubt it can not measure what the researcher wants to obtain in the form of the correct information that adds important value to the study. Further Bell<sup>101</sup> argues that just because a study has high reliability, the validity may not be

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<sup>96</sup> Befring, E., (1994)

<sup>97</sup> Ejvegård, R (1996)

<sup>98</sup> Starrin B., & Svensson P-G., (1994)

<sup>99</sup> Bell, J., (1995)

<sup>100</sup> Winter, J., (1987)

<sup>101</sup> Bell, J., (1995)

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the same. In order to determine the validity of measurements there exist two methods to do this, *internal* and *external* validity.

The *internal validity*, according to Winter<sup>102</sup>, implies that an instrument is constructed in a way so that it correlates with the definition of the variable that the study is based upon. This means that the person/persons performing the study is well aware of the fact that the subjects included all have different views of how reality is built up, therefore all possible theories within a subject must be examined and analysed, if this is done an internal validity can be obtained. *External validity* means that the results that are obtained from one measurement correlate with the results from another method. This means that if the results correlate with one another a high external validity is obtained.

It is in scientific terms harder to obtain a high degree of validity and reliability with a quantitative study compared with a qualitative study. The demands on the questions asked is higher when conducting a quantitative study with static questions since the one that is interviewed can not with his/her own words describe what he/she means.

## 4.6 Objectivity

Within any research project the researchers should constantly keep in mind the problems associated with being objective during the research period. It is not difficult to be influenced by the surrounding environments, the people and the opinions stated. According to Cambridge Dictionary the definition of objectivity is:

*“...the ability to perceive or describe something without being influenced by personal emotions or prejudices”<sup>103</sup>*

According to Kvale<sup>104</sup> all researchers have to keep in mind that all things conducted during the research project period can serve as a base for affecting the researcher. To avoid this is nearly impossible since all things processed mentally are subject to subjectivity with an individual. Within this research project we have tried to view things as objectively as possible and have not taken in the opinions by the staff members of what is good or bad within a specific department or when conducting interviews. In order to stay objective we have focused on what actually

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<sup>102</sup> Winter, J. (1987)

<sup>103</sup> Cambridge Advanced Learner's Dictionary, April 2003

<sup>104</sup> Kvale, S., (1997)

has been gathered in our information conquest and as Kvale<sup>105</sup> stresses not based on opinions and what is said in the hallways,. This would serve no purpose for this research project since our analysis and conclusion would not make academic sense or provide VLCI with adequate information and analysis. We know that subjectivity is difficult to refrain from, but we have continuously tried to avoid it to the best possible extent. By keeping ourselves uninfluenced, the result should reflect the company holistically and should not focus on a sole variable.

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<sup>105</sup> Kvale, S., (1997)

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## Chapter Five

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# PHASE I VLCI AND THEIR PROCESSES

*The empirical data of the different activity centres and resources will in this section be presented. This in order to establish the foundation required for the model building process. The information is gathered through interviews with employees at VLCI if nothing else is stated. The activities that form the processes are presented for each activity centre.*

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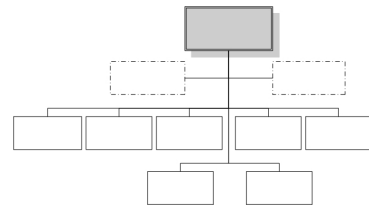
## 5.1 Activity Centres

Different departments within the organisation represent the activity centres at Volvo Logistics Corporation. Each department has a clear role and the activities between them can clearly be identified as each department is unique from the other. Each activity centre consumes resources from the organisation as a whole, as the responsibilities vary so does the consumption. A presentation of the departments and the different resources follows. The construction of the model used in this research project follows what the theory indicates in *Figure 2.2* in the Theoretical Framework.

The activities will be presented formed together in processes since the significance of investigating the individual activities in detail will not provide additional value for this research. This since VLCI has substantial number of different customers that individually require specific activities. General activities of the activity centres will be presented that represent the processes at each department to understand the relationship between them.

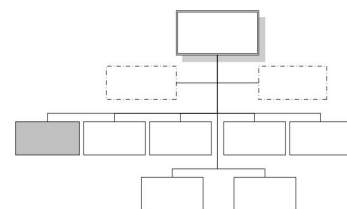
### 5.1.1 Management dep. 7400

The management function represents management of the inbound division. Except for the management itself there are other support functions included, as for example the secretary/receptionist and general IT-support for the staff members. The only activity concerned in this department is the management itself, the others are considered to be included in the management function.



### 5.1.2 Express and Customer Service dep. 7410

The Express and Customer Service department handles all transports that is not included in the ordinary flows. The department consists of 14 staff members, three work with customer service, four with import production, two with export express and four with general cargo. The department is divided into two service areas, customer service and express services.



The *express service* is a function that enables express road and air transport where fluctuations in the ordinary flows have occurred. The express function works directly towards the customer 24 h per day seven days a week. Transport are

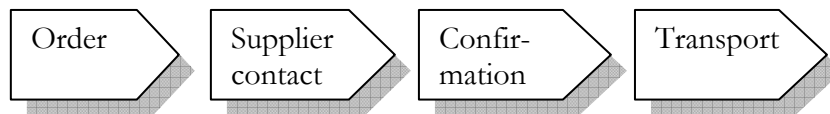


booked from the supplier to the customer. According to the department manager the department is working on implementing door-to-door services for the customer, total responsibility to achieve greater control of the flows.

The mode of transport differs depending on the distance of the transport. In Sweden where a lot of the suppliers are local or regional, road transport is preferred. Sweden is divided into several areas where at least one transport provider is always available.

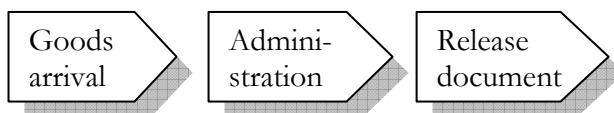
Air transport is carried out in Europe, USA and Japan. Contracting with different airlines for different regions exists. For the regions where air transport is applicable the suppliers are divided into zones. Each zone has a fixed flight and the suppliers know when they have to have the products ready for pick up in order to make sure that the goods are on that particular flight. General activities that form the process that later will be analysed for the express function are illustrated *Figure 5.1*.

*Figure 5.1: Process Express Function*



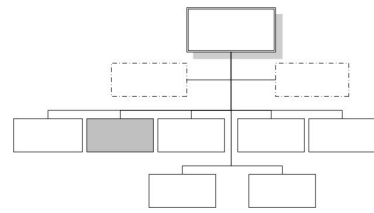
*Customer service* handles the operative services for the Import department for the different flows and markets. All of the ordinary traffic that arrives to Sweden is handled by customer service. Customer service creates documents and flags for the transporters. Whenever transports deviate from the ordinary the person responsible within the import department should handle the problem. Customer service only handles the ordinary transport. The customer service function has three main activities illustrated in *Figure 5.2* that form a process that will be analysed in *phase II*.

*Figure 5.2: Process Customer Service*



### 5.1.3 Sales and Logistics dep. 7420

Sales and Logistics is the department where the development of VLCI originates. The department sell the services and support of the operative departments such as the import and export departments. The department consists apart from the manager of eight staff members with customer responsibilities; four logistics support functions, one product engineer and one project manager. The responsibility of the department is to ensure that the customers of VLCI are satisfied with the services that they are provided with.

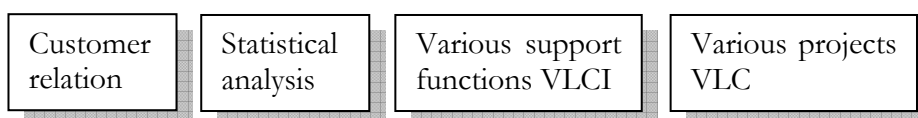


The department tries to gather new customers on a continuous basis. At the moment there are 60 to 70 customers. The largest customers are Volvo Car Corporation followed by Volvo Truck Corporation. Each customer has a customer responsible staff member who is responsible for his or her account, these are financed through a management fee. The management fee is established through contracting process. The annual goal for these customer responsible staff members is to lower the total logistics cost for the customer by 5%. A customer in this case can be a single plant or an entire company such as the car assembly plant in Torslanda or Volvo Construction Equipment.

The department also offers logistics support functions for the different departments within inbound. These have the role of supporting the different departments when making decisions on implementing new logistics solutions and variations in the current flows. Further the department has one product engineer that works closely with departments 7480 and 749x. There is also one project manager that is in charge when new ideas and customers are to be implemented.

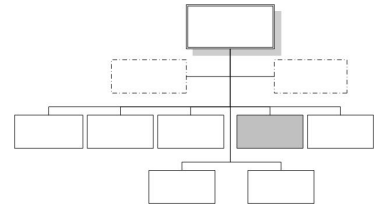
The department also provides other services for Volvo Logistics Corporation as a whole in various development projects including statistical analysis and follow ups. Below activities performed at this department are presented, the activities are not performed in sequence and thereby there is no particular correlation between them.

*Figure 5.3: Activities Sales & Logistics*



### 5.1.4 Inbound Export dep. 7430

The export department within VLCI handles shipments from suppliers to production facilities within the Volvo Group. The department has different groups with different responsibilities. The three largest groups are Brazilian/SAMBA with six staff members, Belgium group with roughly five, and the North American group with four staff members. In total the department employs 21 staff members including the department manager.



The *North American* group has four staff members that together handle roughly 800 shipments per month to North America from various suppliers. Goods shipped from Sweden are mainly goods from three suppliers, Olofström, Skövde and Umeå. These are mainly parts for Volvo Trucks such as engines and chassis, which contribute to the main flow of goods. There are about 260 other customers with small volumes that are handled per year.

The workflow of the *Brazilian group* differs from that of the other groups because of the fact that VLCI actually owns the goods they transport opposed to the other markets where the administration of transport takes place. The group consists of six staff members. Within this group there are two different flows, SAMBA which is a customer specific flow with Volvo do Brazil that has its own requirements and the other is for Volvos other involvement in Brazil. The group also have at their disposal designated personnel at the terminal which only focus on the flow of goods destined for Brazil.

The Brazilian group also handles goods for external customers from the Volvo Group. The goods for these customers are sent to the terminal for consolidation, this flow generates a volume of one container per week. These external customers stand for 10% of the total volume shipped for Brazil.

The *Belgian market* stands for about  $\frac{3}{4}$  of the total exported volume of VLCI, this generates a lot of administration, as it is a continuous flow that is administrated by around five staff members. Shipments take place seven times a week. The main customers are Volvos production facilitates in Ghent. The volume shipped equates to about 100 trailers per day, which is a decrease from previous years but is expected to increase as the car production plant in Ghent is expanding. Volvo in Ghent provides VLC with forecast figures of which volume to expect to ship.

This is so that bookings can take place with the transporters and shipping lines. The trailers are loaded onto ocean vessels and shipped down to Ghent.

Other products that are handled by the Belgium group is the shipment of Truck Cabins from Umeå to Ghent. These are transported to Gothenburg by rail, 11 wagons per day, reloaded onto trailers for further transportation to Ghent. The wagons are then resent to Umeå for reloading. VLC only administers this process, the cabins never enter the terminal for handling.

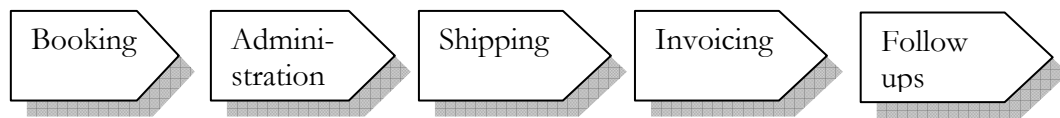
There is a market within the export department called *CKD (Complete Knock Down)* which means that components of complete products are sent to an assembly plant in different markets such as Mexico and Iran. The reason for this is import restrictions, the customs duties for complete cars are very high therefore it is cheaper to send the cars in parts and assemble them at the respective market. There is one person in charge of CKD worldwide in the export department. The major customer is Volvo Busses in Mexico to which 400 containers are shipped annually. The customer in Mexico orders the parts at VBC which in turn send this information to VLCI, so that the volume can be booked with the shipper. The appropriate documents are then sent to VLCI from VBC for further preparation. The necessary documents are prepared by VLCI and when it is complete they are sent to the customer. The order is then released and the customer then handles the responsibility of the shipment. Within Volvo Car Corporation there are customers in the markets Malaysia and Thailand, these order the goods in the same way as components sent for Volvo Bus Corporation.

Shipments to the *Polish market* are fairly new. Goods shipped go to Wroslaw where Volvo Bus Corporation and Volvo Construction Equipment both have factories for final assembly. At present the flow is small therefore it is handled by one person.

There are two different flows, the direct flow to Poland from the supplier and the flow where the goods arrive at the terminal for reloading. The direct flow is supplied from Finland, which is transported, directly with DFDS to Poland, the person responsible for the market just administers the order, and no handling of the goods is conducted. Swedish and Norwegian suppliers send their goods twice a week to the terminal for reloading into a trailer for transportation to Poland.

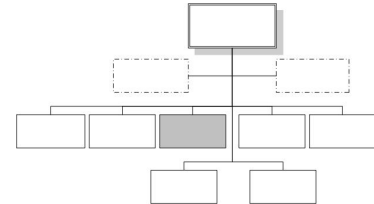
Below the different activities that form the process that takes place in the export department is presented.

Figure 5.4: Process Export department



### 5.1.5 Import and Domestic dep. 7440

The import department within Volvo Logistics Corporation Inbound division is responsible for shipping goods from suppliers to the end customers in Sweden. The import department is divided into three different functions where each handles its own flows. The different functions are Scandinavia, Sea and Continent.



As the name implies the *scandinavian group* handles the flow of goods from the scandinavian markets to the production facilities of their customers within the Volvo Group and Volvo Car Corporation. There are four major markets, Sweden which is without comparison the biggest market within the function. Sweden has approximately 1500 suppliers, in Denmark there are 30, Norway 40 and Finland has 40 suppliers. The Scandinavian group consists of three full time employees. These focus on the management of traffic that is generated by all the suppliers. As the Scandinavian group does not handle the hands-on operations, their main function is to optimise the flow of goods from the different suppliers, to maximise the utilisation degree of each transport. Optimisation means that the routes are analysed so that the transport can be as efficient as possible. Agreements for purchasing are conducted, instructions to the transporters are drawn up.

The *sea group* has four staff members that handle goods that come to Sweden by sea, from markets such as USA, Brazil and Japan. There are two types of flows, unstructured and structured. Within the unstructured flow there is no direct contact with the transporters, instead VLCI is notified when goods arrive at the harbour in Gothenburg. Then transport is booked and the goods are brought to the terminal or directly to the customer depending if it is a full container for one customer or if the goods have to be consolidated with other shipments. Some administration tasks are undertaken for this flow such as customs documents and destination flags. The consignee is then billed for the administrative job that VLC has provided.

The structured flows are formed in another way, goods are handled by VLC from the country of shipment to Sweden. Goods from the USA are handled in two

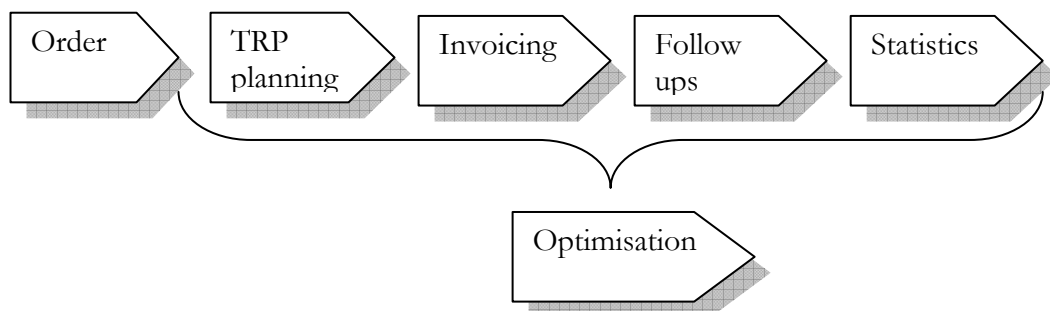
hubs, where goods is consolidated, one in Virginia and one in California, after the consolidation process is done the goods is shipped to Sweden and to the production facilities. Volvo Logistics North America enters all the necessary data into the TIR system on an article level. When the goods arrive, they are picked up and delivered either directly to the customer or through the terminal depending on the volume of the shipment. Administrative tasks such as customs documents and destination flags are also performed in this flow.

England and Belgium are two markets within the sea group that are handled somewhat differently. The respective offices in England and Belgium do the operational tasks such as instructing the transporters where, when and how to transport the goods, the data necessary to complete a shipment is entered by them into the systems. When the goods arrive at the harbour in Gothenburg, the sea group plans how to release the shipments and how to transport the goods, their task is to work with traffic management.

The *continent group* within the import department handles every other market that the others do not cover. There are four people working in the group, three permanent and one that assists when necessary. The main responsibility for the group is to make sure that the functionality of the different transport is maintained. Monitoring that the transport is accurate and on time as promised, and that the way the goods are transported is in the correct manner. The group also focus on the deviations that exist in the respective flow, in order to optimise each flow as much as possible. Germany is by far the largest market and Volvo Car Corporation is the biggest customer

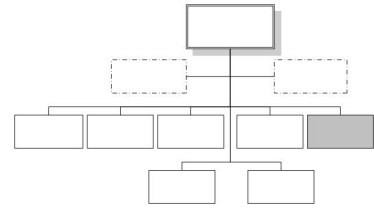
According to the staff members this group tries to optimise the flows in order to maintain high degrees of utilisation for each trailer, and ensure that a smooth flow is maintained.

