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# Managing IT Costs with ABC

- An empirical study of Toyota Industries IT Supply Europe

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## Preface

Throughout the process of writing this essay we have had the opportunity to meet and converse with several highly talented individuals. The first person we want to thank is Urban Järund from BMC Software, the initiator of this project.

Secondly, we want to thank Ronny Ideskär our Project Host at BT IT Supply and the rest of the people at BT IT Supply. Their assistance and support were of great importance during the making of this thesis.

Last but not least we want to thank our supervisor Christer Kedström for being a source of inspiration and for providing us constant support throughout this whole process.

Without the help of these individuals this thesis could not have been conducted.

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## Abstract

- Title:** Managing IT Costs with ABC – an empirical study of Toyota Industries IT Supply Europe
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- Authors:** Linus Lovén, Johan Rudsvik
- Advisor:** Christer Kedström
- Keywords:** Activity Based Costing, Activity Based Management, ITIL, Cost Management, Service Desk
- Purpose:** The purpose of this essay is to apply Activity Based Costing on a Service and Support function in order to identify and allocate costs for providing support for IT deliverables.
- Methodology:** The methodology is based on a deductive approach. A study of a single case is applied, mostly based on qualitative semi-structured interviews and a quantitative questionnaire.
- Theoretical perspectives:** To apply Activity Based Costing on a Service and Support function. In addition to this we will use Activity Based Management ITIL, the IT Infrastructure Library framework.
- Conclusions:** The results depict a percentage of the total cost mass distributed among the IT deliverables. Having illuminated the resource distribution per deliverable it will be possible to compare the present support cost with existing support agreements. New support agreements can with this information be based upon the actual cost instead of approximations. The results also provide a base for purchasing and outsourcing considerations.

# Table of Contents

<b>1 Introduction .....</b>	<b>4</b>
1.1 Background.....	4
1.2 Problem Discussion .....	5
1.3 Problem Focus.....	7
1.4 Questions at issue .....	7
1.5 Purpose.....	8
1.6 Intended Readers .....	8
1.7 Disposition .....	9
<b>2 Methodology.....</b>	<b>10</b>
2.1 Methodology Approach .....	10
2.2 Information Gathering.....	11
2.2.1 Theoretical Framework .....	11
2.2.2 Interviews.....	12
2.2.3 Questionnaire.....	13
2.2.4 Studying of Documents.....	14
2.2.5 Observations and Informal Talks .....	14
2.3 Methodological Discussion .....	14
2.3.1 Critical Discussion.....	14
2.3.2 Validity .....	15
2.3.3 Reliability.....	16
2.3.4 Alternative Approaches .....	16
2.4 Methodological Summary .....	17
<b>3 Theory .....</b>	<b>18</b>
3.1 Introduction.....	18
3.2 Traditional Cost Models Relating to ABC .....	18
3.3 Activity Based Costing (ABC).....	19
3.3.1 Direct Costs.....	21
3.3.2 Resources .....	21
3.3.3 Activities.....	21
3.3.4 Cost Drivers .....	21
3.4 The Implementation of the ABC Model .....	22
3.4.1 Determination of Direct and Indirect Costs.....	23
3.4.2 Identification and Selection of Activities.....	23
3.4.3 Allocation of Resources to Activities .....	24
3.4.4 Determination of Activity Cost Drivers .....	24
3.4.5 Determination of Costs to the Cost Objects .....	24
3.5 The IT Infrastructure Library Framework.....	24
3.5.1 Service & Support according to ITIL .....	25
3.6 Activity Based Management (ABM) .....	26
3.7 Discussion of Selected Theories.....	27
3.7.1 Limitations.....	27
3.7.2 Benefits.....	27
3.8 Theoretical Summary .....	28

<b>4 Empirical .....</b>	<b>29</b>
4.1 Introduction.....	29
4.2 The Organization of BT Industries .....	29
4.3 Empirical Data Gathering.....	30
4.4 The Service & Support Function.....	32
4.4.1 The Service Desk.....	34
4.4.2 The Service Group .....	35
4.5 Supported Deliverables .....	37
4.5.1 Selection of Deliverables.....	38
4.5.2 Support of Deliverables.....	39
4.6 Empirical Summary.....	41
<b>5 Analysis .....</b>	<b>43</b>
5.1 Introduction.....	43
5.2 Cost Objects .....	43
5.3 Implementation of the ABC Model.....	43
5.4 Determine Direct and Indirect Costs .....	45
5.5 Identify and Select Activities .....	45
5.5.1 First-line Support.....	47
5.5.2 Second-line Support.....	47
5.6 Allocation of Resources to the Activities.....	48
5.6.1 Resource Allocation to First-line Support.....	49
5.6.2 Resource Allocation to Second-line Support.....	50
5.7 Determine Activity Cost Drivers.....	51
5.8 Determine Cost of Cost Objects .....	52
5.9 The ABC Model .....	52
5.10 A Fictive Version of the ABC Model .....	54
5.11 Activity Based Management .....	56
5.11.1 Internal Pricing and Recharge Rates .....	56
5.11.2 Purchasing of Deliverables .....	57
<b>6 Conclusions .....</b>	<b>58</b>
6.1 Results .....	58
6.2 Discussion .....	59
6.3 Implications for Further Research.....	59
6.4 Suggestions for BT IT Supply .....	60
<b>7 References.....</b>	<b>62</b>
7.1 Literature .....	62
7.2 Electronic .....	63
7.3 Verbal.....	63
<b>Appendix 1 – Questionnaire .....</b>	<b>64</b>
<b>Appendix 2 - Interview Questions .....</b>	<b>66</b>
<b>Appendix 3 – Selection of Deliverables .....</b>	<b>67</b>

## INDEX OF FIGURERS AND DIAGRAMS

FIGURE 1 THE IT DIVISION.....	4
FIGURE 2 ACTIVITY BASED COSTING (AX ET. AL 1995).....	6
FIGURE 3 THE ABC MODEL (KAPLAN ET.AL 1997).....	20
FIGURE 4 THE IMPLEMENTATION PROCESS OF ABC.....	22
FIGURE 5 ACTIVITY CRITERIA.....	23
FIGURE 6 THE ORGANIZATION OF TOYOTA INDUSTRIES CORPORATION...	30
DIAGRAM 1 COST STRUCTURE OF SERVICE AND SUPPORT.....	33
DIAGRAM 2 COST STRUCTURE OF SERVICE DESK.....	35
DIAGRAM 3 COST STRUCTURE OF SERVICE GROUP.....	37
FIGURE 7 CATEGORIZE OF SUPPORTED DELIVERABLES.....	37
DIAGRAM 4 ERRANDS PER CATEGORY AND SUPPORT FUNCTION.....	38
FIGURE 8 SELECTED DELIVERABLES.....	39
DIAGRAM 5 TIME CONSUMPTION PER DELIVERABLE (SERVICE DESK).....	40
DIAGRAM 6 NUMBERS OF ERRANDS PER DELIVERABLE (SERVICE DESK).....	40
DIAGRAM 7 CAPACITY UTILIZATION (SERVICE DESK).....	41
DIAGRAM 8 NUMBERS OF ERRANDS PER DELIVERABLE (SERVICE GROUP)..	41
FIGURE 9 COST OBJECTS.....	42
FIGURE 10 THE IMPLEMENTATION PROCESS OF ABC.....	44
FIGURE 11 SELECTED ACTIVITIES.....	46
DIAGRAM 9 RESOURCES SERVICE AND SUPPORT.....	48
FIGURE 12 RESOURCE SELECTION FIRST-LINE SUPPORT.....	50
DIAGRAM 10 RESOURCES FIRST-LINE SUPPORT.....	50
FIGURE 13 RESOURCE SELECTION SECOND-LINE SUPPORT.....	51
DIAGRAM 11 RESOURCES SECOND-LINE SUPPORT.....	51
FIGURE 14 THE ABC MODEL FOR SERVICE AND SUPPORT.....	53
FIGURE 15 FICTIVE RESOURCES.....	54
FIGURE 16 ACTIVITY COST DRIVERS FIRST-LINE SUPPORT.....	54
FIGURE 17 A FICTIVE VERSION OF THE ABC MODEL.....	55
FIGURE 18 COST ALLOCATION TO THE COST OBJECTS.....	58