Figure 5.5: Process Import & Domestic



### 5.1.6 Customs dep. 7470

The Customs department has its own result responsibility for their activities and own agreements with customers. At present the customs department have 12 staff members that work in teams with specialists. Each team is responsible for the service that they provide. The different services that the department offer are:



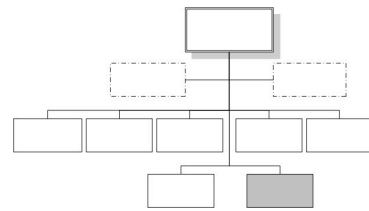
- Customs declaration, which is the declaration of Volvo goods for import to Sweden from non EU countries. There are two different types of declarations, first, the standard declaration that stands for about 75-80% of the declarations and concerns the import that is easiest to administer. The other, the advanced declaration that concerns the more complicated flows, different certificates and security issues must be solved.
- Intrastat registration that involves statistical measurements for import/export within EU countries. Information of type of goods, statistic number, weight, number of articles and value are registered. These statistic activities are automated largely to facilitate the service.
- Classification of goods involves the specification down to article number level, which is a legal demand by some markets. The price for this is static against set intervals of the number of articles administered.
- Managing the origin of the goods involves issuing of certificate of origin to ensure where the product actually originates from. Some customers demand this service as it is a legal prerequisite for importing goods to a specific market.
- Active processing means reimbursement of the customs fee if an article first is imported from a non-EU country and then when processed exported again outside of the EU. Reimbursement figures are about 80 – 90 million SEK on yearly basis.

Other services are customs inventory, education and training, and development of customs services.

The customs department serve the import flows within VLC traffic but even other flows within the AB Volvo Group. About 40% of the business is outside the regular traffic that VLC generates. Some of the activities are performed for the departments internally at VLCI.

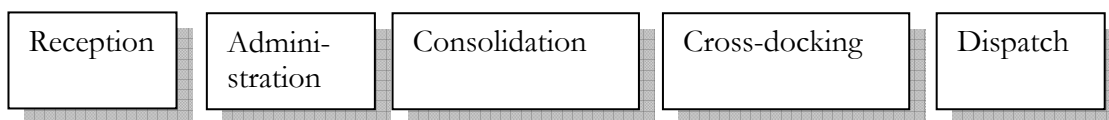
### 5.1.7 Material Handling, Crossdock Arendal dep. 7480

The department Material Handling Crossdock Arendal handles goods sent through Volvo Logistics Inbound division that is not a direct delivery to a customer. The goods are received and consolidated with other goods to form a full trailer, container or railway wagon if possible. The terminal area where the goods are stored and consolidated is the largest in northern Europe. In total more than one million parcels pass through the terminal annually. Goods in all sizes are handled for all customers within the Volvo Group, the terminal also handles business for customers external to the Volvo Group.



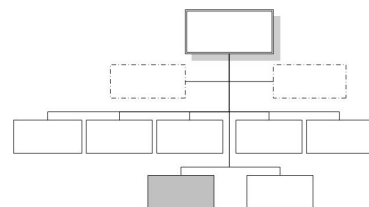
The staff within this department rotates on three shifts, during daytime around 20 staff members receive, reload and ship goods, late afternoon and evening 14 people and during the night shift four staff members work. Around the clock every day of the year the terminal is active, goods constantly arrive to be reloaded and shipped. All of these shipments have to be administered, 11 to 12 staff members are involved in this process, when the goods arrive, they are registered and the documents are given to the department that further administers them, the export or import departments are an example of this. Some flows have dedicated resources in the form of space and staff members.

Figure 5.6: Terminal handling process



### 5.1.8 Logistic Centre dep. 749x

The Logistics Centre department offers tailored services for external customers and handles the flow of general cargo in the VLCI traffic. The department consists of around 30 full time Volvo employees, and is complemented with additional consultants when required. This department consists of six different sub-departments:



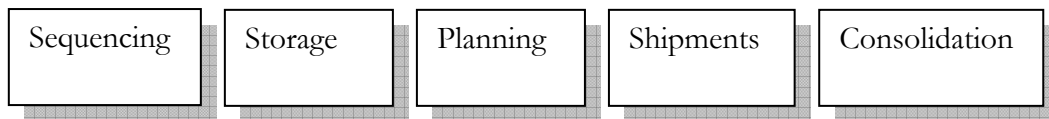
- 7490 Department manger
- 7491-7494, 7496 External customers
- 7495 General cargo



The departments 7491-7494, 7496 sequences goods for Volvo Car Corporation for various products, an example, the boot lids for models V70 and XC90 are sequenced so that the goods arrive in the same order that the cars are assembled on the assembly line. Storage between deliveries is offered to the customers if requested.

The department offers various services within temporary storage, sequencing and handling of special goods. The centre also acts as a hub for consolidating general cargo (7495) goods. The department handles around 4 trailers per day.

Figure 5.7: Activities within 749x



## 5.2 Resources investigated to be allocated in the model

The resources investigated at Volvo Logistics Corporation and later allocated to the profit centre that actually consumes the resources is presented below. These resources conform to what the theories of ABC in chapter 2 recommends as suitable when conducting an analysis of this sort. As theory states all costs in ABC modelling are regarded as indirect. The resources that are investigated are categorised in *common and separable costs*.

### 5.2.1 Internal costs for administrative services

#### ***Human Resources (HR)***

The cost for the HR department represents the cost for the employees at VLICI. The cost is regarded as common as the cost is not dependent on the sales volume. The cost should only be allocated to Volvo Employees and not to the consultants, as this cost is taken care of by the recruitment companies that they are employed by. What the HR department does is to serve as a support function, employees can seek guidance when they feel that they are not treated in the correct way by the colleagues.

Further the department can be utilised as an advisory function when recruiting new personnel as this is something that is synonymous with a HR department.. All of these services are important for a company and many of them are legally required by governments, therefore this cost has to be carried by VLICI.

***Economy support***

The costs for economy support are the costs for the business support services within financial services and regarded as separable. The cost for the financial IT reporting system that provides the ledger as discussed in the theory is included in this cost and is not a part of the bundle of IT-costs, which will be allocated differently. This as the information system is solely used by this function. According to the staff members of the economy support function, the workload is determined by how much economic data is generated by each department. Departments that generate a large amount of invoices for example utilise more of the functions resources than a department that does not.

***Facilities***

The facility costs are the costs for the offices, the surrounding areas and the terminal space that is utilised by Volvo Logistics Inbound division. These facilities are provided and rented by Danafjord, which is a Volvo Group company that provides all facilities to all Volvo Companies. This resource is regarded as a common cost as it is the cost for the facilities used by VLCI. These costs are divided into two different sections, one for the office building and one for the operative terminal. The facilities costs are due to natural causes, much higher for the terminal since it takes up a lot more space.

**5.2.2 Offices Services**

The cost for office services contains maintenance of the office facilities and equipment in order to keep the everyday activities running. The cost for office services arise when something breaks down and has to be changed, for example the exchange of burnt out light bulbs. When an employee moves to a different department or office and help is needed in order to facilitate this, their services are required. As the movement of personnel is quite frequent this is a cost that can not be avoided, therefore it is regarded as a common cost.

**5.2.3 Management VLISO**

The cost for management VLISO is the cost for the management of the organisation. This common cost has to be covered by each division and department throughout VLCI.

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#### 5.2.4 IT costs

Since the IT costs stand for two thirds of the total cost at VLCI, this cost is important to study as it is such a substantial part of the cost within the organisation. The cost is distributed from a central location in this case, Volvo Logistics Corporation which states that VLCI stands for about 45%<sup>106</sup> of the total IT cost within the entire organisation. These distributed costs can not be affected by Inbound as they use various systems, the costs are based on forecasts for the coming year. The forecast value can be regarded as the actual cost for VLCI, if the outcome were to be different than the forecast there exists no compensation for the different activity centres, the deviation is handled higher up in the organisation and is not set by VLCI. This cost can be seen as separable and common but in this thesis it is regarded as a common cost as it is allocated from VLC.

#### 5.2.5 Specific department overhead

Each department/activity centre generates the specific department overhead costs during the everyday activities. The costs are not related to the transportation of the goods handled or overhead costs as facilities or office services. The cost for department overhead are variables such as the salaries for the staff members, the travel costs for the department, representation accounts, social costs, the costs for the company cars, and the other costs associated with a department such as office supplies. Therefore this resource is regarded as separable as it varies. A detailed list of all the costs typical of departments at VLCI can be found in *Appendix 4*. The illustration is of the export department 7430, and is representative of the other departments.

#### 5.2.6 Terminal Handling Cost

Terminal handling takes place at VTA the terminal facility where goods are consolidated and shipped to respective customers. The suppliers of the Volvo Group either send full truck loads directly to each customer or to the terminal. Goods consolidated and handled have a terminal handling cost that today is a fixed administration fee. Each parcel that arrives has a handling cost no matter what the size or volume.

The costs associated with the terminal are the overhead costs, the terminal itself, equipment such as forklifts and the department specific overhead. The terminal

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<sup>106</sup> Forecast for 2004

itself does not administer any transport themselves but handles the goods for the respective departments. The departments that utilise the terminals services generate these costs. Therefore this resource is regarded as separable as it varies. The departments that use most of the service of the terminal are the export and import departments.

### **5.3 Cost objects**

The different cost objects are the final allocation and in this case, as stated previously, the different profit centres at VLCI. The different profit centres refer to the different markets that VLCI does business with. The departments that have profit centres are the ones that generate sales for VLCI. These are 7410, 7430, 7440, 7470 and 749x. The function of a profit centre is that all transactions for a specific market are recorded together which forms a profit centre.

## Chapter Six

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# PHASE II ANALYSIS & MODEL APPLICATION

*In this section the different resources and processes will be analysed to develop the model. Each investigated resource will be traced to the respective activity centre and then further down to the cost object where available. The resource allocation to the different activity centres will first be analysed and then in turn each activity centre.*

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The analysis is based on the theories of ABC modelling, the empirical data and the data collection methodology. The individual allocations are illustrated as figures following the analysis for each department and resource. The actual modelling that this chapter refers to is performed in a spreadsheet in Excel, of which a presentation can be found in *Appendix 6*. A summary of the different resource and cost drivers is shown in *Appendix 8*. The resources and costs presented in the previous chapter will here be analysed and allocated to the appropriate activity centre/profit centre where applicable. As stated in the limitations the direct and indirect overhead costs are investigated, all other costs are excluded in the model.

## **6.1 Overhead resource allocation to activity centres**

The resources will be allocated to the respective activity centres on an equal basis in relative terms depending on the resource driver that is best suited for the specific resource. The resource driver utilised for one resource such as office services might not be applicable for another such as the IT-costs. The resource drivers have to be analysed in order to obtain a valid result. This is the initial step, to allocate resources to each activity centre. Further see *Appendix 7* for detailed cross resource utilisation between departments.

### **6.1.1 Internal costs for administrative services**

The internal resources for the administrative services are divided into three categories HR, Economy Support and Facilities.

#### ***Human Resource (HR)***

The HR resource, as previously stated is the cost for the human resources at VLCI. The employees at VLCI are defined as the staff members that actually are employed by VLCI, which includes the employees under a collective agreement. The consultants can not consume resources from HR and should therefore not be a part of the resource allocation of the HR resources. The cost per employee is fixed by the HR departments higher up in the organisation, it is a cost that the different divisions have to carry, and therefore this resource is in direct relation to the number of employees at VLCI. The cost driver is therefore the number of Volvo employees, which further can be motivated by the fact that it is regarded as a common cost.

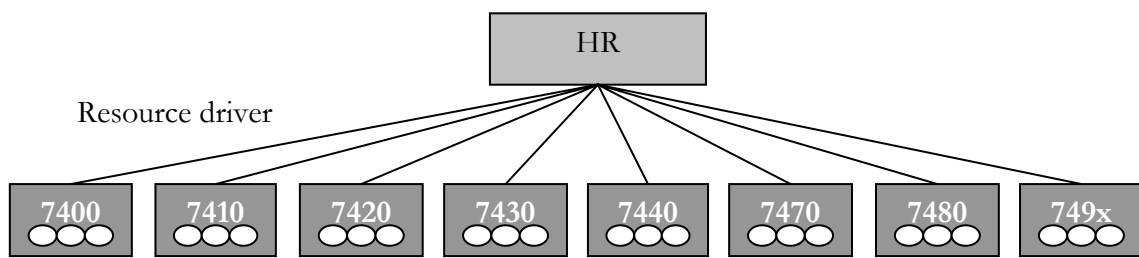
The number of staff members differs from department to department and as the number of employees is used as a cost driver, each department will carry a proportional cost. For the resources of HR the distinction between employees and

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employees under a collective agreement is disregarded since it is difficult to distinguish which group utilises more or less of this resource. If a difference exists, it can be argued whether it will provide this research project with any additional valuable information. The assumption is that there is a difference between the two but the result would presumably be negligible and will not provide the model with input of interest for this study.

The result of the HR costs shows that departments 7480 and 749x together stand for about half of the HR cost. This is a high figure and would be different if the staff members under a collective agreement were excluded. These two departments have the majority of the staff members under a collective agreement. The cost can not really be affected by VLCI in rationalising terms. The HR department itself can only bring down the cost of their services themselves.

*Figure 6.1: Allocation of HR costs*



Resource driver: number of Volvo Employees

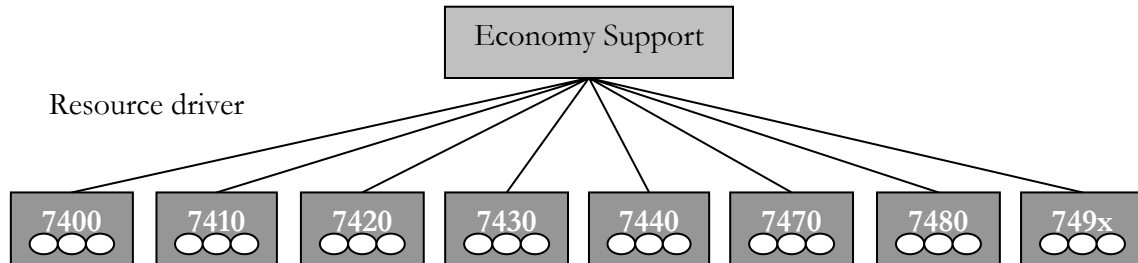
***Economy Support***

The resources of the economy support function are considered as a separable cost and consumed by the different departments depending on how much work is demanded by each. The sales figures for the different departments are therefore identified as the resource driver where it is applicable. Some departments do not have a product or service that they offer but still consume resources from the function in the form of costs.

The higher the sales the higher the workload is put on the economy support function. The sales are not enough to get a satisfying model for the resource utilisation of economy support, since departments with no sales should be included in the allocation. The relation/accumulation for the cost and sales will be regarded as the driver for the departments. The accumulated sum to be allocated is the sales for departments 7410, 7430, 7440, 7470, 749x and the costs for departments 7400, 7420, 7480. We have made this assumption since the model will show a more correct illustration over how the distribution of the costs should

be. The main reason is that otherwise the departments without sales would not be included in the allocation and therefore that departments total costs would be lower, which in fact would not be correct. As each department in one way or another utilise the function, all departments should in fact be accountable.

Figure 6.2: Economy support Allocation



Resource driver: Sales and Costs (7400, 7420, 7480)

### ***Facilities***

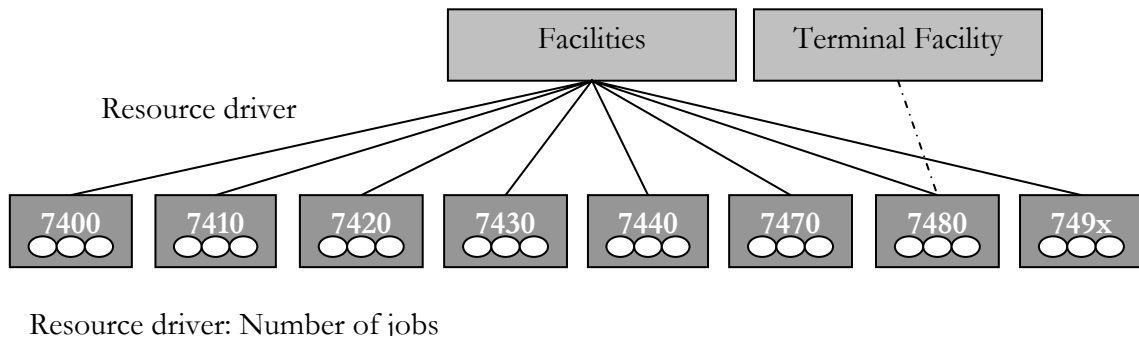
The facilities resource is divided into two different resource groups, one for the office building and one for the terminal and the space it utilises. For the office facilities a logical allocation should be the number of jobs that each activity centre have. The more jobs an activity centre has, the more office space is needed in the form of facilities.

The complexity in allocating this resource is that a staff member uses a certain amount of space for conducting the various tasks at a desk, the complex part is that that person also utilises joint facilities with persons from other departments. There are several lunchrooms available for the staff members of VLCI which all employees can use, the size of these differs, further some rest rooms have three toilets and others two. To consider this would only complicate the calculation to endlessness. To investigate which members of a certain department utilise which lunchroom does not correlate with the theories about keeping the calculations as simple as possible. Therefore an applicable resource driver is the number of jobs at VLCI. Any other allocation would not provide VLCI with any additional beneficial information.

The other facility group is the terminal area. This resource can be seen as directly related to department 7480, since they are exclusively using this facility. Thereby this resource should not be allocated through the previous stated resource driver. The allocation of the resource of the terminal area will depend upon which departments actually use the services.