## Chapter 1

### Introduction

*In this chapter we intend to give an introduction to the subject and to present the questions at issue. The chapter will also bring clarity to existing definitions and limitations within the theme and provide a disposition for our study.*

### 1.1 Background

Information Technology (IT) is today a central part of many organizations. Numerous publications relate IT to increased business value but few studies are linking Cost Management to IT more closely. The fact that most IT services have varied degrees of intangibility and a relatively high degree of complexity makes it a challenge to measure the cost of the services that are being delivered. A further challenge is that IT settings continuously evolve and change which make them difficult to measure and analyze.<sup>1</sup> As a result IT organizations have had difficulties in not only accounting their costs but also accounting for the work they perform and the deliverables they deliver. By deliverables we refer to different IT products and services such as Microsoft software and requests for forgotten passwords.

To realize economies of scale many IT divisions are often vertically integrated which gives the organization the ability to reduce total cost of support functions. But this brings new challenges. If the functional structure of an IT department is an autonomous division and its daily work is vertically shared through the organization, how does one control the cost for IT and ensure that the right division or unit is accountable for the specific IT service it is using? This imposes a major dilemma for organizations both when it comes to measuring and allocating costs. What is the cost for using an email system? Which division should be accountable for this? Figure 1 illustrates the relationship between the IT division as a support function to the rest of the organization and how the IT division provides different deliverables without proper knowledge of the costs.

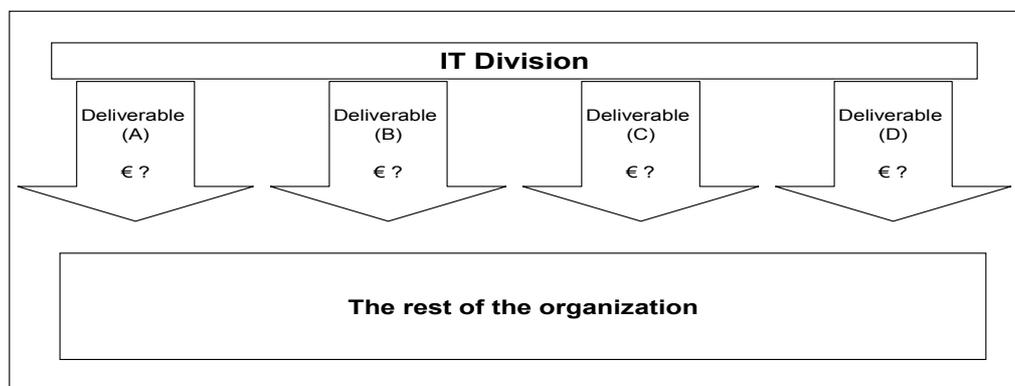


Figure 1 The IT division

<sup>1</sup> Gerlach, James et. al., *Cost Management using ABC for IT activities* (2004) in MAQ.

Due to the limited understanding of IT costs many organizations are today using approximate cost recovery approaches.<sup>2</sup> These IT charge backs do, however, not lead to an optimal situation since they are approximations rather than based on factual cost. Another alternative is to outsource certain deliverables or the whole IT division. This provides a fixed cost for the whole service, but it does not enhance the knowledge about the actual cost structure. Another difficulty is that IT costs are usually treated as overhead rather than direct costs. The allocation difficulties for overhead costs make these either inappropriately absorbed by the IT department or charged out equally to all units within the organization regardless of individual consumption.<sup>3</sup> As a result the need for a more sophisticated way to measure IT costs is essential in order to develop long-run strategies and to sustain competitive advantage.

Kaplan and Cooper (1997) argue that too many managers in organizations rely on information from a cost system designed for a less advanced technological age. At a time when competition was local and featured standard products and services, as opposed to today's global competition and customized products and services, speed, quality and performance were less critical to success.<sup>4</sup> They argue that the solution for organizations is to use many cost systems at the same time. We find their discussion very interesting and this study can be seen as an enhancement of their argument. IT related services are becoming more and more costly. At the same time many organizations are having difficulties with understanding the cost structure of IT and the allocation of IT related costs.

Johnson and Kaplan (1987) discuss the American manufacturing industry during the 20<sup>th</sup> century and point out that the current cost systems have become obsolete and need to be revised. Johnson and Kaplan argue that this is one of the reasons for the decline of the American manufacturing industry.<sup>5</sup> In this essay we use the same argument and apply it on an IT environment. We argue that the need for a modification and an upgrading of the current cost systems is essential. Today IT has become a prerequisite for all organizations and consequently the cost for managing IT has rapidly increased. An IT organization must be scrutinized like any other division of a company. One must be able to trace costs in IT to the activities that drive these costs. Why should the IT division be an exception? The journey of trying to control and define these costs has just begun.

## 1.2 Problem Discussion

Advances in IT have provided organizations with opportunities to create improved production systems, but the benefits from these systems will not be fully realized unless the cost structure is identified. Without such understanding organizations may believe that they have acquired a modern and integrated system that only provides benefits. Understanding and managing costs is an absolute requirement in order to support an organization's strategic planning and decision process.<sup>6</sup> This

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<sup>2</sup> Gerlach, James et.al., *Determining the Cost of IT Services* (2002) in "Communications of the ACM" September 2002/Vol 45. No 9. Page 61-67.

<sup>3</sup> Gerlach, James et.al., *Determining the Cost of IT Services* (2002) in "Communications of the ACM" September 2002/Vol 45. No 9. Page 61-67.

<sup>4</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>5</sup> Ibid.

<sup>6</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

may e.g. include outsourcing considerations. Should the organization provide the service internally or should the organization purchase IT solutions externally? In order to evaluate the alternatives the organization has to be able to evaluate which solution that generates the largest costs. Some products and services may have a low purchase price, but if the product or service demands a high degree of support, then the total cost (purchase + internal / external support) rises.

When Activity Based Costing emerged in the 1980s the purpose was to gain better understanding and control over indirect and overhead costs.<sup>7</sup> This new way of cost allocation was a response to new industrial and economic demands. At the time there was an ongoing transformation towards a more mechanized and computerized production and overhead and in-direct costs had significantly increased in proportion to direct costs.<sup>8</sup> IT costs are treated as overhead rather than direct costs. This implies that the total cost mass must be allocated with the use of an accurate and reliable distribution model. The contribution of the ABC model is to divide the organization into different activities and then use cost drivers to distribute overhead and in-direct costs.<sup>9</sup> Cost drivers can be defined as an incident that occurs as a result of an activity that is performed in order to produce a product. The model states that activities consume resources, and that products consume activities.<sup>10</sup> Costs will consequently depend on how much the activity for a product costs and not on the quantity of the product. In other words, the model should provide a method for calculating cross charges back to the business unit or product so that costs can be justified and tracked with demand. This will help the organization to develop a deeper understanding of how and why IT costs occur. Figure 2 illustrates the relationship between the components in an ABC model.