Figure 6.3: Facilities allocation



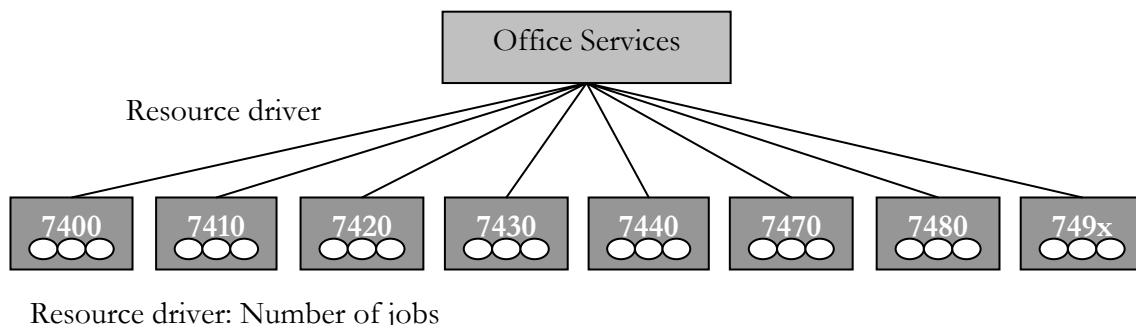
## 6.2 Office Services

The resource for office services is a small amount compared to the total cost. This resource is allocated to the number of jobs per activity centre that VLCI have in total, since there is no meaning in making the calculation too detailed. As office services is a resource that all staff members in one way or another utilise, the movement of a desk, the changing of light bulbs and cleaning services, the most applicable resource driver is the number of jobs at VLCI. Another way of allocating the resources would not provide any value since it is impossible to know where the resources are needed from time to time.

There is the question if the office services also should include the terminal, since the personnel working in the terminal do not utilise the office space as much as the other staff members. They do however use the toilets and lunchrooms, which office services maintain. To some extent they should be included in the calculation. What would provide the best result could be questioned. The alternative that we have concluded that is the best resource driver in this case is the total number of jobs, including the staff members under a collective agreement.

This resource has a more conventional allocation since there is no value to investigate it further. The cost exists and should not be neglected, it is a valuable service as it facilitates the work of the employees and consultants in their everyday work.

Figure 6.4: Office Service allocation

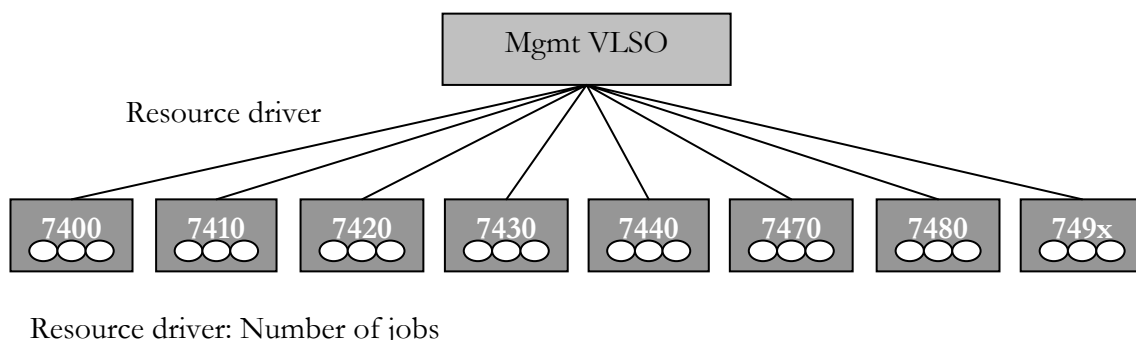


### 6.3 Management VLSO

The management resource is difficult to allocate to the different activity centres. This since the manager effort is often point-effort related and different flows need different actions taken at different times. The resource consumption of the management resources are therefore impossible to foresee in detail. Allocating this resource with the distribution of the number of jobs per departments can be questioned. An important question here is if the management really is a resource that every employee can utilise whenever needed? Another way of allocating the costs is by the number of actions to the specific departments that the management actually carries out. This however is impossible for obvious reasons, the specified data is impossible to obtain and would not really serve any purpose to VLCI.

The way that the allocation is carried out is by the number of jobs, this as the resource is regarded as common cost. This might be difficult to motivate since different flows needs different strength and effort from the manager. Therefore with the argument that the management is available whenever a problem arises means that the allocation chosen actually represents fairness.

Figure 6.5: Management allocation VLSO



## 6.4 IT costs

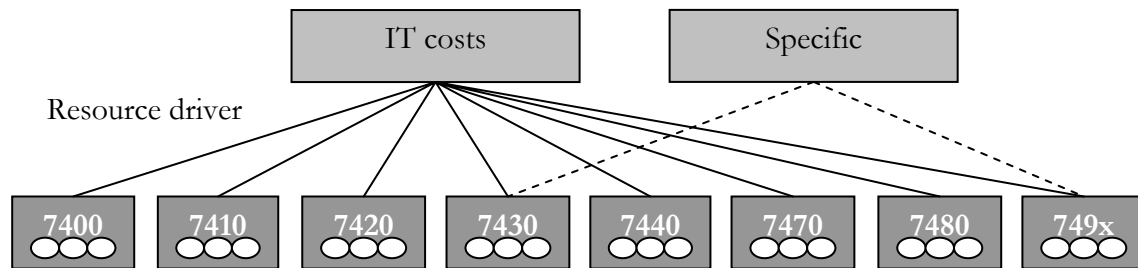
IT-costs are significantly the largest overhead cost with almost two thirds of the total overhead and is therefore a major resource to allocate. The IT costs are a difficult resource to directly allocate to some activity/process since it is difficult to investigate which systems are used for a certain market.

The cost driver for the IT cost can be discussed, whether it is enough to allocate the costs by workstation or in more detail such as per software usage. If the costs are allocated to available workstations, the distribution might be unfair, since different systems/software that may have different cost structures. These are utilised differently at different workstations or departments. One other alternative might be to allocate the costs to each login authority, by this is meant that the system/software cost are allocated individually where it is available for a certain login. It is here important to consider the trade-off between work with allocation and the usability of the investigation.

One sort of weighting of the system, used at each department, is important to develop to be able to allocate the costs in a fair way to each department. There are examples of systems that are only used at a certain department and the most logical solution would be that the department that incur the cost for software usage should be allocated the cost. To be able to develop some sort of weighting system, the different system costs have to be taken into consideration. The weighting system used is based on existing data. Since VLCI receives a prognostic cost per system, one has to consider which department uses which systems. This investigation of the different system must be made on a regular basis since new systems will be used and others will be eliminated. We are somewhat reserved to use this resource driver since every time a new system is implemented into the organisation the allocation changes. The ideal solution would be a monitoring system that is linked to each and every system that monitors the usage for the systems at the individual workstation levels. However the substantial cost for implementing this sort of system would be hard to motivate in the trade-off between feasibility and cost. The individual staff-members would also potentially feel that their personal integrity is violated.

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Figure 6.6: Allocation of IT costs



Resource driver: Internal weighting System/employees

## 6.5 Other resources

The activity centre specific overhead are not part of the initial allocation since these costs are generated at each department themselves, the activity centre overhead cost will be allocated to each profit centre, this is a separable cost. The terminal handling cost is not included in the initial allocation to the activity centres as each profit centre determines the consumption of this resource.

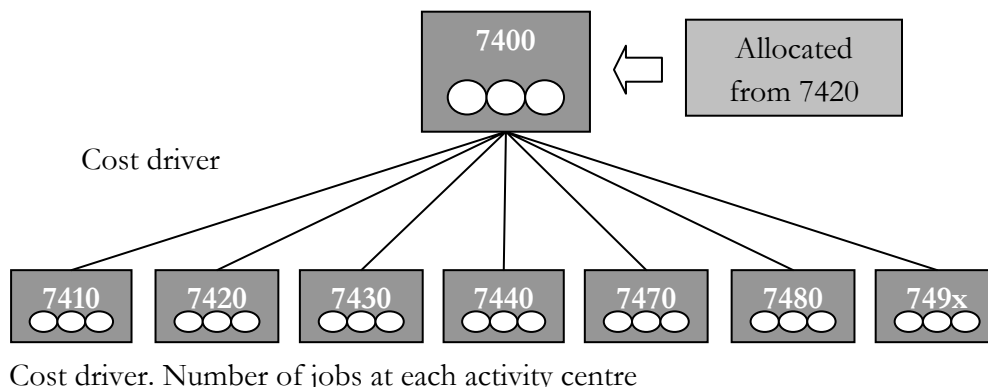
## 6.6 Cost allocation to the respective activity centres

After the initial allocation of resources to activity centres, the allocation to the respective profit centres takes place. That is the profit centre consumption of each activity is identified and the specific profit centres are allocated the costs.

### 6.6.1 Management Inbound, 7400

This department is the management of VLCI, the overhead cost for management service and the specific activity centre cost has to be allocated to each department since there are no profit centres for this department. This department does not provide any service directly to customers and has therefore no sales or profit centres. The activity that is concerned in the allocation is management. As discussed before, managing VLCI varies from day to day and is often point-effort related, the efforts are impossible to measure precisely therefore a fair allocation of this departments costs are through the number of jobs at each activity centre. The cost driver refers to the number of employees that consume resources at each activity centre. Further as mentioned before department 7400 consume specific resources from Sales & Logistics, as this function is regarded as statistical gathering for the entire division, then this resource can be allocated with the same cost driver, the number of jobs at VLCI. The cost for the economy support function is included in the overhead allocation.

Figure 6.7: Allocation of Department 7400



### 6.6.2 Express & Customer Service dep. 7410

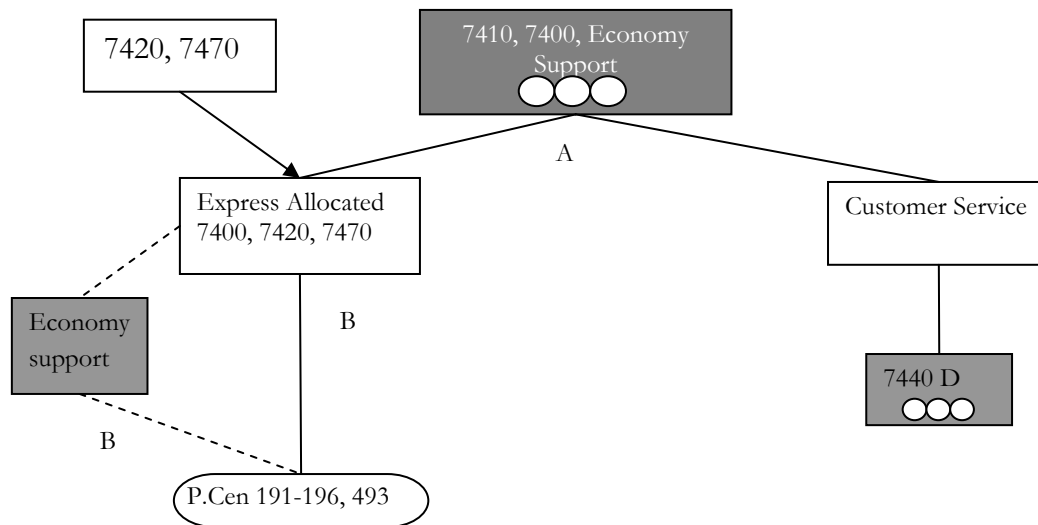
The express and customer service department provides VLCI with express deliveries to the production plants globally as well as customer service. Therefore the department is split up into two functions, express and customer service when allocating the costs. The express service has profit centres within air express and the appropriate portion of costs will be allocated to these.

Customer service is mainly a support function for the domestic traffic generated in the import department, therefore the resources are allocated to the domestic function.

The express function consumes resources directly from departments 7420 and 7470, therefore this is allocated directly to the express function.

The express function has profit centres but it almost is impossible to find a relationship between the cost and the demand. Since the demand varies from day to day and is therefore unable as it is today to allocate in a detailed way. Therefore we have chosen to allocate to the express function by postings. It could be argued if the allocation should be based on profit per resource or order. Since the relation is assumed to be the same we have chosen to use postings that later can be altered if further investigation suggests it.

Figure 6.8: Allocation express &amp; customer service, 7410



A : Resource driver : No. jobs per function

B : Cost driver : Postings

### 6.6.3 Sales & Logistics dep. 7420

The sales & logistics department is a support function and thereby does not have its own profit centres. The cost should therefore be allocated to other activity centres that consume resources from 7420. The customer specific activities should not be financed by the other activity centres since they are financed by management fees. The income from the management fee should cover the customer specific resource consumption. As no sales are generated at this department the cost allocated for economy support is low, this cost is allocated in the same manner as the overhead resources.

Some functions are guided towards specific activities in Volvo Logistics Corporation and the consumption of resources is allocated to other departments outside of VLCI and is not included in the scope of this model.

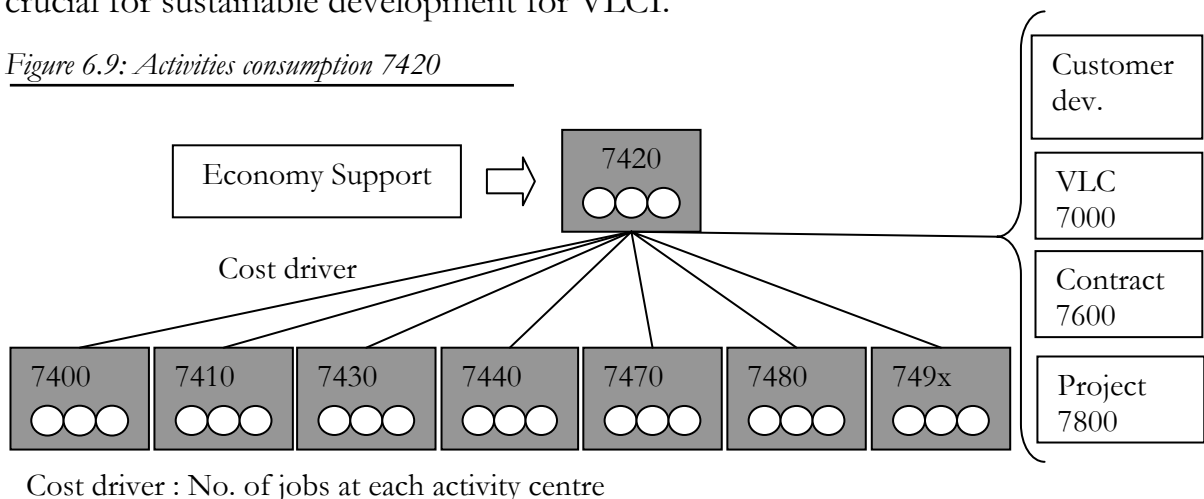
The department performs statistical analysis for the Inbound organisation and therefore this resource is allocated to 7400 to be distributed as a general overhead to other departments. The allocation to departments 7410, 7430, 7440, and 7470 represents the resource consumption of their processes of this department of which 7440 consumes a significant part. We believe that this can be explained by the fact that most of the developments occur in this department and a lot of support is needed.

Departments 7480 and 749x require the support of a project engineer and should be allocated their respective share of this resource in the form of development. Further department 749x requires assistance in sequencing and general cargo and therefore should be allocated respectively for their consumption.

The driver used for allocating the costs for this department is an estimation of the number of jobs that each process consumes. An example, if one activity centre requires 0.7 jobs, the cost for 0.7 jobs should be allocated to that specific activity centre. We believe that the estimation is valid because it represents the actual work performed for each process.

This department is important for VLCI, the department does not generate any income directly but as future developments originate in this department this is crucial for sustainable development for VLCI.

Figure 6.9: Activities consumption 7420



### 6.6.4 Export department 7430

The export department has different profit centres where the cost should be allocated. The costs that have the same cost driver are grouped together in the illustration in Figure 6.10

The overhead resources for the department that have been allocated to 7430 in the initial allocation, and specific overhead cost are allocated through the cost driver of the number of jobs that each profit centre utilises. This is based on estimations made of the requirements of each profit centre. This is, as we see it the most optimal driver since each costs should be carried where the costs are incurred. To give a fair allocation of these cost and it is relatively easy to obtain required data of what each staff member does. The distributed cost from department 7400 is allocated with the same premise, since as previously discussed the effort of the management is impossible to foresee in detail.

The allocation of the costs for the resources that economy support consumes is allocated by the cost driver postings. The postings reflect the turnover of each profit centre, since there is an assumable identified relationship between the economy support workload and turn over. The assumption is that the higher the turnover, the higher consumption from economy support is. It might be possible to investigate the economy support function in more detail but the significance of this investigation is hard to motivate since it is questioned if it adds any additional function in the model without any complexity.

The cost allocated from the terminal 7480 is allocated as a lump sum to the department and is allocated further to the profit centre that utilises the terminal. We see that the reason to look at the utilisation level in the allocation of the terminal is important, since some flows utilise the terminal and some do not. If the terminal costs were to be allocated on a more template basis the allocation would not be fair since the allocation would not be based on where the cost is incurred and profit centres that do not utilise the terminal would be charged for it. The cost driver is determined by available statistics at VLCI which is the sales for terminal handling and will not be further investigated.