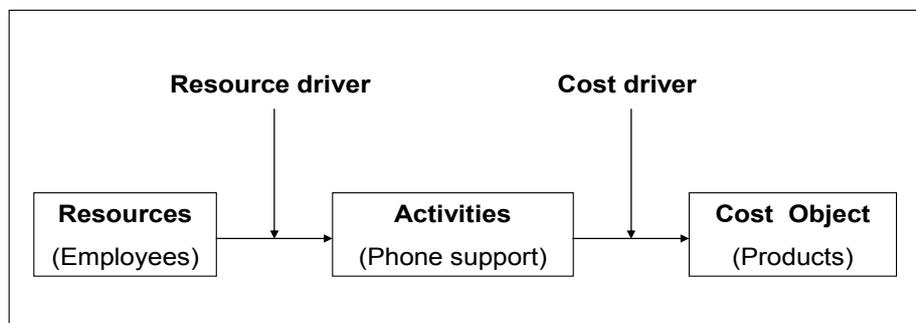


Figure 2 Activity Based Costing<sup>11</sup>

<sup>7</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 55.

<sup>8</sup> Gerdin, Jonas, *ABC-kalkylering* (1995) Studentlitteratur: Lund. Page 15.

<sup>9</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö. Page 265.

<sup>10</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>11</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 61.

### 1.3 Problem Focus

With the help of BT–Industries, a subsidiary of Toyota Industries Corporation, we were given the possibility to conduct our essay at their IT division. The initiative for this originated from the consulting firm BMC Software. BT Industries is the world’s largest manufacturer of warehouse trucks and was in 2000 acquired by Toyota Industries Corporation (TICO). Together they created a world leading constellation in industrial trucks.<sup>12</sup>

Toyota Industries is divided in four regions: Europe, North America, Japan and International (the rest of the world). Within each region and business segment there are several support functions and this essay has its focus on the Service & Support function at Toyota Industries IT Supply Europe AB (in this paper referred to as BT IT Supply or IT Supply). This Service & Support function is located at BT Industries headquarters in Mjölby, Sweden, and provides support to internal users and divisions within BT Industries in Europe. The function provides support to a great variety of IT related issues for a number of deliverables. At the Service & Support function the Service Desk is the initial point of contact which makes it a central part of the organization. When a problem of any kind arises the Service Desk provides the necessary assistance. If the Service Desk cannot solve the problem it is forwarded to more specialized technicians.

For us BT IT Supply represents an interesting case when it comes to the predicaments of understanding the costs for providing support of IT deliverables. Our Project Host, Ronny Ideskär, enlightened us with the current situation and informed us about their need of enhanced cost understanding. An initial step in this process has already been taken by a recent restructuring process at BT IT Supply. The ambition is to gain better understanding of how the cost mass relates to products and services and to which extent a service or product consumes resources for support. Such understanding is useful in decision making relating to purchase of IT deliverables, outsourcing and recharge rates of IT deliverables. The use of ABC can be of much assistance for this ambition since it provides useful information of how the cost mass is structured and how it relates to the supported deliverables. We discussed our vision of this essay with our Project Host at BT IT Supply and together we scoped down the issue and formulated the following questions at issue to look into.

### 1.4 Questions at issue

- Which resources, activities, cost drivers and cost objects can be identified at the Service & Support function at BT IT Supply?
- How much of the indirect and overhead costs should be allocated to the different cost objects?
- How can BT IT Supply benefit from the ABC model?

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<sup>12</sup> <http://www.bt-industries.com/en/ourcompany/btbusiness/history.htm> (2006-11-20)

## 1.5 Purpose

The purpose of this essay is to apply Activity Based Costing on the Service & Support function at BT IT Supply in order to identify and allocate costs for providing support for IT deliverables.

## 1.6 Intended Readers

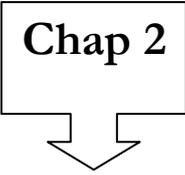
This study aims to bring clarity into the relationship between IT costs and the allocation of these to different deliverables. The main target group are mostly organizations and companies that want to expand their knowledge in this specific area and in particular our case company BT Industries and their IT-division IT Supply. The lack of knowledge regarding cost structures in IT settings is widespread, whereas this thesis can be seen as an embryo of clarification.

Our essay can also work as a source for inspiration for other academics and scholars interested in this field. The area of allocating IT costs is not very well explored and more academic research is needed. This also serves another great purpose which is the recognition that is paid to a field when academics get involved. The principles of Activity Based Costing were used long before Johnson and Kaplan wrote "Relevance Lost" (1987), but it was not until the academic discourse approached the area that it got world wide recognition.<sup>13</sup> Therefore it is of importance that other academics continue this interesting research.

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<sup>13</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 42.

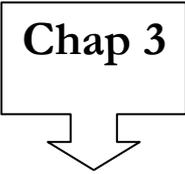
## 1.7 Disposition



**Chap 2**

**Method**

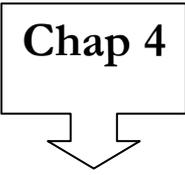
In this chapter we clarify our methodological approach and the validity and reliability of our thesis. We also make a critical discussion concerning our methodological choices and present alternative approaches.



**Chap 3**

**Theory**

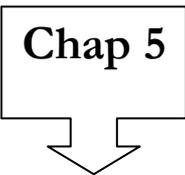
We present the theory necessary to link the empirical material to the analysis. Here we will use the principles of Activity Based Costing and Activity Based Management. In addition to this a presentation of the IT Infrastructure Library will be made.



**Chap 4**

**Empirical**

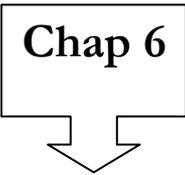
We begin with a presentation of our case company and its organizational structure. Further, we describe all the information we acquired through interviews, literature and our questionnaire. In addition to this we discuss our chosen theoretical framework on behalf of the empirical findings.



**Chap 5**

**Analysis**

Here we combine the theoretical framework with the empirical findings and create an ABC model. This chapter also includes a discussion concerning the choice of activities, resources and cost objects. A discussion about ABM and the benefits from ABC will follow.



**Chap 6**

**Results**

Our final results are systemized and discussed, as well as the potential for an ABC model in IT settings. Furthermore, we present suggestions for additional research in this area

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## Chapter 2

### Methodology

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*The purpose of this chapter is to provide the reader with insight in our methodological considerations. We will clarify the methods we use and why we use them. Furthermore, we will present our course of action considering data and information gathering. These will be critically reviewed and followed by a discussion concerning validity and reliability.*

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#### 2.1 Methodology Approach

A requirement for an IT organization, in the process of making strategic decisions and pricing its deliverables, is to understand the costs for its operations and the cost for specific services and products. In order to meet these requirements we have applied the basic principles of an ABC model.