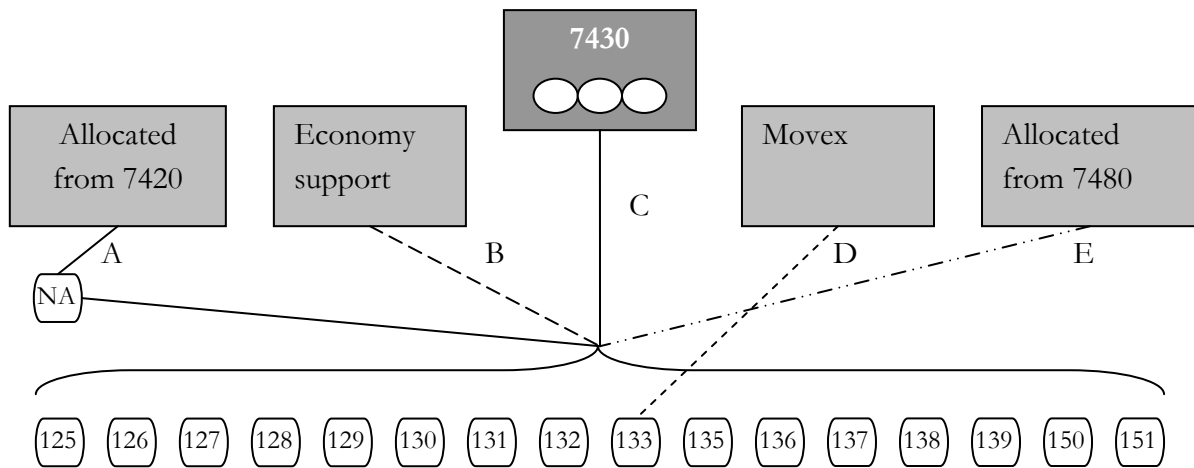
Costs that have been allocated from Sales & Logistics 7420 are the costs for logistic support and other services that are not possible to allocate to any specific profit centre. This as the individual consumption of these activities is impossible to identify on a practical basis since the consumption varies from time to time and have resulted in non consistent fluctuations at the profit centre level. To be able to handle this issue and to allocate the cost to make the model manageable, the cost has to be assumed to be allocated by the number of profit centres that exist. This can also be motivated with, that the logistical services provided by Sales & Logistics are a developing process that incur costs that have to be taken for future potential.

The costs marked Movex in the figure refers to the cost of IT software Movex. The Movex costs are separated from the IT costs, otherwise considered as an overhead cost, since it has been identified that the system is exclusively utilised by a specific flow. The cost for Movex is therefore allocated directly to the appropriate profit centre.

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Figure 6.10: Allocation of Export 7430 costs



- A : Not applicable, allocation no. profit centres
- B: Cost Driver : Postings
- C : Cost Driver : No. of jobs per profit centre
- D: Specific allocation
- E: Cost Driver : Sales for terminal handling

### 6.6.5 Import & Domestic, 7440

The import & domestic department is divided into two profit centre groups, domestic and import. The overhead resources, the department specific overhead and the resources from department 7400 are allocated in the same manner as for the export department, 7430, as the departments are similar and applicable for 7440 as well. In *Figure 6.11* the allocation is illustrated of the overhead costs as well as the resource utilisation of other departments.

The allocation of the resources that economy support provides is done through the same cost driver as for 7430 as the argument is valid for 7440.

The express & customer service department provides the domestic part of 7440 with services that should be carried by the respective profit centres. What the department provides is customer service, arriving goods are administered by department 7410.

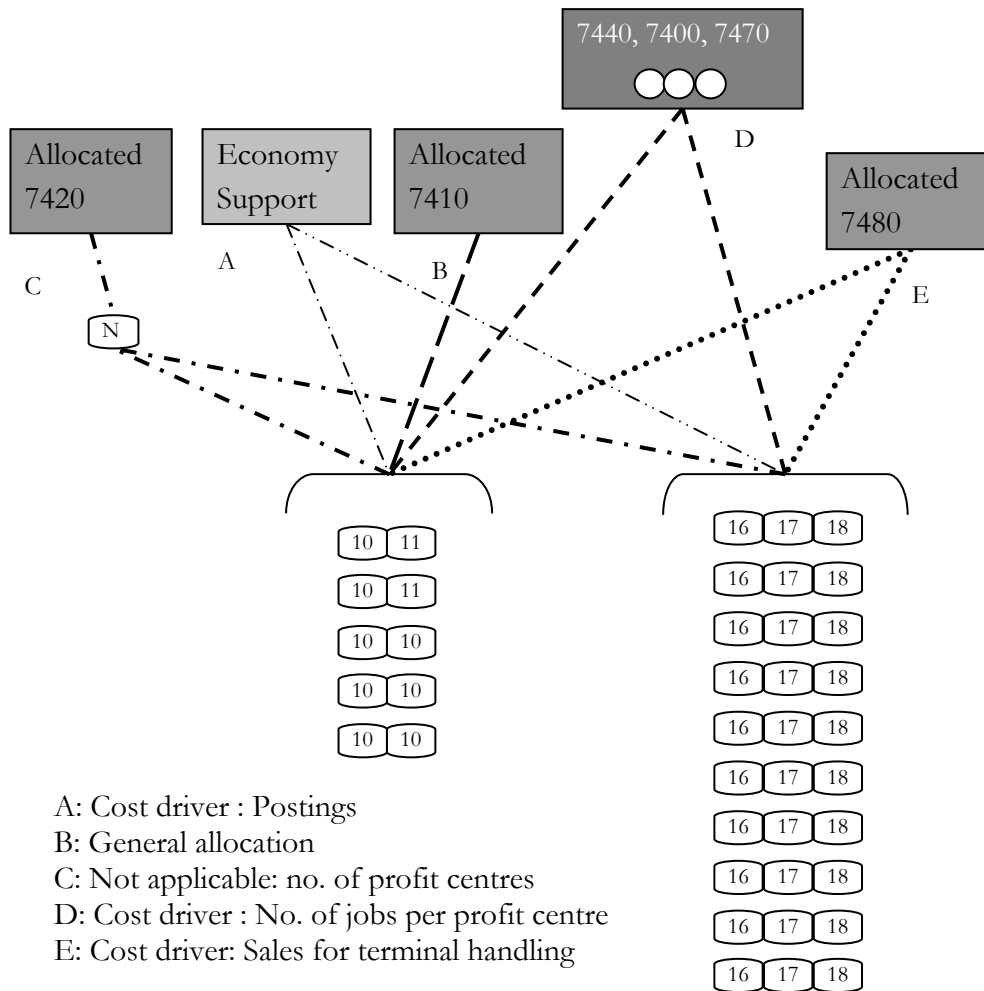
The allocation of department Sales & Logistics, 7420 is done through the same type of cost driver used for allocating costs for 7430.

The customs department performs different activities that the import department utilise, the different activities are specified in *Phase I*. The profit centres themselves utilises this service as the different markets specify what form of customs duties

have to be used. Therefore an estimation of the consumption of this department has taken place.

Department 7480 provides terminal handling some of the profit centres utilise this service and others do not. The cost driver used is the same as when allocating this cost to 7430

Figure 6.11: Allocation import & domestic

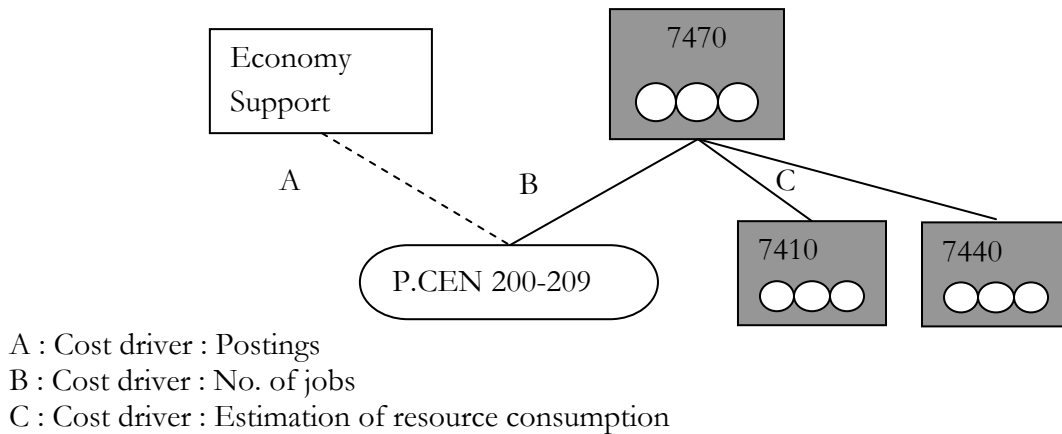


### 6.6.6 Customs, 7470

The customs department performs services for different departments within VLCI as well as for external customers. The majority of the external customers are within the Volvo Group but the actual shipping of the goods is not administered by VLCI. Therefore the customs department has two major customers, external of VLCI and those within their own traffic. The overhead costs and the specific overhead are traced to the cost objects according to how much of the resources each customer consumes from the department. Each activity has its own profit centre and will be traced directly to that particular profit centre.

The department offers support functions to the import department that can and have been estimated by each staff member.

Figure 6.12: Allocation Customs, 7470

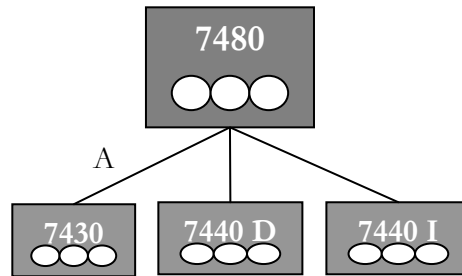


### 6.6.7 Material handling, cross dock Arendal, 7480

The department itself does not have any profit centres as it does not sell its services to customers, it provides service for the traffic departments in the form of material handling. Other departments have to carry the cost of this service through what they sell through their respective profit centre. The resources that the terminal provides are consumed through the amount of goods that is consolidated and shipped by each department. As mentioned before a profit centre can use the terminal to some extent, therefore the amount of volume shipped from a market should carry the cost, not the volume that is shipped directly. The allocation is performed according to dedicated personnel, dedicated surface area and the number of parcels handled. The allocation is performed according to statistics available. The statistics provide an estimation of a percentage of how many parcels are handled for the different processes at activity centre level. This in turn works as a resource driver to the activity centres. We believe that this figure is important to continuously evaluate since it is highly probable that this figure changes over time. The assumption is that these statistics provide an accurate basis for allocation. The cost for handling goods that pass through the terminal is determined by a terminal handling fee. This fee is static and has remained the same over several years, it is questioned if the fee should be adjusted to reflect the new prerequisites for the business that VLCI today offer. We will not go into this any further but it is suggested to be suitable for further research.

Through statistics that reveal the amount of goods handled at the terminal a resource driver can be established. The statistics show the relation of the resource to the cost object, in this case the profit centre. Hence the resource driver is the amount of goods handled for a department. The distribution is illustrated in *Figure 6.13*.

*Figure 6.13: Allocation Terminal, 7480*

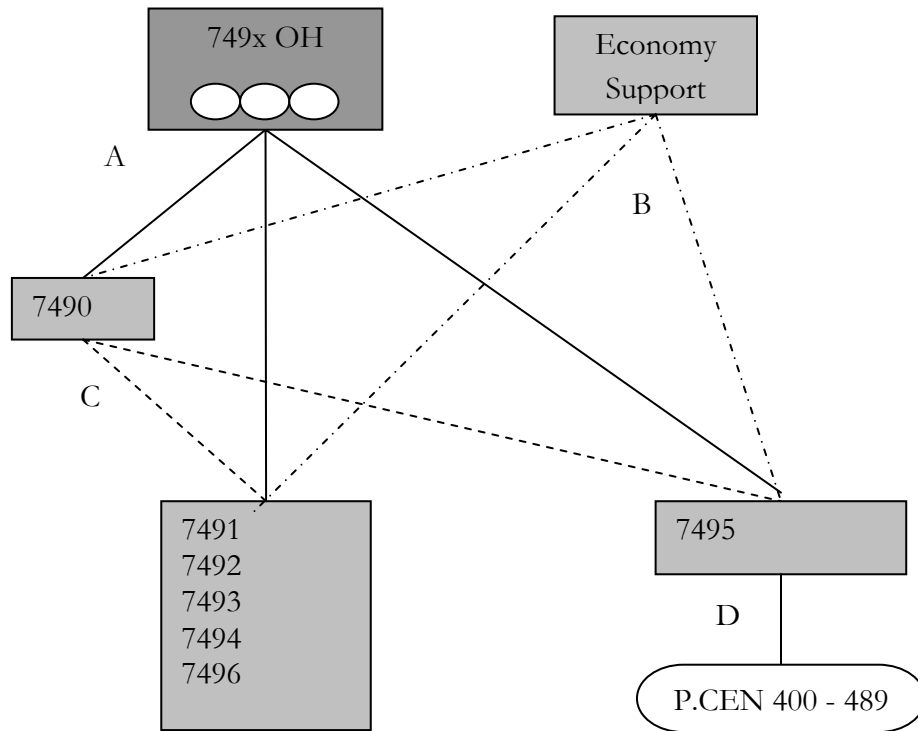


A : Resource driver : Dedicated personnel, dedicated surface area and Number of parcels handled	7440 D – Domestic 7440 I - Import
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### 6.6.8 Logistic Centre dep. 749x

The logistics department 749x, as previously stated, consists of several departments with various functions. The department 7490 represents the management and is distributed by the number of departments. The activities that are performed are split into two groups, general cargo 7495 and external customers represented by 7490-7494, 7496. The overhead resources are at first allocated to these two groups using the number of jobs as the resource driver. This identified resource driver corresponds to the actual work performed in each activity. We see that there is no other available resource driver that could provide a fair allocation of the resources. Once the costs have been traced to the two groups the allocation to the profit centres can take place. Since the external customers should carry the costs there are no profit centres and this cost will be eliminated from the model in this stage. The general cargo department (7495) has its own profit centre and the costs for these activities will be traced to their respective profit centre using the annual postings as the cost driver. The annual postings give a representative picture of which profit centre consume which activities. The specific overhead cost will be traced directly to the external customers and be allocated to the profit centre using the same cost driver as the overhead costs.

Figure 6.14: Allocation 749x



- A : Resource Driver : Number of jobs
- B : Cost driver : Postings
- C : Cost driver : No. of departments
- D : Cost driver : Sales

## 6.7 The actual model

The cost for VLCI is allocated to the appropriate profit centres where applicable. The resources have been traced to activity centres and the defined cost objects. The first part of the analysis is now considered to be fulfilled by the actual establishment of the conceptual model. The modelling in itself is by this absolute, and *phase II* is completed. The actual modelling has taken place in Excel spreadsheets a brief presentation of it is presented in *appendix 6*. A brief description of some spreadsheets is shown to obtain an understanding of how it has been performed. Further a summary of the resource and cost drivers used can be found in *appendix 8*.



## Chapter Seven

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# PHASE III EVALUATION AND DISCUSSION

*In this section the model building approach and the benefits of the model will be analysed and evaluated. Critique of the ABC-model from the perspective of VLCI is discussed. This chapter finalises the analysis.*

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## 7.1 Model building discussion

The challenge has been to build a model that can create a holistic and true representation of how the organisation is constructed on a cost allocation basis. The developed ABC-model for VLCI is unique and adapted to suit the specifications and structures of the specific organisation. A cost models are unique, as theories state, the model can not be applied to other companies as the basics of running a business differ. The objective has been to investigate the structure in the way that the allocations are true to the highest possible extent, while keeping complexity to a minimum, which provides an understanding of the modelling methodology. The research has illustrated which general processes the organisational resources at VLCI perform. The empirical section provides the foundation for the cost model, which in turn is applied in the analysis section in order to construct the cost model.

The cost model created clearly illustrates where the costs incur, and how the costs have been allocated through, what according to ABC theory and our analysis, are appropriate resource and cost drivers. The model generates and illustrates the appropriate cost information, which enables each department to be aware of how much of the organisational resources each cost object consume. The model illustrates what each of the different profit centres requires from the organisational resources and by this each profit centre cost can be traced throughout the organisation.

If a cost model were to be created and not be adaptable to changes in the organisation the potential benefits of the model over a long spectrum of time would be lost as organisations change over time. As the goal was to create a cost model that can be used several times and be adaptable to changes, simplicity has been the principle throughout the model building. A frequently used cost driver in this model is the number of jobs that are required to produce a product or service. As stated before the number of jobs refers to the amount of resources put into a process, hence one job refers to one full time employee. We feel that it represents the true resource consumption. If one staff member works with a specific profit centre the cost for the time that the profit centre utilises should be allocated to that profit centre. We feel that there is a direct relationship between the number of jobs a resource demands and the cost.

The first *phase* in the model building, VLCI and their processes, laid the initiation for creating the model. The empirical information has been collected through

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interviews and observations at the VLCI facilities. The choice of respondents has been chosen based on which respondent is representative for the different levels of allocation. It can be said that the knowledge of the different departments and how they function has served as a basis for analysis. The interviews and observation have led to the introductory part of the model building and resulted in fulfilling the information need set for this phase.

In *phase II* the actual modelling has taken place. Additional interviews and observations have been important in order to identify the correct resource- and cost driver relationship between the different activity centres, cost objects, resources and costs. During the modelling phase the importance of the trade-off between complexity and simplicity have always been considered and, as Lin et. al.<sup>107</sup> also stress, the goal has been to keep the model as simple as possible with as few input sources in the model as possible. The information need in this phase has been developed into a conceptual cost model.

By this discussion we consider that the research project has obtained reliability and validity. By following a structured and well-developed theory, ABC-modelling, we consider ourselves to have achieved a high level of validity of the model. The reliability of the model depends on the data used. The information used in the model must be of high quality in order for the information provided by the model to be correct. When the model is operational, it is important that the data is analysed so that it reflects the reality at VLCI at the particular moment of investigation. In order to achieve the highest reliability possible we have compared data from various interviews and data output from systems. Our information in the model will work as a foundation for further development.