As a result, this essay has a normative purpose, but in order to fulfill this normative purpose the process also has to be descriptive and explanatory.<sup>14</sup> The explanatory process concerns the study of how the IT division was structured and it considered the identification of the IT division's resources, activities and cost drivers. The normative purpose was made in order to clarify the benefits of the ABC model. We therefore argue that this essay is both explanatory and normative since it both depicts the current situation and indicates how potential problems can be solved.<sup>15</sup>

When describing the methodological approach, we consider it relevant to mention that a preliminary purpose initially was formulated, but during the process this has been adjusted. The process has been characterized by a journey of scoping from broad to a narrower position. In the initial phase we had limited information about the context of BT IT Supply and our opening ambition was to conduct a more wide and general study of the whole IT setting. Eventually, we were faced with its profound complexity and a demarcation with focus on Service & Support was made.

It could also be of value to point out that BT IT Supply recently went through a reorganization process and at the time of our stay was involved in intense budget talks. As a result of this restructuring process the new budget will now comprise new cost centers. On the basis of these premises we had dialogues with members of the IT division and together we scoped down our purpose which eventually led to the research of First-line and Second-line support within the Service & Support function. All parties involved were satisfied.

This thesis includes theories concerning both IT Service Management and Cost Management. We have approached the phenomenon by using existing theories hence it can be seen as a deductive study.<sup>16</sup> The theory concerning IT Services consists of the framework that is known as IT Infrastructure Library, ITIL, and

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<sup>14</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund.

<sup>15</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund.

<sup>16</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund.

for Cost Management the chosen theory is Activity Based Costing. The purpose of ITIL is to provide a framework that separates the rather complex components and processes in the delivery of IT services, in order to clarify the sub processes within First-line and Second-line support. Therefore, we refer to ITIL as a theory even though it is mostly a framework of best-practices. We do this because ITIL is an imperative component in the Service Management setting at BT IT Supply.

## 2.2 Information Gathering

When we first were addressed with the matter of investigating IT costs we began to gather information about IT and Cost Management from all certain places. The literature on this subject was quite limited which strengthened our motivation and eagerness to proceed. Our choices of literature selection will be further discussed in 2.2.1.

The next part of the information gathering process approached the context of BT IT Supply. This empirical information was brought together mainly by semi-structured interviews and a supplementary questionnaire. These interviews and the questionnaire provided us with information concerning consumption of resources and what types of services and products the IT division provides. We were also given information about the relationship between IT Supply and the rest of the divisions.

Accordingly, we argue that this thesis primarily is a qualitative study entailing some quantitative features.<sup>17</sup> During the process and as a result of the initial interviews the purpose and questions at issue were modified. The interviews and the questionnaire were also complemented by studies of documents and informal dialogues. Due to the sensitive nature of the material and as a result of a dialogue with IT Supply we are not able to publish any financial information. Accordingly, the different variables in the ABC model are presented as proportions instead of absolute figures.

### 2.2.1 Theoretical Framework

The preset conditions for this essay set by BMC Software was to use the principles of an ABC model in an IT setting. Naturally, this had a major influence on the selection of the theoretical framework. On the basis of these premises we began to gather relevant secondary data consisting of articles and literature. This process was mostly conducted through the internet and several databases at Lund University. Concerning Cost Management and ABC there was a wide contribution of literature but writings linking ABC to IT were almost nonexistent. This discovery indicated the contemporary glitch concerning the combination of Cost Management and IT. Nevertheless we were able to find two interesting articles regarding ABC and Cost Management which were “Determining the Costs of IT Services” and “Cost Management using ABC for IT activities and services” both

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<sup>17</sup> Arbnor, Ingeman & Bjerke, Björn, *Företagsekonomisk metodlära* (1994) Studentlitteratur: Lund.

written by Bruce Neumann and James Gerlach. These articles targeted about the same issue as our study but from a wider perspective. Neumann and Gerlach have studied an entire IT Department at a multi million dollar company, whereas we have scoped down our research to Service & Support. Nevertheless the arguments and overall perceptions are much alike and the articles gave us inspiration as well as practical tips on how to implement an ABC model. We were also engaged in a mail correspondence with these gentlemen, which was of great assistance. Further on, we have been reading several Cost Management related literature such as “Relevance Lost” (1987), “Cost Management” (1995) & “Cost and Effect” (1997). This literature constitutes as secondary data although they comprise elements which can be seen as primary data, for example the specific characteristics of the ABC model.

### **2.2.2 Interviews**

The first and most important part of the interview process is to find relevant people to interview. This may sound self-evident but is utterly important to underline. If this part of the process fails the validity of the thesis deteriorates. In order to avoid this problem we sat down with our Project Host at BT and formulated an interview schedule with different key individuals. We informed our Project Host with our aims and goals and what we expected from the interviews. We then scoped down the range of employees and ended up with seven key individuals. We started off with the Manager of the Service Desk, Hans Berg. For this interview we had prepared questions concerning the current cost mass and how the different IT services were priced. Another important objective was trying to identify the resources indispensable for the Service & Support function and to achieve relevant statistics. Since this was our first interview we also expected to familiarize us with the “every day life” at BT IT Supply. Our next interview had its focus on the daily routines and procedures inside the Service Desk, and for this we interviewed Camilla Ask, the most experienced Service Desk operator. The interview related to the standard procedures and details on errands logging, recording and diagnosing. The aim of this interview was not only to get acquainted with the day by day customs but to familiarize us with the different processes taking place in the Service Desk.

Our three next interviewees were Eirik Nabå, Operational Server Manager, Tommy Adolfsson, Technician and Morgan Bjernersjö, IT controller. The intention of these three interviews was to focus more on the different resources, such as computer servers and other technical resources necessary. Our questions also concerned different applications indispensable for the Service Desk. Further on, we interviewed to executives at BT IT Supply, Gisela Fagerstedt and Ronny Ideskär. From these interviews we wanted to get the “big picture” as well as cost information related to First-line and Second-line support, in particular personnel costs. Our aim was also to ask questions about the current reorganization and the new budget in which new cost centres will be created.

Before conducting our interviews we decided to perform a pilot study consisting of an interview with a Service Desk operator working for another company. During this meeting we could test our questions and familiarize us with the

implications of a Service Desk, which was of great help when we arrived at BT. The questions were broad and Service Desk specific and during this interview we were able to practise our interview technique. This interview was naturally not included in our research material.

The overall structure and the aim for each interview were set in advance and during the interview we let the interviewee speak freely without specific restrictions. Each interview was opened in the same way where we presented ourselves and our vision with the thesis; we also explained our aim with the specific interview. The response from the interviewees was very positive and everyone was eager to help. Before the interview began we asked permission to record it, which was accepted by everyone.

All our interviews were transcribed the same day they were conducted. We spent most of our hotel nights listening and summarizing everything into structured categories. This served two purposes. First, it helped us in differing between the inadequate facts and the important facts. We scoped down the essence of each interview into different groups depending on the facts that were given. Secondly, this procedure made us refine and sharpen up our interview technique for the next day.

### 2.2.3 Questionnaire

In order to enhance our insight we felt it necessary to complement our interviews with a questionnaire.<sup>18</sup> The content of this concerned the time consumption per employee based on different deliverables. This approach of seeking a pattern of time consumption is characteristic by a positivistic mindset.<sup>19</sup> The questionnaire was handed out every morning, for a period of one week. The employees were instructed to write the time consumption after each activity was performed. We did not want them to estimate time consumption at the end of each day, since the enthusiasm and eagerness to go home might have impacted the precision of their estimations.

Since the intention was to gather comparable and general information the questionnaires were completely structuralized and without multiple choices. Before we handed out the final version we presented the operators with a beta version. This led to small adjustments and minor clarifications. By involving the employees in the development process our intention was to make them feel more motivated to present accurate information. In order to further encourage them they received a reward for participating in this assignment. We also explained that their contribution was an absolute requirement for our study and that their contribution was much appreciated. The result from the questionnaire provided us with time consumption based on different deliverables. This will be further discussed in the empirical section.

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<sup>18</sup> See Appendix 1.

<sup>19</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund. Page 31.

### 2.2.4 Studying of Documents

In addition to our interviews and our questionnaire a central part of our data gathering process was to take part of statistics. The initial idea with this was to find statistics that would help us allocate significant resources to the First-line and Second-line support. These statistics would also serve as a foundation for the creation of the cost base in our final ABC model. During the interviews we asked for statistics about computer servers linked to First and Second line support and the cost information for these servers. Further, we took part of information regarding the two major software “Remedy” and “Unicenter”. We received cost statistics for these as well as the amount of “software transactions” that could be directly linked to Service and Support. Additional to this we were provided with a large amount of “everyday” statistics such as number of incidents, incoming calls per person etc. The studying of these formal statistics and documents became a crucial notion for our final analysis.

### 2.2.5 Observations and Informal Talks

The three whole days we spent at BT IT Supply gave us plenty of time to capture and observe the organization from within. During idle time between and after the interviews we were able to hold informal talks supplementary to the formal interviews, both with former interviewees but also with new individuals. When we talked to new individuals we were able to confirm information from the interviews and were also given new reflections on certain matter. This three-day visit enabled us to absorb the informal culture and make short acquaintances with employees which provided us with useful information.

## 2.3 Methodological Discussion

In order to achieve a high degree of replicability the methodological assumptions of a thesis must be thoroughly reviewed. Our choice of method has led us to a certain approach in the process of making this thesis. Accordingly, we mean that it is important to lead a discussion regarding validity and reliability. In addition to this the chosen approach must be discussed and challenged with other methodological alternatives.

### 2.3.1 Critical Discussion

Since this study is characterized by a deductive approach and the empirical gathering was influenced by the preset theoretical framework there is a probability that some information unwarily has been left out.<sup>20</sup> In the initial phase our information gathering consisted mostly of a qualitative method, which was further complimented by our quantitative questionnaire. An important factor concerning

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<sup>20</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund.

the entire data gathering process is the suspicion that can be associated with cost related issues. Asking to many questions about the current cost structure may impose suspicion from the interviewees and there is likelihood that questions are not answered correctly. For our concern we did however not encounter this dilemma and all our interviewees were giving us as much support as possible. The fact that we were aware of this before we started our interviews helped us to avoid it. Another very common quandary when conducting interviews is the possibility that the respondents are not motivated or interested in providing the interviewer with answers.<sup>21</sup> We did however not encounter that. Our situation was quite the opposite and we felt a great willingness from the interviewees in answering our questions.

The use of questionnaires raises some methodological issues one must consider. Since questionnaires usually are characterized by a structuralized design the respondents are only able to give answers according to the preset options.<sup>22</sup> An initial mistake in the design of the questionnaire may consequently lead to dismissal of important information. In order to limit these risks we presented the beta version of the questionnaire where the respondents could participate in the designing of the final version. One problem that on the other hand is difficult to reduce is the degree to which the respondents give honest answers. The only argument against the significance of this problem is that any incorrect information from the questionnaire does not affect the design of the final model, only the proportions between the different components. The proportions can however be modified with the correct information later on which almost constitutes as a must for an everlasting ABC model. Hence, if the respondents were to give incorrect answers this does not pose a major problem.

### 2.3.2 Validity

The concept of validity tangles whether or not you measure what you intend to measure.<sup>23</sup> Consequently, there must be a clear alignment between the purpose of the thesis and the analysis.<sup>24</sup> Validity is often divided in two perspectives; an internal perspective and an external perspective<sup>25</sup>. In order to achieve a satisfactory level of internal validity alignment must exist between the empirical observations and the theoretical framework.<sup>26</sup> For our concern we argue that our internal validity is far above the satisfactory level. The theory which consists of ABC, ABM and ITIL clearly relates to the empirical observations. The theory we have chosen has a clear and present objective and leaves limited room for interpretation.

External validity entangles the predicament as to which degree the result can be applied and related to other contexts.<sup>27</sup> Since this thesis is a study of a single case it is per definition aimed for a certain context. Despite this we believe that the fundamentals of this thesis can be used in other contexts as well. The reason for

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<sup>21</sup> Denscombe, Martyn, *Forskningshandboken* (2000) Studentlitteratur: Lund.

<sup>22</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund.

<sup>23</sup> Bryman, Alan, *Företagsekonomiska Forskningsmetoder* (2005) Liber AB:

<sup>24</sup> Holme, Idar Magne, *Forskningsmetodik* (1997) Lund: Studentlitteratur. Page 163.

<sup>25</sup> Bryman, Alan, *Företagsekonomiska Forskningsmetoder* (2005) Liber AB:

<sup>26</sup> Ibid.

<sup>27</sup> Ibid.

this is firstly, ITIL - the setting in which we have applied the ABC model. We believe that other IT divisions organized according to this framework can benefit from the study. Secondly, we believe that the overall tasks in First-line and Second-line support do not remarkably differ between organizations and that the resources identified in this thesis are similar to resources in other IT environments. Accordingly, this study can be seen as a generic approach to the subject, even though we have practiced a study of a single case.

### 2.3.3 Reliability

Reliability, just like validity, is divided into the two perspectives: internal and external. The former of these two covers the dynamic between the researchers (assumed that the research team consists of more than one writer).<sup>28</sup> In order to maintain a high degree of internal reliability it is vital that the authors make similar interpretations about important basics. This thesis is based both on a quantitative and a qualitative method. However, the nature of our interview questions were not of an interpretive character since they mostly approached areas such as identification of resources, cost drivers, and the daily routines. The important basics between the authors of this essay are much alike, especially on behalf of the aim with the study.

The external reliability is often related to the degree to which a study can be replicated. A high degree of external reliability can be achieved if different measurements of the same phenomenon provide the same result (or close to same result).<sup>29</sup> This objective construction is based upon the likelihood that if other researchers with the same competence and presupposition would conduct the same study by the use of the same methods they would come to same conclusion as the first researcher. This occurrence is also known as replicability.<sup>30</sup> Throughout the whole research we have been aware of this occurrence and done our utterly in order to stay objective. We are in no doubt that if other researchers would conduct the same study with the same method they would come to a similar conclusion as we did. The measurements taken in order to maintain a high degree of reliability were discussed in chapter 2.2.1 and chapter 2.2.2. We consider the degree of our reliability to be high, especially on behalf of the replicability.

### 2.3.4 Alternative Approaches

The initiative for this study originated from the consulting firm BMC Software. We were addressed to study the possibilities of ABC on a specific context, in this case an IT division. Accordingly, we approached the phenomenon based on these premises. During the process we have however considered possible alternative approaches.