## **7.2 Benefits of the ABC model**

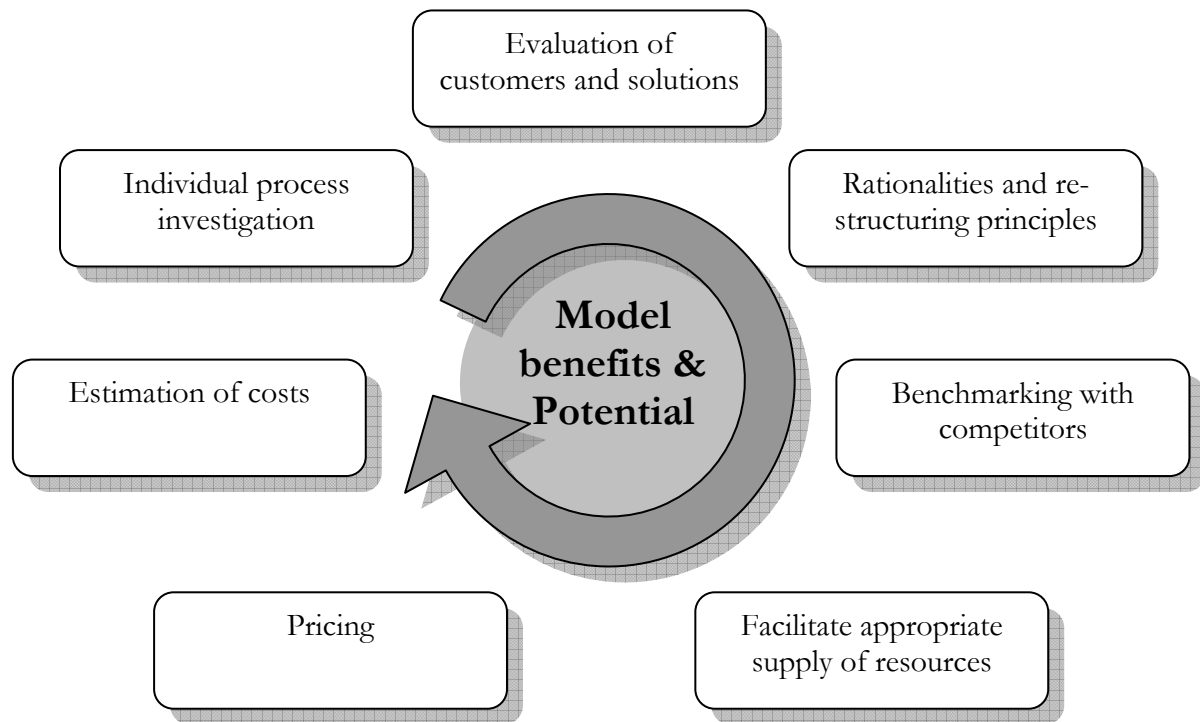
The model can be utilised in different ways and thereby provide benefits depending on the nature of the required information for VLCI. The model is a tool that VLCI can use to understand the cost of their services. Through constant evaluation of the data acquired, an organisation can be improved. Several benefits that the model can provide VLCI are identified in *figure 7.1* with a subsequent elaboration.

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<sup>107</sup> Lin, B., Collinj, J., Su, R, (2001)

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Figure 7.1: ABC model benefits



### ***Individual process investigation***

The model can provide information about the costs themselves and the organisational structure. Through the model a good estimation of what the cost for each activity and service can be obtained. If the costs are identified the different processes can be investigated and an analysis of the input versus output can be performed. Questions important for VLCI to consider are whether the amount of resources put in to the process reflects the outcome. If the processes have added additional value to their services and motivates the cost for it? This analysed is a benefit for management, which enables strategic decisions and a holistic overviews. Further the possibility to investigate processes from a cost perspective where the cost information can be obtained for each of the activity and profit centres where allocation has taken place. It is possible to isolate specific resources and cost and thereby trace them individually using the defined relations in the model. The costs can easily be allocated one step further to know the exact product cost. If the cost had been allocated one step further the cost per order on an annual basis, VLCI can identify where the costs incur differently at different profit centres. The model can be used operationally in different scenarios allocating costs to the activity- or profit centres when the resources and cost are entered in the model for the period investigated.

***Evaluation of customers and solutions***

VLCI can use a cost approach when evaluating their different markets. Focus can be aimed at investigating where actions are needed in order to improve each process. The best solution would probably be to decrease the activities at costly markets, but since VLCI is a service provider, services have to be provided where customers require. The only variable that VLCI can elaborate with is the physical movements of the products and does not have the possibility to de-emphasise certain markets which are too costly. The limitations set for this research project state that the external factors are not to be analysed, therefore further discussion on this topic is refrained.

Further VLCI can use the model when evaluating present customers and acquiring new customers, suppliers or establishing logistics solutions that are tailored to that specific delivery chain. A new supplier that would be included in a profit centre for a specific market, that profit centre can then be investigated and analysed from a total cost perspective. Does the deal in itself generate profit?

***Rationalities and re- structuring principles***

Through the model VLCI can be made aware of which activities consume resources and costs. When the costs are identified at each profit centre an awareness of which markets that have a higher consumption of costs compared to others can be made. A consequence when revealing the true costs for logistics services at VLCI is that a possible re-structuring of the different activity centres could take place. As the links between the activity centres are illustrated, we assume that it is possible that some of these links might cease and be re-structured so that the particular service is performed at the activity centre that actually utilises it. This is because some of these links are not necessary for one specific department and can be performed elsewhere. Through this focus can be aimed at improving areas where costs are comparably high. From a total cost perspective, the aim is to lower the costs throughout the organisation and thereby increase the potential for savings on the products and services offered. The model can answer the question, how will the cost be allocated if we would restructure this particular activity centre or process?

***Benchmarking***

The model can facilitate benchmarking with other logistics service providers based on competition. As benchmarking is common practice among corporations today, benchmarking of the performance of VLCI towards other logistics service providers is made easier through the model. The model provides cost information

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for each cost object, through this information different markets can be compared from a profitability standpoint. Through various forms of statistical information the cost regarding administrating an order can be made available. This information can be compared to the cost base of competitors. Further the different activity centres and processes within VLCI can be benchmarked with each other, this to examine which require the least amount of resources in order to achieve the objective. An internal best practice can then be established which could serve as a guide for the other activity centres and processes.

When benchmarking, a gap analysis should be made which can show the relative market position of the organisation both externally and internally. The results from such an analysis should be put into a plan of action where all necessary areas of possible improvement should be stated.

As VLCI has its major customer outside of the Volvo Group, Volvo Car Corporation they are constantly being evaluated by Ford Motor Company, which has its own logistics, service provider. VLC has come out on top from the result of those benchmarks, however this does not mean that they are secure and have VCC as a guaranteed customer. Therefore to continuously improve the organisation can be somewhat facilitated by the ABC analysis as it provides valuable information. VLCI strive to enhance their structure and thereby improve and strengthen their market position as a solid and reliable logistics provider.

### ***Facilitate appropriate supply of resources***

The model can further be used for facilitating decisions on the appropriate supply of resources. What the organisation actually spends of its resources in order to perform the required activities can be traced. The model specifies the resources separately therefore each resource can be investigated separate from the other. The direct costs, in this research project, department specific overhead can be traced and visualised to view how much a cost object requires at a particular moment of investigation. The indirect costs are displayed in the same manner as with the cost allocated from other departments. This enables tracing of costs separate from each other and therefore decisions of structural changes can be facilitated by the use of accurate information. Hence the model can avoid unsound structural changes that would make an activity centre reduce its cost level.

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### ***Pricing***

The cost information obtained can be used to track of where costs are incurred in order to provide VLCI with information to know what an activity costs in order to evaluate the margin of the services that they provide. This is important since awareness of which activity that consumes costs are crucial for a healthy development within a company. One benefit for the cost model is therefore within setting prices for future business deals while evaluating the present customer base. The model can answer the question, how much does it cost to perform different organisational activities and business processes?

When the costs for the specific activities are known it is easy to calculate the total cost for each logistics service solution that consists of different activities. The total package of these services determines what the administration fee should be set to for the specific logistics solutions. VLCI is a service provider and administrates the transports, therefore the administration fee that is invoiced to each customer is what VLCI actually can make a profit from. If the model is used for this purpose it can provide a foundation for the pricing of logistical services. It is important that it reflects the true costs of business. It is important for the company to ask themselves, if the administration fee is correctly set? VLCI has different administration fees set depending on the service that is performed. The administration fees can be differentiated depending on the cost of the profit centres, as each profit centre should provide VLCI with their share of the profit. The administration fee should reflect the cost that the organisation has since the administration fee is the main source of income for VLCI.

The benefit of using the model for pricing is crucial for VLCI to have knowledge if they are making profit by their services and logistics solutions, since the separable cost for the different profit centres are identified in the model. The price should at least cover the separable cost and provide a margin. It is however important to not solely use the model as pricing tool since other aspects such as willingness-to-pay and the strategic importance of customers are important to consider when setting the price. This is not considered in the model.

### ***Estimation of cost***

The model can provide the possibility to estimate costs for the services. Theories within ABC state that an analysis of this sort never can achieve a higher allocation of costs to more than 75-80%. Therefore estimations from the data provided by the model can be made. Different commissions, customers can be evaluated and estimated from a cost perspective. The model displays the total cost for each

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profit centre, each profit centre is a bundle of commissions of different suppliers that the customers of VLCI have specified. The total cost can be calculated per order, per hour or per kilo depending on what is regarded as significant for a particular investigation. If the individual commissions are deemed to yield low costs by the data provided, the concept can be applied to other commissions. The bundle of commissions also represents individual markets therefore the same can be applied to them.

### **7.3 Critique of ABC output**

The output that has been generated by the model can serve as a basis for managerial decisions, management have to consider the output for what it actually is, output. The output is not the solution to the problems that VLCI has. It simply identifies where the costs should be allocated.

The costs have been allocated to the respective profit centres where possible, information has been given to how much it costs to administrate an order. This does not mean that the organisation should be reorganised to fit the ABC model more correctly. Everything that the model gives in information has to be analysed critically. Theory states that a properly conducted ABC analysis will be able to allocate 75-80% of total costs to the specific cost objects. This means that the information provided can not be taken for absolute true costs and should be viewed as general guidelines. Therefore naturally the model has limits and these have to be taken into consideration.

Another dilemma with conducting an ABC-model is that the organisation has to be structured in a corresponding way, the activities have to be conducted regularly and in the same manner over time to even be able to perform an ABC investigation. In this specific case, VLCI is constructed in the way that it is suitable for ABC, there are however departments that are not as clearly defined as others, one example as stated is Express & customer service, the prognosis for this department is never correct as the prediction of how much express service is needed can not be foreseen. The result is therefore that the department consumes far more resources than it actually should. Therefore this department has been regarded as difficult to analyse.

Further critique can be aimed at the lack of perfect cost data. The model can never be better than the data actually used. The output is a reflection of the input. The way the costs are recorded in today's computerised companies is not always correct. Therefore what the systems report as an input can be incorrect. In reality

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an important thing to consider when analysing the output of a model is what has actually been used as an input.

As VLCI provides as their main function logistics services globally the data from the ABC model has to be viewed from a global perspective. The model provides cost data down to each profit centre. That data should not be used to solely focus on just one profit centre but all of them. The examination of the total costs should focus on what can be done to improve the entire organisation instead of focusing on one variable. Therefore a holistic viewpoint has to be adapted. The costs themselves are not the issue, changes to them affect the customer base in one way or another, the viewpoint has to be extended both ways in the value chain. The focus on customers can never be compromised by only examining the costs.

Internal politics as mentioned in the theory is a variable that can never be neglected. If the ABC analysis is given too much focus and the data were to influence management decisions, changes might take place that divide the organisation, opinion wise. As data and statistics can be interpreted in various ways all angles have to be covered. As the ABC-analysis does not provide this the opinions are subjective and not always focused on what is best for the company. It is natural for a department manager to mainly focus on that department and not on the others. Changes are not always well received. Therefore the data has to be evaluated by the people that actually will be affected by it, not by someone else whom is external and does not have the essential thorough insight.

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## Chapter Eight

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# CONCLUSIONS

*In this section the conclusions will be presented and the research questions stated will be concretised. The conclusions from the research questions are illustrated in perspicuous frameworks.*

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## 8.1 Concretisation of the research questions

A model is a simplification of reality and this research project has developed a cost measurement model at VLCI. The model reveals sufficient cost data by tracing the resource consumption to activity centres, and in turn tracing the costs to the cost objects which in this case are the profit centres. Through this the first question of the research project can be answered.

- *How is it possible through a conceptual cost model to reveal the cost of logistic services at a logistic service provider?*

When establishing a conceptual cost model an advantage is to exploit already developed theories. The ABC-methodology developed by Johnson & Kaplan in the late 1980s is very suitable for investigating the cost for logistic services. This since the concept core is to allocate the costs to the activity that actually consumes the resources from the organisation. This enables knowledge of profitability potentials for individual logistic services. As VLCI offers several different logistic services that are tailored to support the specific solution, ABC-methodology is an enabler to reveal the cost for logistic services. We have chosen to develop the model from existing methodology, since already developed theories enable the model to achieve a consistence and validity. This in order to avoid neglecting important issues and variables.

To be able to trace the cost to the cost object, certain information needs have to be obtained. The information need is set from the model creation procedure stated in the ABC- theories. We have sequenced the procedure into three distinct phases. The information need in the initial phase involves the creation of knowledge about the organisation and the different resources and cost that are to be investigated. The second phase involves the actual modelling and model creation where relationships between the resources, activity centres, and cost are analysed. The relationships are illustrated in resource and cost drivers for each activity centres respective profit centre. The evaluation of the model as well as the different benefits, represent the final phase of the model creation. The second main research question will further discuss the benefits and potential.

We consider the model to have its limitations because the model is a simplification of the reality. The model is therefore, for natural reasons important to adapt as the prerequisites in the reality change. We have therefore developed an adaptive model where the information can be changed to reflect new situations. It could also be said that the model has to be continuously improved with follow ups on a

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regular basis where the changed information is entered into the model coherent with the new reality.

Through careful analysis of the context within the different phases we have concluded that VLCI has been provided with a conceptual cost model that reveals sufficient cost data for the logistic services. By this the first main research question is considered to be answered.

The sub question presented in the introductory part can now be concretised.

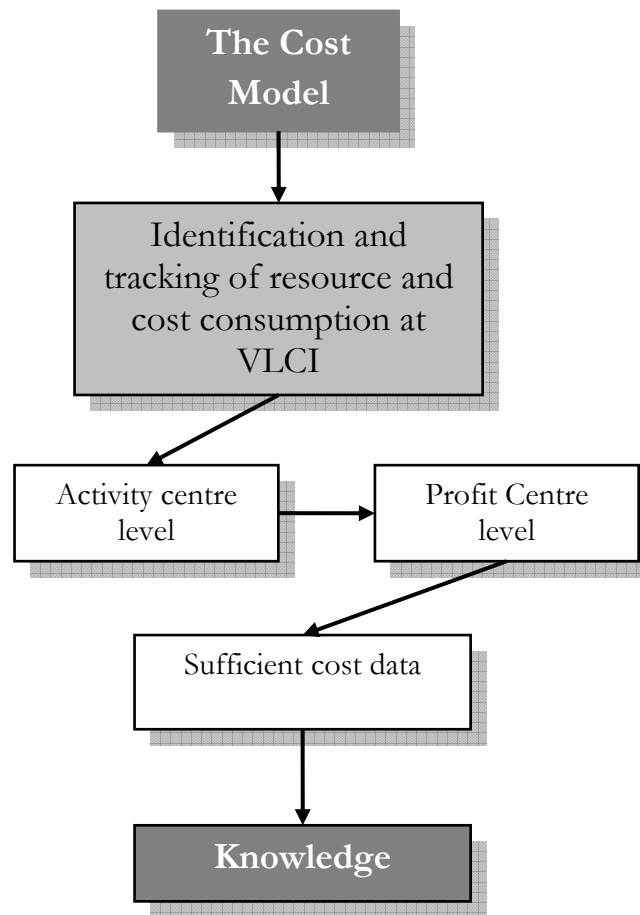
➤ *What determines the difference between the resource utilisation of the profit centres?*

Each market has its own particular logistic solution therefore the consumption between the profit centres differs. The resource consumption depends upon which activities/processes are required for a specific logistic solution which in turn is what the customer requires.

It is almost impossible to specify what determines the resource utilisation at each profit centre on a general basis. This since the requirements for each profit centre is individual. To obtain the difference in resource utilisation of each profit centre has to be carefully analysed. Through our model the consumption is illustrated for each profit centre, as the resources are allocated through cost drivers that affect the profit centres on a relatively equal basis. Therefore to specify exactly what determines the consumption is outside the scope of this research project. This question can thereby only be answered in part, a more concrete analysis of the profit centres is therefore suggested for further research. The first research question is considered to be answered and illustrated in *Figure 8.1*.

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Figure 8.1: Conclusion framework 1



The first research question brings forth the second main research question:

- ***What benefit and potential can a cost model provide Volvo Logistics Corporation?***

Answering the sub-questions concretises this research question:

- *What is the significance of accurate cost information for the processes at Volvo Logistics Corporation?*
- *Will there be any consequences of revealing the true cost at Volvo Logistics Corporation?*

We feel that the conceptual cost model can provide VLCI with various forms of information depending on what the model is utilised for at a particular time. When investigating the organisation the model can clearly illustrate how the resources and costs are allocated to the different activity centres and profit centres. As different activity centres and profit centres relates to each other the knowledge of how resources are allocated is an important benefit. We see this as a facilitator for managerial decisions where the information can enable appropriate decisions.

The users of the model can acquire information of how the costs are allocated that are required in order to run the everyday activities that are necessary. This is the significance as management, department managers and the staff members can be aware of how much resources the different activities consume. This creates consciousness throughout the organisation.

We consider a consequence for VLCI to be that the model can facilitate rationalities principles. If the costs are known at profit centre level a discussion of why different profit centres incur cost in different ways can take place. If a profit centre were to cease to exist no allocation would take place. The consequence would be that the direct costs would be eliminated specific to that profit centre, the indirect costs that were consumed would instead be added to the other profit centres. Processes should be performed where they are needed, otherwise unnecessary resource consumption can take place and reducing the total cost for specific processes. This means that the model is adaptive to changes within the organisation to some extent. The model is a simplification of the organisation, therefore for natural reasons it is important to adapt to the prerequisites of reality. This could also be said with the model have to be continues improved with follow ups on regular basis where the changed information are put into the model to reflect the new reality.