One alternative approach could have been to use an inductive method instead of a deductive. By using this method the empirical data would first have been gathered

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<sup>28</sup> Bryman, Alan, *Företagsekonomiska Forskningsmetoder* (2005) Liber AB:

<sup>29</sup> Holme, Idar & Solvang, Bernt, *Forskningsmetodik* (1997). Lund: Studentlitteratur. Page 163.

<sup>30</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund.

and then act as a guide for the choice of a theoretical framework.<sup>31</sup> This design might have led to a different choice of theory relating to Cost Management. Another approach could have been the use of a Comparative Design where two different IT settings could be compared in order to get a more general approach. A third alternative approach could have been to include other parts of the IT division, additional to First-line support and Second-line support.

## 2.4 Methodological Summary

Finally, we want to recapitulate our methodological assumptions into a short summary. The purpose of this essay is to identify costs for providing First-line and Second-line support, and allocate these costs to different products and services (cost objects). By this, the essay intends to improve the allocation and understanding of costs for First-line and Second-line support. Based on this premise we describe the thesis as both descriptive and normative.<sup>32</sup> At the time for our empirical data gathering the theoretical foundation was already chosen, which classifies the methodological approach of the study as deductive.<sup>33</sup> The information gathering process was mainly qualitative but was complemented with a quantitative questionnaire. The purpose of this questionnaire was to find a pattern and comparable data concerning time consumption relating to the different deliverables. This was difficult to achieve only by a qualitative approach. A combination of approaching the phenomenon by both semi-structured interviews and a structuralized questionnaire contributes to characterize the thesis as both a qualitative and a quantitative study.<sup>34</sup> Our intention with this methodological explanation is to enable the reader a clear critical review and to achieve a high replicability.

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<sup>31</sup> Rienecker, Lotte & Jörgensen, Peter Stray, *Att skriva en bra uppsats* (2002) Liber: Malmö. Page 160.

<sup>32</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund.

<sup>33</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund. Page 42.

<sup>34</sup> Jacobson, Dag I., *Vad, hur och varför* (2002) Studentlitteratur: Lund. Page 38.

## Chapter 3

### Theory

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*In this chapter we present the theory of Activity Based Costing and make a comparison with the traditional cost models. We will also discuss benefits and limitation with this theory and the relationship with Activity Based Management. In addition to this, we present a selection from the ITIL Framework.*

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#### 3.1 Introduction

The purpose of Activity Based Costing (ABC) is to address our two first questions at issue which deal with clarifying the cost structure of the function Service & Support and allocate these costs to selected cost objects. In the process of selecting activities and cost drivers we believe that the ITIL framework will be helpful since it addresses the rather complex processes that take place in an IT setting. Activity Based Management is the third theoretical constituent which can be seen as an advancement of ABC. This will be used to approach the third question of issue which addresses how BT IT Supply can benefit from the ABC model.

#### 3.2 Traditional Cost Models Relating to ABC

Traditional cost models, also known as unit-based systems, divide the total cost mass in direct and indirect costs. Direct costs are defined as resource utilization that can be directly allocated to the cost object.<sup>35</sup> Other are referred to as “indirect” or “overhead” costs. In order to distribute these, traditional cost systems normally register these expenses to different cost centres.<sup>36</sup> Cost distributors such as direct material or direct labour are then used to allocate expenses to different deliverables.

The indirect cost “rent” is a good example since it is normally shared by more than one cost centre. According to a traditional cost model this should be distributed based on their utilization of space. Normally the “principle of proportions” is applied in this process. The principle states that the chosen cost bases should, at least in the long run, correlate proportionally with the distributed indirect costs.<sup>37</sup>

The ability of traditional cost models to distribute overhead costs has over the years, however, been greatly debated.<sup>38</sup> The criticism claims the lack of traditional models ability for correct distribution of overhead costs to specific products.<sup>39</sup> For organizations operating in stable environments with standardized products

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<sup>35</sup> Gerdin, Jonas, *ABC-kalkylering* (1995) Studentlitteratur :Lund. Page 23

<sup>36</sup> Ibid. Page 22.

<sup>37</sup> Ibid. Page 25.

<sup>38</sup> Johnson, H. Thomas & Kaplan, Robert, *Relevance Lost; The Rise and Fall of Management Accounting* (1987) HBS Press: Boston.

<sup>39</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 63.

traditional cost models are argued sufficient<sup>40</sup> But for organization with a high degree of overhead and indirect costs traditional cost system are considered less appropriate and are sometimes charged for bringing a false illusion about the cost structure.<sup>41</sup> This problem can be referred to as a “problem with the proportions” between overhead and indirect cost and the chosen distributor base.<sup>42</sup> The problem concerns that indirect and overhead costs are distributed to the cost objects by distributors that often are related to volume. As a result a higher degree of direct material means that a higher degree of overhead and indirect costs should be distributed to the cost object. But since overhead costs tend to increase and may depend on other factors than volume, the need for other distributors except volume is vast.<sup>43</sup>

There is yet another predicament with a traditional cost system which is the fact that cost centres often are subject for more than one type of indirect or overhead cost, for example “rent”, “salaries” and “right offs”. The use of only one cost deliverable to distribute these costs is concerned as a limitation.<sup>44</sup> As a result of the criticism, Cost Management has been developed towards an alternative approach, Activity Based Costing.

### 3.3 Activity Based Costing (ABC)

The development of ABC has been a process over a long period of time discussed in four steps by R. G Larsson (2004).<sup>45</sup> Larsson argues that the first step was addressed during Cooper & Kaplan’s presentation of the expression in 1988 when they published the article “Measure Costs Right: Make the Right Decisions”.<sup>46</sup> At this stage the discussion mostly concerned production costs. The second step was an enhancement of the first and included profitability analysis. The third and the fourth step addressed the activity hierarchy and the capacity utilization.

While traditional cost systems often are associated with issues such as how the organization can control costs for financial reporting and departmental cost control, ABC highlights the activities that are being performed and the resources needed for these activities. ABC seeks to answer why an organization needs to perform activities and business processes and how much of each activity that is required for different products, services and customers?<sup>47</sup> A properly constructed model is considered to provide the answer to these questions and based on organizational activities present an economic map of the expenses and profitability.<sup>48</sup>

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<sup>40</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>41</sup> Ibid.

<sup>42</sup> Gerdin, Jonas, *ABC-kalkylering* (1995) Studentlitteratur: Lund. Page 27.

<sup>43</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö. Page 263.

<sup>44</sup> Gerdin, Jonas, *ABC-kalkylering* (1995) Studentlitteratur: Lund. Page 29.

<sup>45</sup> Larsson, Rolf G., *Prototyping inom ABC och BSC* (2004) Växjö University Press: Växjö. Page 59

<sup>46</sup> Ibid.

<sup>47</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston. Page 79.

<sup>48</sup> Ibid.

The basic assumption of ABC is that all activities occur as a result of production and distribution of products.<sup>49</sup> Accordingly, all costs are considered as production costs.<sup>50</sup> As for traditional models direct costs are distributed directly to different cost objects. The difference occurs for the indirect- and overhead costs. In order to allocate these the ABC model requires different cost drivers for distribution to activities and from activities to cost objects.

The model states that in order to produce deliverable, resources such as labour and material are consumed by activities. Another postulation for the ABC model is that different products (cost objects) create demand for different activities. Consequently, the costs for an activity should be distributed to different deliverables in proportion to their consumption of the activity.<sup>51</sup>

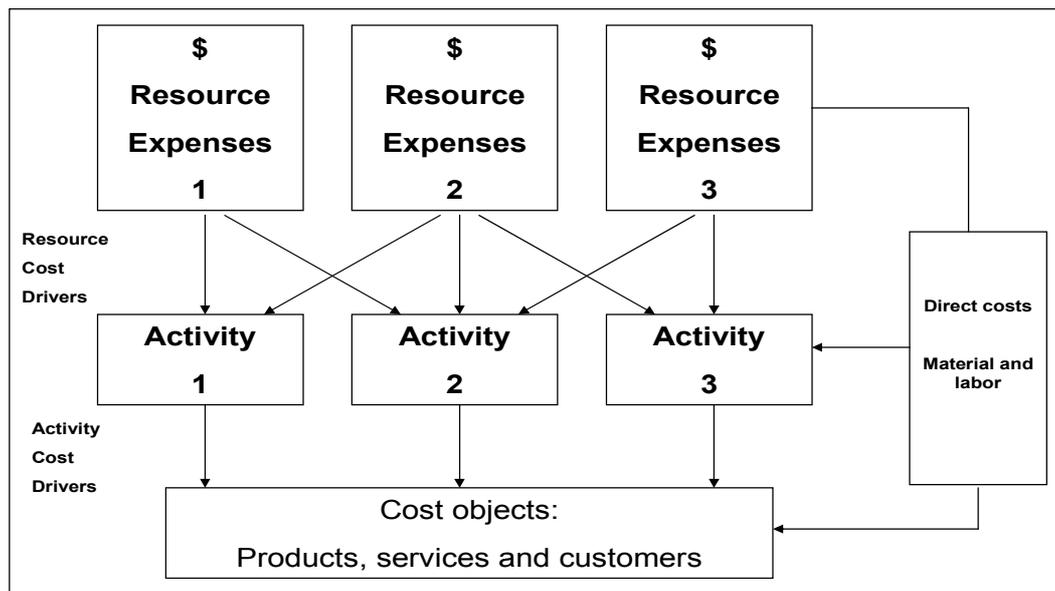


Figure 3 The ABC model<sup>52</sup>

An ABC model requires costs to be allocated in two steps. The first step is to distribute these from the resources to the activities. This distribution occurs by the use of different resource drivers. During the allocation of costs to the activities it is necessary to estimate the embracement of each activity.<sup>53</sup> For this estimation there is a tendency that this should occur during conditions of full capacity utilization. By full capacity the ABC model refers to full practical capacity. Since there may be complications in determining the practical capacity a solution is to correlate full capacity utilization by the normal capacity utilization over a period of time.<sup>54</sup> The final step is to distribute the costs from the activities to the different cost objects. The allocation is done by the use of activity cost drivers.<sup>55</sup>

<sup>49</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>50</sup> Gardin, Jonas, *ABC-kalkylering* (1995) Studentlitteratur: Lund. Page 61.

<sup>51</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö. Page 276.

<sup>52</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston. Page 83.

<sup>53</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 66.

<sup>54</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston. Page 79.

<sup>55</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö.

### 3.3.1 Direct Costs

Direct costs are directly allocated to the cost object, without any specific cost driver. This could for example be material or labour that is used specific for a product. As a result these costs would not exist if the activity did not occur.<sup>56</sup> An example of a direct cost could be the licence for software aimed to a certain product or service. The cost for this licence would then directly be allocated to the cost object and consequently not be part of the ABC model.<sup>57</sup>

### 3.3.2 Resources

In order to conduct activities the organization requires resources in terms of labour, manufacturing, buildings, and machinery.<sup>58</sup> Resources can often be quantified as salaries, material costs or software licenses. The resources constitute the foundation for the ABC model since this is the starting level for the cost distribution. It is therefore very important for the resource identification process to be thorough and meticulous. Having identified the wrong resources or resources with minimal impact on the cost objects will most certain lead to an inaccurate outcome of the ABC model.

### 3.3.3 Activities

Activities can be described as actions and processes that are conducted by labour or equipment. The activities consume a certain amount of input (Resources) in order to produce a certain amount of output (Activities). As a result an activity may be seen as a process for transforming resources.<sup>59</sup> From this wide definition it may occur as if almost all operations in an organization are activities. This however is a false assumption. To be relevant for an ABC model activities have to be aggregated. It is also important that the aggregation is at a satisfactory level. Unique and far to complex activities are difficult and sometimes impossible to include.<sup>60</sup>

### 3.3.4 Cost Drivers

There are two types of cost drivers in an ABC model: resource cost drivers and activity cost drivers.<sup>61</sup> The former of these to are used in order to distribute resources to activities and should therefore indicate activity consumption of the resources. The activity costs drivers act as an indication of the cost objects consumption of activities and can be divided into three categories: Transaction related, time related and intensity related. "Transactions related" refers to, for example in an IT division, the amount of errands being reported. "Time related"

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<sup>56</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 64.

<sup>57</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund.

<sup>58</sup> Billgren, Rolf, *ABC kalkylering i praktiken* (1995) Förlags AB Industrilitteratur. Page 23.

<sup>59</sup> Gerdin, Jonas, *ABC-kalkylering* (1995) Studentlitteratur: Lund. Page 66.

<sup>60</sup> Andersson, Göran, *Kalkyler som beslutsunderlag* (1997) Studentlitteratur: Lund. Page 129.

<sup>61</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

cost drivers refer to how much time each activity consumes. The third category, “Intensity related” is appropriate when the cost objects demand special activities such as labour with higher salary or special equipment. This, however, is dependent of a separate registration of the resource utilization for each cost object.<sup>62</sup>

### 3.4 The Implementation of the ABC Model

When implementing ABC the theory declares that two questions are to be considered. The first refers to where the organization initially should look for the potential benefits from implementing an ABC model. The second question concerns during which circumstances the model will have the greatest impact. The answer to these questions can be found in two rules that are called the “Willie Sutton rule” and the “High diversity rule”.<sup>63</sup>

These rules are to be considered as guides in the search for high-potential ABC implementations. The “Willie Sutton rule” states that organizations should notice areas with large indirect costs; especially if these costs have increased significantly and are difficult to allocate. The “High diversity rule” declares that ABC should be implemented in organizations with a high diversity of products, customers and processes.<sup>64</sup> In the case of Service & Support in an IT environment we argue that both the “Willie Sutton rule” and the “High diversity rule” are evident. The indirect costs mass is extensive as well as the range of products and services. These two rules make the Service & Support function a very interesting setting for an ABC implementation.

Ax et. al (2002) argues that implementing an ABC model could suitably be described as a process with supporting steps that not necessarily has to occur in a line of order.<sup>65</sup> The steps are described as: Determination of direct costs, identification and selection of activities, allocation of resources to the activities, determination of activity cost drivers and determination of cost to the cost objects. We have chosen to illustrate the presented process of Ax et. al (2002) below. The linking arrows between the five steps visualizes and illustrates that the steps does not necessarily has to occur in a line of order and that they relate to one another.