One other important benefit of the model is that rationales for correct pricing can be achieved. We believe that the different administration fees that VLCI have for the different logistical services that they provide can be set so that profitability can be maximised.

As mentioned Volvo Logistics Corporation has its main competitor in other logistics service providers. We believe that the model can facilitate benchmarking procedures that are necessary in order to obtain knowledge of the market position that they currently are in. As Ford Motor Company constantly evaluates if VLCI is the correct service provider for VCC they have to be able to convince their customers that they are the best the market has to offer.

The model allocates resources and costs down to each profit centre where available and then down to the cost per order on an annual basis, the different profit centres can be compared to each other and how much the consumption differs of resources. We believe that a total cost perspective should be applied and every profit centre analysed in order to perform at a higher level. This is important for VLCI as they can not cease to deliver services to a specific market just because it is unprofitable as the markets they are active in is determined by their

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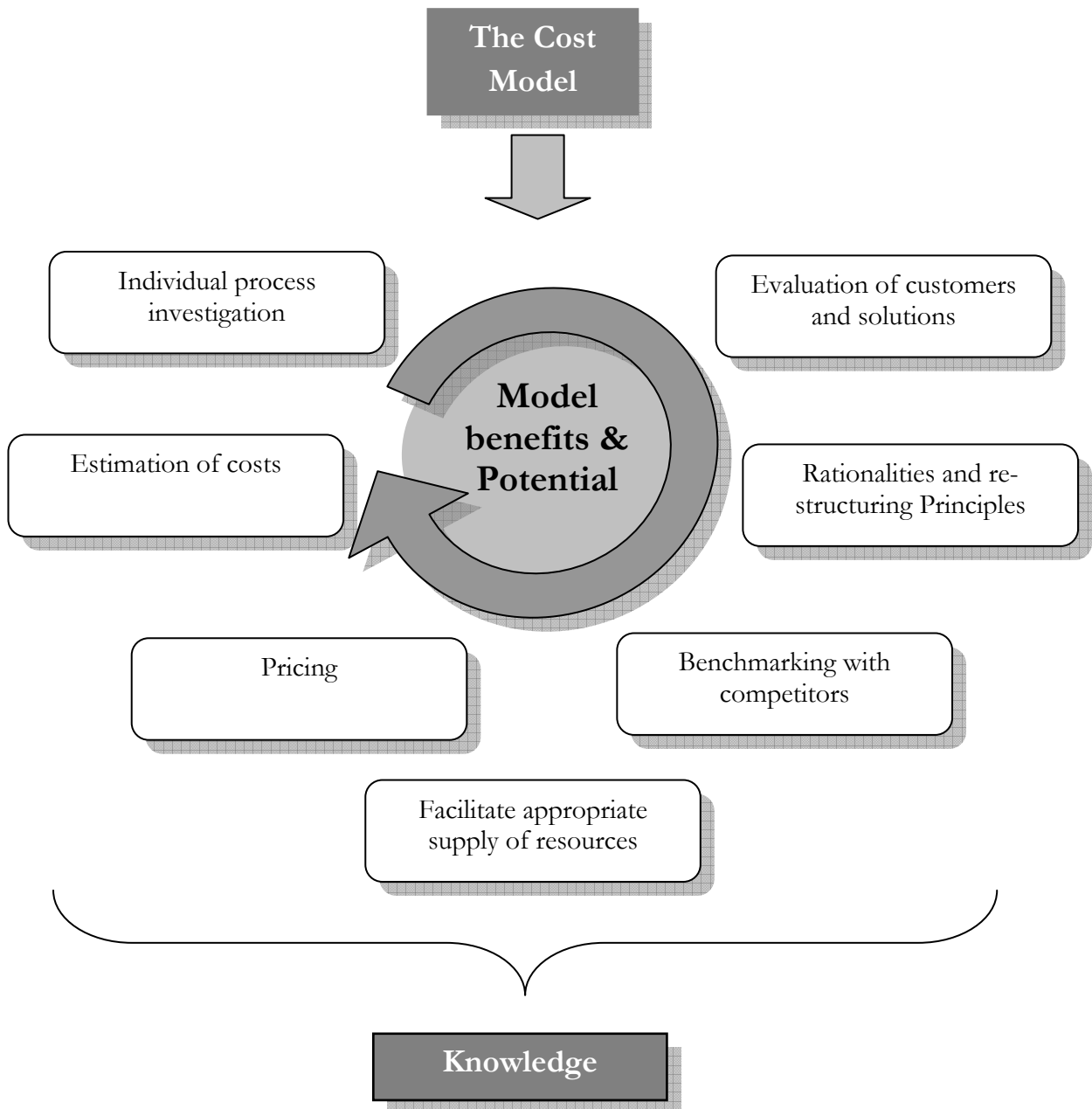
customers. The model can answer the question, how much does it cost to perform different organisational activities and business processes?

Through the data acquired from the model certain estimations of certain costs can be made. When the costs for the specific activities are known it is easy to calculate the total cost for each logistics service solution that consists of different activities/processes. The total package of these services determines what the administration fee should be set to for the specific logistics solutions. A new supplier that would be included in a profit centre for a specific market, that profit centre can then be investigated and analysed from a total cost perspective. Does the deal in itself generate profit? The benefit of the cost model is therefore within setting prices for future business deals while evaluating the present customer base. The model can answer the question, how much does it cost to perform different organisational activities and business processes? Therefore a benefit of the model is that it has a certain pedagogical value.

We believe that an eventual re-organisation can with assistance of the model show how it would affect the cost structure that the change would imply. This awareness is important as a healthy development of a company only can strengthen the market position among the competitors, thereby acquiring new potential customers.

Thereby the second question is considered to be answered. The conclusion is illustrated and finalised in *Figure 8.2*.

Figure 8.2: Conclusion framework 2



By the presented conclusion frameworks the research questions are considered to be answered, the purpose and scope of the research project is considered to have been fulfilled.





## Chapter Nine

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### FINAL DISCUSSION

*We will in this final section discuss the validity of our research project as well as our final thoughts and reflections. The section finishes with suggestions for further research.*

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## 9.1 The Validity of the Research Project

We believe that we have reached a high level of reliability and validity throughout this research project. This is motivated by the fact that during the collection of data we have continuously tried to verify the data through different sources to obtain *reliable* data. Of course to reach correctness of 100% is virtually impossible as when creating a conceptual cost model the amount of variables to consider as input sources is vast. We have always strived to obtain accurate data where possible. During the investigation our objectivity has always been kept in mind, and as far as it is possible our personal reflections both from the respondents and us as researchers to have been avoided.

As we have used already developed theory about the ABC-concept methodology and have followed its principles with corresponding adaptations in order to suit Volvo Logistics Inbound, *validity* has been achieved. To reach further validity we have continuously led a dialogue with our tutor at VLCI in order to make sure that the data and information is accurate. We have also made sure that we have always obtained information from the appropriate source concerning both the secondary data in terms of original authors and the primary sources, such as our interviews and observations.

We believe that we have achieved a high level of *internal validity* throughout this research project. The ABC-methodology in itself is precise and has been regarded as a guiding tool in the process of the model creation. We have followed the methodology but adapted the guidelines so that the model conforms to the structure at VLCI. Further we believe that we have achieved a high level of *external validity* as the results from the model have been compared to previous data and that the figures correlate.

## 9.2 Suggestions for further research

The challenge when writing a thesis is to limit the scope of the project so that there is a possibility to complete it in the short time span that is available. This is the reason for us setting the limitations that we have. There are many possibilities for further research at Volvo Logistics Corporation, Inbound Division that could be investigated in order to improve the organisation.

Further studies within economic model building could be how the organisation potentially could be re-organised so that it better enables economic analysis and

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tracing of the resources. Is the organisation today organised that to keep track of the costs were harder than if it were to be formed in another way.

Another possible research area could be to investigate the profit centres as such, if it is correct to use the concept of profit centres within a company. A further division might be necessary to precisely be able to trace the costs to the cost object. Is it correct to divide the organisation into different profit centres.

A study could be to investigate the true cost of terminal handling. How much it actually costs to utilise the terminal for consolidation of the goods over different periods of time. Can the terminal be used for other purposes than it is today? Is it ever profitable to offer terminal handling to the customers, should this activity be outsourced? These suggestions are all applicable to a third party logistics service provider. As these provide service to their customers it is of vital importance that each aspect of the services is investigated and potentially improved where possible.

### **9.3 Final reflection**

This master thesis project has provided us with many implications and obstructions. At times it has been frustrating and some things have seemed to be impossible to overcome. The research has made us aware of the importance of keeping track of where all costs are generated within a company. We dare to say that it is the costs that determine how well a business is run. Unnecessary mistakes can be avoided within a company, it is not uncommon for businesses to start projects that potentially can yield more business and in the last minute become aware of the fact that to implement it would demand so many resources that the implications would be severe.

The question is not how much money can be made, it is how much insight does a company have into its cost base, it is then that prices can be set and profits can be maximised. If everything is seen as a possible resource a potential output can be achieved. In the end costs are not everything that should be focused upon when performing economic modelling. The following closure reflects the dilemma through these wise words:

*“You have to learn to treat people as a resource...You have to ask not what do they cost, but what they yield, what can they produce?”*

Peter F. Drucker

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## REFERENCES

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### *Published sources*

- Andersson, G. (1997), *Kalkyler som beslutsunderlag*, Lund : Studentlitteratur
- Befring, E., (1994), *Forskningsmetodik och statistik*, Lund : Studentlitteratur
- Bell, J., (1995), *Introduktion till Forskningsmetodik*, Lund : Studentlitteratur
- Bowersox, D. J., Closs, D. J., Cooper, M. B., (2002), *Supply Chain Logistics Management*. Mc Graw Hill
- Creswell, J.W., (1994), *Qualitative & Quantitative Approaches*, Thousand Oaks, California : Sage Publications, Inc.,
- Cristopher, M., (1998), *Logistics and Supply Chain Management*, London : Financial Times/Prentice Hall
- Daly, J. L (2002), *Pricing for Profitability*, John Wiley & Sons, Inc
- Ejvegård, R. (1996), *Ventenskaplig metod*, Lund : Studentlitteratur
- Gerdin, J., (1995), *ABC-kalkylering*, Lund : Studentlitteratur
- Hicks, D. T (1992), *Activity-Based Costing for small and Mid-Sized Businesses: An Implementation Guide*, John Wiley & Sons, INC.
- Hicks, D. T (1999), *Activity-Based Costing. Making it work for small and mid-sized companies* 2<sup>nd</sup> ed. , John Wiley & Sons, INC.
- Holme, I. & Solvang, B. (1991) *Forskningsmetodik: om kvalitativa och kvantitativa metoder*, Lund: Studentlitteratur
- Jensen M. (1994) *Värdeskapande ABC & ABM*, Göteborg : IHM Förlag AB
- Johnson H. T. & Kaplan R. S.(1987), *Relevance Lost, The Rise and Fall of Management Accounting*, Boston : Harvard Business School Press
- Kaplan, R. S. & Cooper, R. (1998) *Cost and Effect: using integrated cost systems to drive profitability and performance*, Harvard Business School Press: Boston, Massachusetts

- Kvale, S., (1997), *Den Kvalitativa Forskningsintervjun*, Lund : Studentlitteratur
- Nilsson A G., et. al., (1999) *Perspectives on Business Modelling, Understanding and Changing organisations*, Berlin : Springer Cop.
- Olsson, C. & Moberger, H., (1995), *VOLVO – Gothenburg, Sweden*. Norden Publishing House LTD.
- Porter, M., E., (1985), *Competitive Advantage : Creating and sustaining superior performance*, New York : Free Press Corp.
- Sekaran, U., (2003), *Research methods for business – A skill building Approach*, 4<sup>th</sup> ed., John Wiley & Sons, Inc :
- Starrin B., & Svensson P-G., (1994), *Kvantitativ metod och vetenskapsteori*, Lund : Studentlitteratur
- Stock J., R.,& Lambert, D., M.,(2001) *Strategic Logistics Management 4ed*, McGraw-Hill Irwin
- Thiéart et. Al. (2001), *Doing management research – a comprehensive guide*, London : Sage
- Turney, P., (1996), *Activity Based Costing – The Performance Breakthrough*, Kogan Page
- Winter, J. (1987), *Problemformulering, undersökning och rapport*, Stockholm: Liber AB
- Griful-Miquela, C., (2001), *Activity-Based Costing Methodology for Third-Party Logistics Companies*, Int'l Advances in Economy Res., 7(1) : pp. 133-46, Feb. 01.
- Kaplan, R. (1988), *One cost system isn't enough*, Harvard Business Review Jan-Feb 1988
- Lin, B., Collins, J., & Su, R., (2001), *Supply Chain costing: an activity-based perspective*, International Journal of Physical Distribution & Logistics Management, Vol. 31 No. 10, 2001 pp 702-713, MCB University Press
- Pohlen, T., La Londe, B., (1994), *Implementing Activity-Based Costing (ABC) in Logistics*, Journal of Business Logistics, Vol 15, No 2 1994

*Unpublished*

Cambridge Advanced Learner's Dictionary, April 2003

<http://dictionary.cambridge.org> (available 2003-10-01)

Cambridge International Dictionary of English, April 2003

<http://dictionary.cambridge.org> (available 2003-11-03)

Council of logistics management

<http://www.clm1.org/> (available 2003-09-29)

Dagens Industri

<http://www.di.se> (available 2003-08-25)

The Volvo Group – Financial Report 2002, AB Volvo Publications,

[www.volvo.com](http://www.volvo.com) (available 2003-09-24)

Volvo Internal Presentation Material (2002)

*Interviews Volvo Logistics Corporation*

Anna-Karin Hjerpe, Inbound Import

Anne-Charlotte Warensce, Manager Inbound Export

Björn Möller, Economy Support Function, tutor at Volvo Logistics

Catharina Meyer, Inbound Export

Cecilia Börjesson, Inbound Import

Charlotta Berntsson, Inbound Export

Christer Patersson, Manager Express & Customer Service

Dushanka Zivanov, Inbound Export

Fiona Smyth, Inbound Export

Helen Lundberg, Inbound Import

Ingmar Johansson, Material Handling

Ingvar Johansson, Manager Material Handling

Jan Svanberg, Inbound Import

Jennie Härslö, Inbound Export

Jonas Sonesson, Manager Sales & Logistics

Kees Barten, Manager Logistics Centre, Department

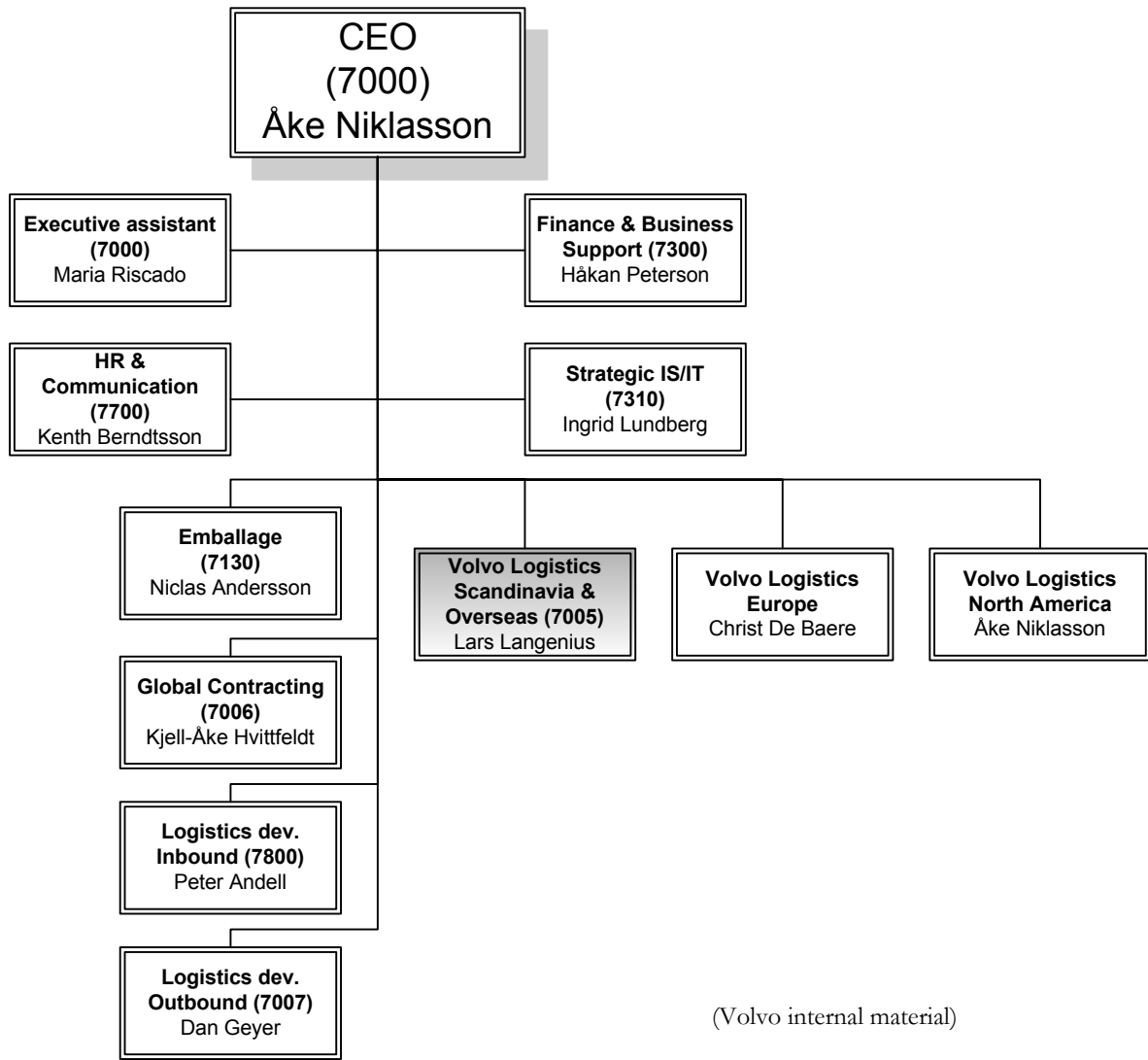
Kjell Johansson, Manager Customs Department

Thomas Olsson, Manager Inbound Import

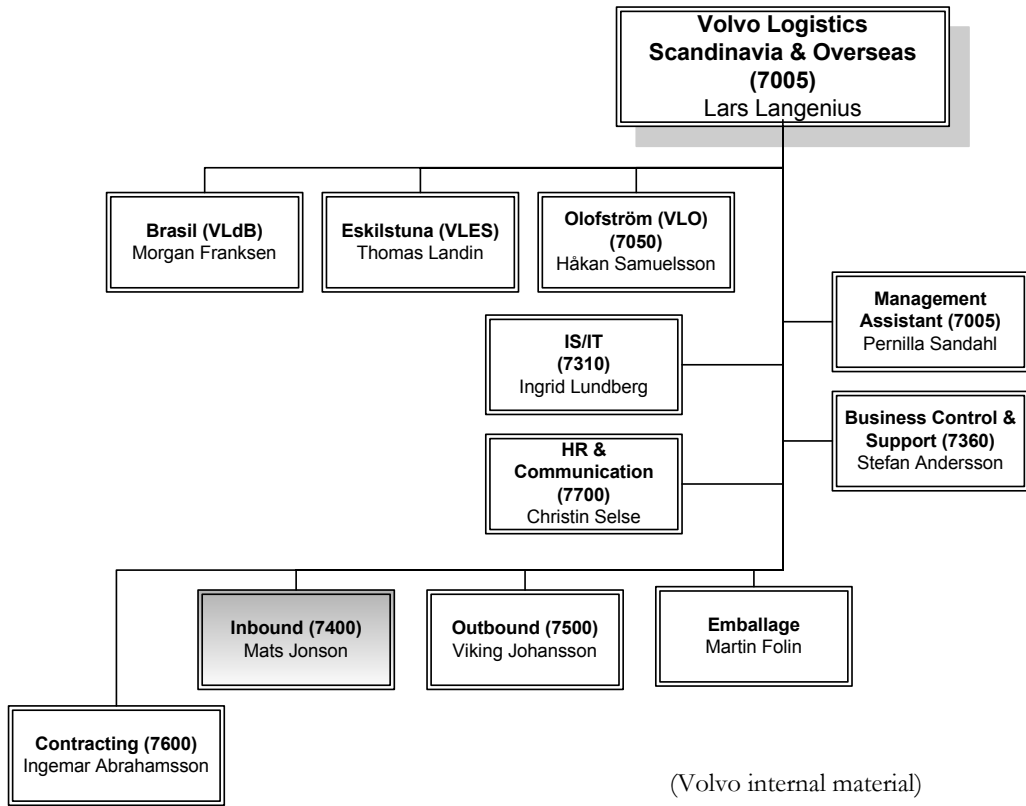
Ulf Andersson, Inbound Import

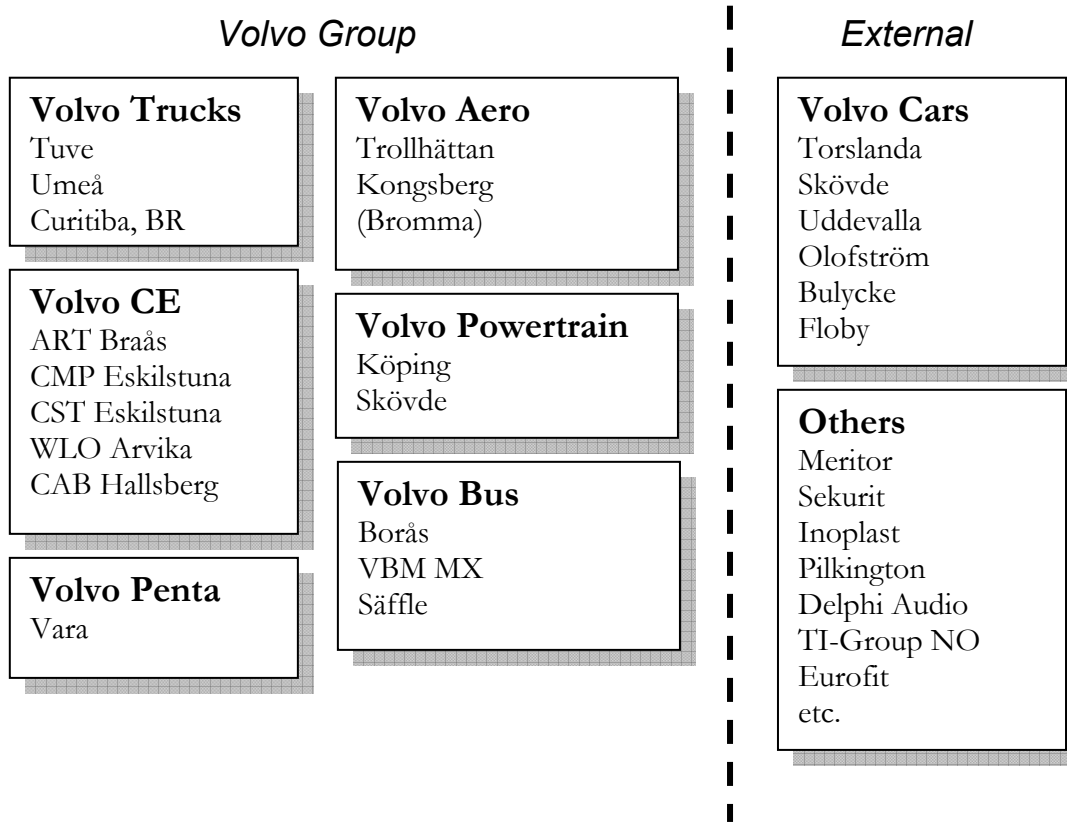
Ulf Jespersen, Sales & Logistics





(Volvo internal material)





	Cost centers/Cost elements
	541001 Kontorsinventarier
	541003 Datatillbehör (ej dataprogram)
	541015 Tillbehör PC-arbetsplatser
*	Förbrukningsinventarier
	581005 Biljetter Sverige
	581006 Biljetter utlandet
	582001 Biljetter
	583001 Hotellkostnader
	589101 Övriga resekostnader
*	Resekostnader
	596201 Reklamresor
	598201 PR-material
*	Annonsering och PR.
	607101 Representerat och konf (mat o dryck), avdr
	607104 Inbarn konferens, avdragsgill, gc
	607201 Representerat och konf (mat o dryck), ej avdr
	607204 Inbarn konferens, ej avdragsgill, gc
	607301 Representerat och konf (mat o dryck), avdr
	607401 Representerat och konf (mat o dryck), ej avdr.g
*	Övriga försäljningskostnader
	611001 Kontorsmaterial (papper, tejp, linjal, etc)
	611003 Blanketter
	615001 Trycksaker (blanketter, brevtyper, kuvert)
*	Kontorsmaterial
	621102 Telestrålltjänster
	621104 Telefonkostnad Volvo IT
	621201 Mobiltelefon- och personsökarkostnader,
*	Telekommunikation och Post
	632107 Övriga skador
*	Förretagsförsäkr. & riskkostnad
	659201 Övriga lejda tjänster, ngc
*	Hyra av tjänster
	637002 Packlitteratur
*	Övriga Kostnader
	721101 Månadslöner till tjänsteman (full lönebel)
	721102 Löna till tillfälligt anställda (lönebel e
	721103 Semesterersättning
	721107 Semesterutlägg
	721301 Övertidsersättning, tillsvärdaanställda
	728201 Stuklösa tillsvärdaanställda
	728203 Stukavdrag för tjänsteman
*	Löner till tjänsteman



## Appendix 5 Profit Centres

<b>Import 7440</b>	<b>Export 7430</b>	<b>General cargo 7495</b>
161 IMP ÖSTERRIKE	125 CKD Bus	400 STYCKEGODS GEM
162 IMP BELGIEN	126 CKD Bus Asien	402 SVERIGE
163 IMP BRASILIEN	127 CKD Bus Kina	403 NORGE
164 IMP CANADA	128 CKD Bus Masa	404 DANMARK
165 IMP SCHWEIZ	129 CKD Trucks	405 FINLAND
166 IMP TYSKLAND	131 EXP BELG	407 HOLLAND
167 IMP DANMARK	132 EXP BELG HYTTER	408 BELGIEN
168 IMP SPANIEN	133 Exp Brasilien Samba	409 FRANKRIKE
169 IMP FINLAND	135 EXP USA	411 ENGLAND
170 IMP FRANKRIKE	136 EXP ASIEN	412 PORTUGAL
171 IMP ENGLAND	137 EXP ÖVR MARKN	413 ITALIEN
172 IMP UNGERN	138 EXP Brasilien	414 SPANIEN
173 IMP IRLAND	139 EXP POLEN	415 TYSKLAND
174 IMP ITALIEN		416 SCHWEIZ
175 IMP JAPAN	<b>Express 7410</b>	417 ÖSTERRIKE
176 IMP HOLLAND		418 POLEN
177 IMP NORGE	493 FLYG, övrigt	419 ÖVR NORDEUROPA
178 IMP POLEN	191 FLYG IMPORT	420 ÖVR. SYDEUROPA
179 IMP PORTUGAL	192 Flyg export	421 BALTIKUM &
180 IMP USA	194 FLYG IMPORTCHARTER	429 ÖSTEUROPA
181 IMP EUROPA ÖVR	195 Flyg import express	431 USA
182 IMP OVERSEAS ÖVR	196 Flyg export charter	449 AMERIKA & KARIBIEN
183 IMPORT INDIEN	197 Flyg export express	459 AFRIKA
184 IMP TNT BIL EUROPA		468 TURKIET
187 Import Tjeckien	<b>Customs 7470</b>	469 MELLANÖSTERN
188 Import Slovakien		471 AUSTR.+NYA
189 Import Estland	200 TULLGRUPPER + TIR	472 JAPAN
<b>Domestic 7440</b>	201 URSPRUNG	489 ASIEN
	202 INTRASTAT	
101 INR LASTB.TRANSP	204 RESTITUTION	
102 Regionala Transporter	205 TULLADMINISTRATION	
103 TÅG HYTTRP FR UMEÅ	208 TULLUPPLAG	
104 Sekvenstransporter	209 IMPORTMOMS	
105 Östergötland	209 IMPORTMOMS	
106 TÅG OLOFSTR > GBG		
108 Småland 3		
109 Stockholm		
112 Trestadsområdet		

## Information Sheet

### VLC inbound info

Number of total Volvo employees	113,6
Number of total consultants	11
Number of total jobs	124,6
Sales total	1645300
Cost	

	Volvo Employees		Consultants	Sales kkr	Costs
	Employee	Collective			
7400	1	0	0	-	8136
Express & Customer Service, 7410	13,9	0	2	143300	-
Sales & Logisitcs, 7420	10	0	0	-	14895
Export, 7430	16,3	0	4	442000	-
Import, 7440	15	0	3	781600	-
Customs, 7470	9,4	0	1	180800	-
Mat. Hand. Crossdock, 748x	16	12	1	-	37391
Logistic Centre, 749x	5	15	0	97600	-
<b>TOTAL</b>	<b>86,6</b>	<b>27</b>	<b>11</b>	<b>1645300</b>	<b>60422</b>

### Cost information - General overhead

HR	2 500 000
Kontorservice	850 000
Mgmt VLISO	987 000
Facilities	2 300 000
Terminal Area	7 000 000
<b>Total General Overhead</b>	<b>13 637 000</b>

<b>Economy support</b>	
Kundreskontra	368 000
Leverantörsreskontra	3 210 000
Kassa/Bank	59 000
Anläggningsredovisning	87 000
Affärsekonomer/R3	6 500 000
<b>Total Economy support</b>	<b>10 224 000</b>

### Department specific overhead

7400	2 300 000
7410	5 400 000
7420	8 700 000
7430	9 870 000
7440	6 520 000
7470	4 500 000
7480	4 987 350
7481	14 250 000
7490	3 200 000
7491	4 897 560
7492	4 455 579
7493	1 125 668
7494	5 982 300
7495	1 200 000
7496	8 900 000
<b>Total Spec Overhead</b>	<b>86 288 457</b>

Data that is used in the model is entered in the information sheet. We have constructed the model so that all costs that are to be allocated throughout the model are entered into this worksheet. When the model is operational it is easier to handle when all data is entered into one single page. This also to reduce the possibility of redundancy and other data input errors.

## Total General OH allocation

	HR	Economy support	Facilities	Office service	Mgmt VLSO	IT costs	Total	In %
7400	41,379	84,706	90,090	6,211	17,640	396,811	636,838	1%
7410	289,655	1,603,769	720,721	49,689	141,118	5,623,809	8,428,762	13%
7420	206,897	158,118	450,450	43,478	123,478	4,233,705	5,216,127	8%
7430	310,345	2,831,099	810,811	55,901	158,758	5,074,135	9,241,047	15%
7440	310,345	5,074,804	900,901	62,112	176,398	11,330,477	17,855,036	28%
7470	165,517	2,086,029	405,405	27,950	79,379	3,781,609	6,545,890	10%
7480	558,621	282,354	945,946	99,379	282,236	4,723,115	6,891,650	11%
749X	1,034,483	1,694,122	675,676	155,280	440,994	4,166,907	8,167,461	13%
<b>Total</b>	<b>2,917,241</b>	<b>13,815,000</b>	<b>5,000,000</b>	<b>500,000</b>	<b>1,420,000</b>	<b>39,330,568</b>	<b>62,982,810</b>	<b>100%</b>
	5%	22%	8%	1%	2%	62%	100%	

Allocation of overhead resources to the respective activity centres.  
The allocations of each resource are held separate in order to facilitate easier overviews and to enable support for managerial decisions.



## Economy Support

Kundreskontra	785,000.00	Justering Leverantörsreskontra avd 7430-7440			
Leverantörsreskontra	7,000,000.00	Levreskontra	Cost fördelad or Justering	20%	Ny fördelning
Kassa/Bank	25,000.00	Export	1,144,539	572,269	1,716,808
Anläggning/redovisning	5,000.00	Import	2,861,347	572,269	2,289,078
Affärskonometr/R3	6,000,000.00				
Total cost	13,815,000.00				

Resource Driver: sales costs where dep. have no turn over

Departments	Resoruce driver	Key	Kund-reskontra	Lev.resk	Kassa/Bank	Anl.red.	Aff.ekon/R3	Total
7400	7,500	0.6%	4,813	42,920	153	31	36,789	84,706
7410	142,000	11.6%	91,130	812,623	2,902	580	696,534	1,603,769
7420	14,000	1.1%	8,985	80,118	286	57	68,672	158,118
7430	200,000	16.4%	128,352	1,716,808	4,088	818	981,033	2,831,099
7440	500,000	40.9%	320,880	2,289,078	10,219	2,044	2,452,583	5,074,804
7470	184,700	15.1%	118,533	1,056,982	3,775	755	905,984	2,086,029
7480	25,000	2.0%	16,044	143,067	511	102	122,629	282,354
7490	150,000	12.3%	96,264	858,404	3,066	613	735,775	1,694,122
<b>Total</b>		<b>100%</b>	<b>785,000</b>	<b>7000000</b>	<b>25000</b>	<b>5,000</b>	<b>6,000,000</b>	<b>13,815,000</b>

An example of overhead allocation of the economy support function to each activity centre by category. This allocation is representative for the other resources allocated.

## Costs to be allocated

General OH	
HR	310,345
Facilities	900,901
Office service	62,112
Mgmt VLSO	176,398
IT costs	11,330,477
<b>Total General OH</b>	<b>12,780,232</b>

Economy support	
Kundreskontra	320,880
Leverantörsreskontra	2,289,078
Kassa/Bank	10,219
Anläggningsredovisning	2,044
Affärskonomer/R3	2,452,583
<b>Total Economy Support</b>	<b>5,074,804</b>

specific OH cost	10,000,000
<b>Total Specific OH</b>	<b>10,000,000</b>

Costs Allocated from other dep	
Cost allocated from 7400	1,045,043
Cost allocated from 7410 Domestic	3,168,295
Cost allocated from 7420	4,880,123
Cost allocated from 7470	488,476
Cost allocated from 7480 Domestic	6,324,299
Cost allocated from 7480 Import	10,749,724
<b>Total Allocated Cost from other dep</b>	<b>26,655,960</b>

<b>TOTAL</b>	<b>54,510,995</b>
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<b>Total cost per employee</b>	<b>5,260,563</b>
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<b>Total cost per employee/hour</b>	<b>2,529</b>
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*Example of costs to be allocated at an activity centre*

Resource allocation to an activity centre.

The costs and resources are divided according to characteristic. First the allocation of the general overhead resources are shown.

The economy support function is specified.

The specific overhead cost for each activity centre is shown.

The costs allocated from other activity centres that should be allocated to the respective cost object is shown.

The total cost that should be allocated is shown.

The total cost per employee per year and employee/hour is calculated.

### Estimation of jobs per profit centre

Jobs per Profit Centre													Total			
125	CKD Bus Afrika	0.07											0.12			
126	CKD Bus Asien	0.08											0.38			
127	CKD Bus Kina	0.07											0.22			
128	CKD Bus Masa	0.07				0.30							0.82			
129	CKD Trucks	0.07										0.50	0.62			
131	EXP BELG	0.07			0.50							0.25	0.10	1.00	3.72	
132	EXP BELG HYTTER	0.07								0.05			0.05	0.40	0.57	
133	Exp Brasilien Samba	0.07			0.70	0.50	0.70	0.20	0.50				0.70		3.42	
135	EXP USA	0.07								0.90	0.90	1.00	0.85		3.72	
136	EXP ASIEN	0.07	1.00	0.10					0.50				0.10		1.77	
137	EXP ÖVR MARKN	0.07												0.15	0.22	
138	EXP Brasilien	0.07				0.30									0.37	
139	EXP POLEN	0.05													0.75	
150	HUB														0.00	
151	Import	0.13										1.00			1.13	
	<b>Total</b>	<b>1.00</b>	<b>1.00</b>	<b>0.80</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>17.80</b>

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~ XI ~

Jobs per Activity													Total	key			
Intrastat (P-cen 202)													0.36	0.05		0.41	5%
Tuldekl (P-cen 205,208)	1.00				0.35		0.80			1.00			0.12	0.80	0.15	5.22	69%
Ursprung (P-cen 201)					0.65								0.04			0.69	9%
Aktiv förädling (P-cen 204)														0.15	0.05	0.20	3%
Tulltaxering (P-cen 201)													0.12		0.10	0.22	3%
Tullutveckling (Other)													0.16		0.70	0.86	11%
<b>Total</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>0.80</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>0.80</b>	<b>1.00</b>	<b>1.00</b>	<b>7.60</b>	

2

1. Example of estimation and input data of how much resources each profit centre consume in order to perform required activities. That is the number of jobs.
2. Example of estimation of input data to activities where profit centres do not exist. The example is for the customs department. This input is activity based opposed to per profit centre based.

### Allocation per Profit centre

Allocation to Profit Centre	Cost Driver	Key	Overhead	Spec OH	Allocated from 7400, 7420	Total
125 CKD Bus Afrika		0.1	34,133	57,756	8,155	100,044
126 CKD Bus Asien		0.4	107,276	181,518	25,631	314,425
127 CKD Bus Kina		0.2	63,391	107,261	15,146	185,797
128 CKD Bus Masa		0.6	165,791	280,528	39,612	485,930
129 CKD Trucks		0.2	48,762	82,508	11,650	142,921
131 EXP BELG		5.6	1,628,649	2,755,776	389,125	4,773,550
132 EXP BELG HYTTTER		0.6	165,791	280,528	39,612	485,930
133 Exp Brasilien Samba		4.8	1,394,592	2,359,736	333,203	4,087,530
135 EXP USA		4.1	1,189,792	2,013,201	284,271	3,487,264
136 EXP ASIEN		1.2	341,334	577,558	81,553	1,000,445
137 EXP ÖVR MARKN		0.4	107,276	181,518	25,631	314,425
138 EXP Brasilien		0.4	107,276	181,518	25,631	314,425
139 EXP POLEN		0.8	224,305	379,538	53,592	657,435
150 hub, 151 Import		1.1	331,581	561,056	79,223	971,860
<b>Total</b>		<b>20.2</b>	<b>5,909,949</b>	<b>10,000,000</b>	<b>1,412,034</b>	<b>17,321,982</b>

Example: Allocation of cost with the appropriate cost driver chosen. The allocation is shown to each profit centre.

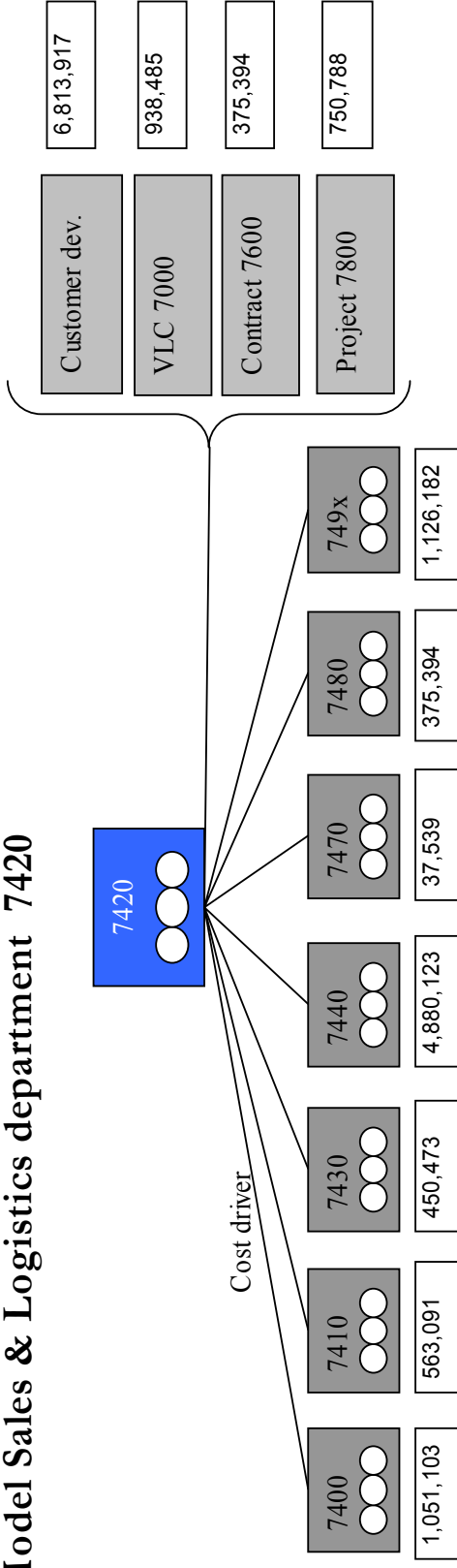
### Allocation Economy Support to profit centre

Economy Support	Cost Driver	key	Total cost
125 CKD Bus Afrika	-1,183,450	0.6%	15,612
126 CKD Bus Asien	-1,625,761	0.8%	21,447
127 CKD Bus Kina	-5,728,899	2.7%	75,574
128 CKD Bus Masa	-14,527,574	6.8%	191,645
129 CKD Trucks	-38,998,134	18.2%	514,455
131 EXP BELG	-20,009,397	9.3%	263,959
132 EXP BELG HYTTTER	-59,052,484	27.5%	779,007
133 Exp Brasilien Samba	-27,094,844	12.6%	357,429
135 EXP USA	-23,692,227	11.0%	312,543
136 EXP ASIEN	-15,651,533	7.3%	206,472
137 EXP ÖVR MARKN	-1,435,018	0.7%	18,930
138 EXP Brasilien	-2,937,176	1.4%	38,747
139 EXP POLEN	-2,674,380	1.2%	35,280
150 hub, 151 Import	0	0.0%	-
<b>Total</b>	<b>(214,610,876)</b>	<b>100%</b>	<b>2,831,099</b>

### Allocation of terminal (7480) to profit centre

Terminal	Cost/Driver	key
125 CKD Bus Afrika	0	0%
126 CKD Bus Asien	0	0%
127 CKD Bus Kina	0	0%
128 CKD Bus Masa	11,100	0%
129 CKD Trucks	0	0%
131 EXP BELG	9,045,531	73%
132 EXP BELG HYTTTER	17,360	0%
133 Exp Brasilien Samba	0	0%
135 EXP USA	2,323,757	19%
136 EXP ASIEN	386,544	3%
137 EXP ÖVR MARKN	0	0%
138 EXP Brasilien	663,156	5%
139 EXP POLEN	0	0%
150 hub, 151 Import	0	0%
<b>Total</b>	<b>12,447,448</b>	<b>100%</b>
		<b>8,400,291</b>

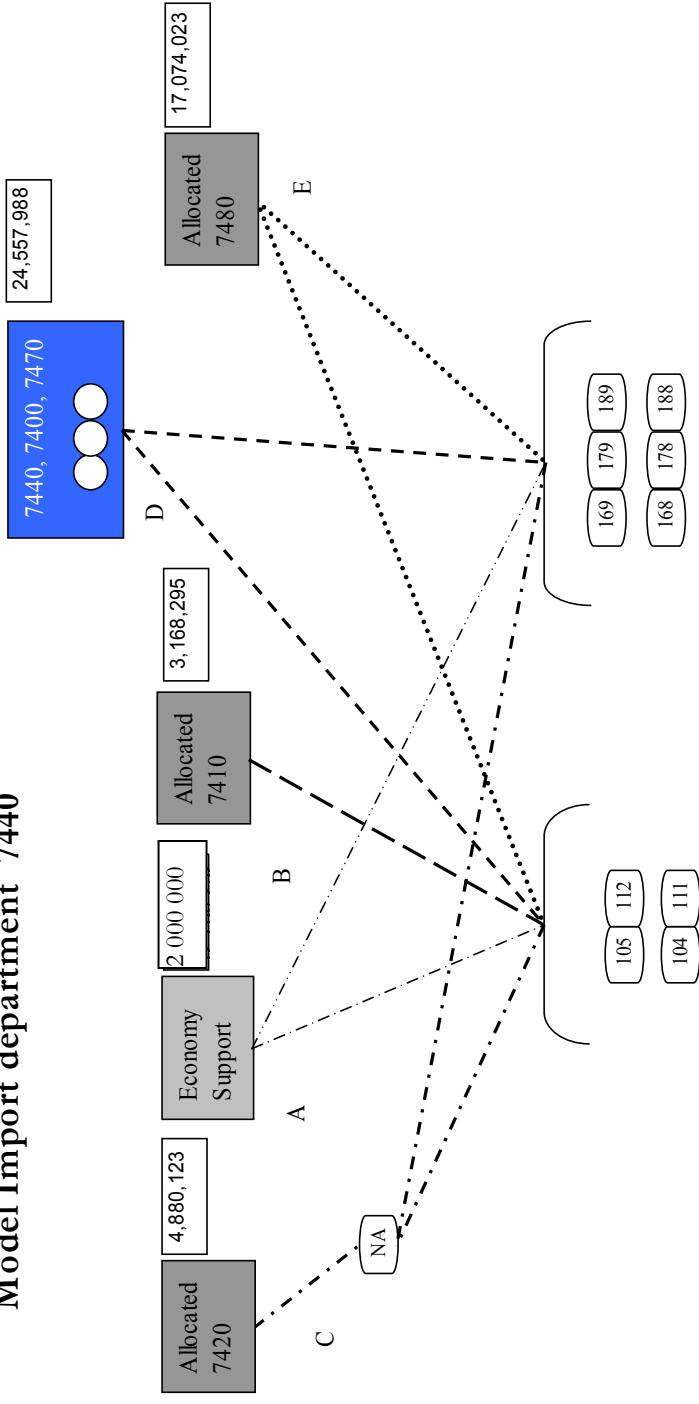
## Model Sales & Logistics department 7420



Cost Driver : No. of jobs at each activity centre

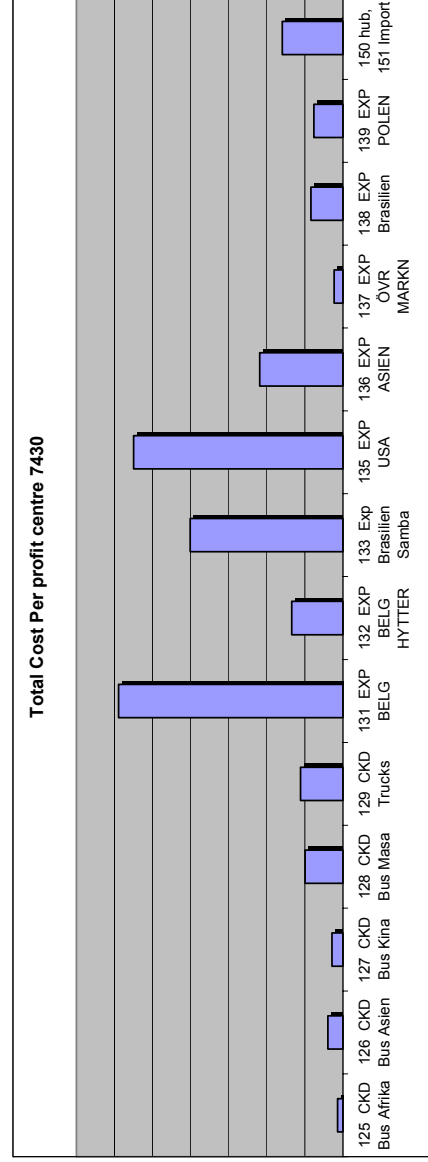
Example of model illustration for a department where costs can not be allocated to a specific profit centre as it does not have any of its own. The costs are allocated to the respective activity centre where the costs incur.

## Model Import department 7440



- A: Cost driver : Postings
  - B: General allocation
  - C: Not applicable: no. of profit centres
  - D: Cost driver : No. of jobs per profit centre
  - E: Cost driver: Sales for terminal handling
- Example of illustrated relationships between cost s to the respective profit centres.

	General			Allocation				Terminal	Total
	Overhead	Spec OH	Economy	7400/7420	Other				
125 CKD Bus Afrika	39,835	67,403	25,000	9,518	-	-	141,756		
126 CKD Bus Asien	127,250	215,315	21,447	30,403	-	-	394,416		
127 CKD Bus Kina	71,924	121,700	75,574	17,184	-	-	286,383		
128 CKD Bus Masa	271,099	458,716	191,645	64,772	-	7,491	993,722		
129 CKD Trucks	204,707	346,377	514,455	48,910	-	-	1,114,448		
131 EXP BELG	1,233,775	100,000	263,959	294,780	-	4,000,000	5,892,514		
132 EXP BELG HYTTER	188,109	318,292	779,007	44,944	-	11,716	1,342,068		
133 Exp Brasilien Samba	1,134,188	1,919,116	357,429	100,000	500,000	-	4,010,733		
135 EXP USA	1,233,775	2,087,624	312,543	294,780	-	1,568,212	5,496,933		
136 EXP ASIEN	586,458	992,324	206,472	140,119	-	260,863	2,186,236		
137 EXP ÖVR MARKN	71,924	121,700	18,930	17,184	-	-	229,739		
138 EXP Brasilien	121,718	205,954	38,747	29,081	-	447,538	843,037		
139 EXP POLEN	248,968	421,269	35,280	59,485	-	-	765,002		
150 hub, 151 Import	376,218	636,585	-	89,888	488,012	-	1,590,704		
<b>Total</b>	<b>5,909,949</b>	<b>8,012,376</b>	<b>2,840,487</b>	<b>1,241,048</b>	<b>988,012</b>	<b>6,295,819</b>	<b>25,287,691</b>		



Example of a summary of cost allocation to profit centres at the different activity centres. The results are also illustrated in graphs.

## Appendix 7      Cross resource utilisation between departments

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*Since the aim of the research project is to allocate costs to the cost objects, in this case profit centres all costs should be attempted to be traced. Departments 7410, 7430, 7440, 7470 and 749x are the operational departments that have profit centres. Therefore costs that are consumed by the departments and profit centres have to be identified in other departments. There exists cross relationships between the departments, these are presented below.*

- *Department 7400* -The management of VLCI utilise the services of Sales & Logistics in the form of one job to 100%. The job is to analyse and compose statistics of the entire division of various variables that can be presented both internally and externally. Therefore 7400 should carry the cost that 7420 has for this job.
- *Express & Customer Service, 7410* - Utilise services provided by Sales and Logistics in terms of customer support. The resource consumption for these should therefore be carried by 7410.
- *Sales and Logistics, 7420* - This department does not consume any resources from other departments, as this department is a support and development function for the organisation.
- *Export, 7430* - The export department consumes resources from a number of departments. Consumption from the express & customer service department, the department assists with customer service functions. Consumption from department 7420 in terms of logistics support. Assistance from the customs department, such as customs clearance. The terminal handles goods for the export flow, therefore the resource consumption should be allocated to the export department from 7480.
- *Import & Domestic, 7440* - Department 7410 provides customer service assistance to the import department. Sales & Logistics provide the service of logistics support and customer relations to this department. The customs department provides services. The terminal 7480 handles both the domestic and imported goods for the import department. The resources from these departments should be allocated to the import & domestic department.
- *Customs, 7470* - The department provides services to others and does not in itself consume resources from other departments.
- *Material handling, cross dock Arendal, 7480* - It is a department that is consumed by others that utilise the services that they provide.



- *Logistics Centre, 7490* - Provides services to customers external of the Volvo Group, other services that are associated with the group are carried by the department itself. The only consumption is from department 7420 and should therefore be allocated to 7490.

## Appendix 8      Resource and Cost drivers

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<b>Process</b>	<b>Driver</b>
<b>Overhead resource allocation to activity centres</b>	
HR	No. of Volvo Employee
Economy support	Sales and costs
Facilities	No. of jobs
Office services	No. of jobs
Management VLISO	No. of jobs
IT- costs	Weighting system / Employees
 <b>Cost Allocation to Activity Centres</b>	
Management Inbound	No. of jobs
Express & Customer Service	Postings
Sales & Logistics	No. of jobs
Export	
From 7420	No. of profit centre
Economy support	Postings
Overhead	No. of jobs per profit centre
Movex (IT)	Specific
From 7480	Sales for terminal handling
Import and Domestic	
Economy support	Postings
From 7410	No. of jobs
From 7420	No. of profit centres
Overhead	No. of jobs
From 7470	Estimation of consumption
From 7480	Sales for terminal handling
Customs	
Economy support	Postings
Overhead	No. of jobs
Internal debit for 7440	Estimation of resource consumption
Material handling Crossdocking	No. of parcels
Logistic centre	
Cost 7490	No. of departments
Overhead	No. of jobs
Cost 7495	Sales
Economy support	Postings