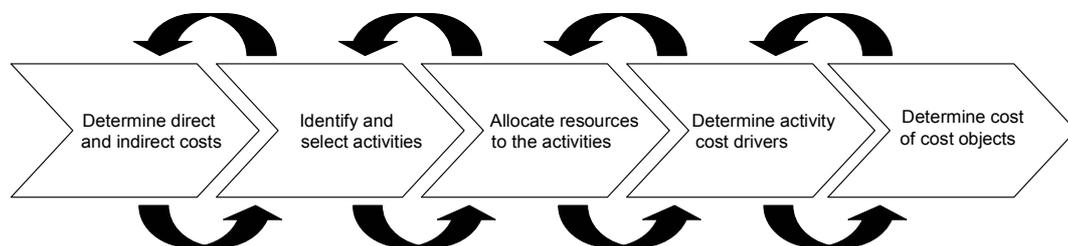


Figure 4 The ABC implementation process<sup>66</sup>

<sup>62</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö.

<sup>63</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>64</sup> Ibid.

<sup>65</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö. Page 270.

<sup>66</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö. Page 270.

### 3.4.1 Determination of Direct and Indirect Costs

An ABC model only distributes indirect costs. All direct expenses should bypass the ABC calculations and go directly to the cost object. The first consideration will consequently be to separate all direct costs from the indirect costs. An analysis of the budget is according to Kaplan & Cooper an appropriate action in the process of determining direct and indirect costs.<sup>67</sup>

### 3.4.2 Identification and Selection of Activities

A critical decision is to define the different activities. The definition of an activity varies a lot and depends on the chosen level of analysis. Generally an “activity” can consist of everything from a detailed description of a certain task to a more general description such as a whole department within a company. They often constitute of concrete assignments which makes it appropriate to begin with the different functions within the division or the organization.<sup>68</sup> Since IT environments constitute of a great variety in tasks it is important to select activities at an appropriate level of detail.<sup>69</sup> In order to do this one must use some kind of criteria. The most central criteria for choosing activities are the fluctuations in proportions that the cost objects generate in terms of activity consumption. As a result activities with great fluctuation in proportion should be included in the model.<sup>70</sup>

When choosing activities it is important to bear in mind that the choice of activities often affects the cost of developing and maintaining the model.<sup>71</sup> Having very detailed activities can create a large apparatus just in order to keep track of all these. Detailed activity modelling is usually needed for operations planning and process improvement, but when it comes to Cost Management more general activity models are often sufficient.<sup>72</sup> In the process of selection activities we intend to use three different criteria:

#### Activity Criteria

- Activities with significant affect on the cost objects
- Activities with difference in resource consumption
- Activities with relevance for BT IT Supply

Figure 5 Activity Criteria

<sup>68</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 63.

<sup>69</sup> Gerlach, James et.al., *Determining the Cost of IT Services*. Sep 2002/Vol 45. No 9 Page 61-67.

<sup>70</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö. Page 271

<sup>71</sup> Gerlach, James, et.al, *Determining the Cost of IT Services* Sep 2002/Vol 45. No 9 Page 122.

<sup>72</sup> Ibid.

### 3.4.3 Allocation of Resources to Activities

To allocate costs from resources to activities such as “salaries” ABC requires resource cost drivers. The percentage of time personnel spend on supporting errands could be used when assigning labour costs to a supporting customer activity. If “time” is selected as cost driver, the amount of time employees spend on each activity will determine a percentage part of the total indirect and overhead costs.<sup>73</sup> If the supporting customer activity consumes more than labour additional cost drivers may be needed.<sup>74</sup>

### 3.4.4 Determination of Activity Cost Drivers

This process continues by choosing appropriate activity cost drivers unique for the activities so that the cost object’s consumptions of activities can be traced. In other words the activity driver measures the rate at which an activity contributes to a cost object. In order to be useful the cost driver must be a compromise between functionality and complexity.<sup>75</sup> In similarity with the selection of resource cost drivers an important criterion for activity drivers is that these should illustrate a possible diversity of how the activity is being consumed by cost objects.<sup>76</sup>

### 3.4.5 Determination of Costs to the Cost Objects

The ABC allocation for each cost object is calculated by applying each activity cost driver to the activity costs. Finally the direct costs are summed to calculate the total cost of providing a specific IT related deliverable.

## 3.5 The IT Infrastructure Library Framework

The above mentioned steps represented the process of implementing ABC. We believe that the “Service and Support”-function consists of a variety of tasks and processes which needs enhanced definitions. In order to accomplish this we present the ITIL framework.

The IT Infrastructure Library Framework (ITIL) is a world wide standard for organizing IT environments.<sup>77</sup> The purpose of the framework is to provide detailed descriptions of important IT practices that can be adapted in an IT organization. These descriptions are made by a set of processes that organizations are recommended to implement in order to structure their IT environment.<sup>78</sup>

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<sup>73</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>74</sup> Gerlach, James et.al., *Determining the Cost of IT Services* Sep 2002/Vol 45. No 9. Page 61-67.

<sup>75</sup> Kaplan, Robert S. & Cooper, Robin. *Cost and Effect* (1997) HBS Press: Boston.

<sup>76</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 65.

<sup>77</sup> Von Bon, Jan, *Introduction to ITIL* (2001) Van Haren Publishing: The Netherlands.

<sup>78</sup> Macfarlane, Ivor & Rudd, Colin, *IT Service Management* (2001) itSMF Ltd: UK. Page 1.

According to the framework an organization will develop a clearer structure, become more efficient, and more focused on the corporate objectives if the framework is applied.<sup>79</sup> We do not intend to further explore the constituents of ITIL, mostly because the framework is rather comprehensive and goes beyond the range of this study. We however consider two organizational functions and two processes relevant in this study. These are “Incident Management”, “Problem Management” and First-line & Second-line support.

### 3.5.1 Service & Support according to ITIL

According to the ITIL framework the organizational structure of a Service & Support function consists of two levels of support, First-line and Second-line.<sup>80</sup> First-line support is normally provided by the Service Desk, which serves as the frontier for an organization’s IT environment. The Service Desk handles multiple queries without needing to contact specialized personnel and for the end users it provides the single point of contact. If an errand cannot be solved by the Service Desk, then more expertise or authority will have to be involved and the request is escalated to Second-line support, which is a more specialized service group.<sup>81</sup> First-line support and Second-line support both handle activities related to a number of basic ITIL processes. The primary process for First-line support is “Incident Management”, whereas Second-line support is associated with “Problem Management”.<sup>82</sup>

The primary objective of “Incident Management’s” is to return to the normal service level as soon as possible, with the smallest impact on the business activity of the organization and the user. An important notion is to keep effective records of all incidents and record all incoming incidents.<sup>83</sup> An incident is defined as any event which is not part of the standard operation of a service which causes, or may cause, an interruption to, or a reduction in the quality of service.<sup>84</sup>

“Problem Management” focuses on resolving the underlying root cause of incidents and prevents incidents from recurring.<sup>85</sup> The difference between this and “Incident management” is that the latter has its focus on the service and takes action if there is an incident to make sure that the service is restored. The aim is to resolve an incident quickly, by whatever means possible and also to work pro-actively.

ITIL defines more processes additional to “Incident Management” and “Problem Management” and other organizational functions within an IT setting.<sup>86</sup> These processes and organizational functions however occur at a level outside our research aim, which is why we discuss them. It is important to bear in mind the difference between a *functional* separation and a *process* separation. The distinction

<sup>79</sup> Von Bon, Jan, *Introduction to ITIL* (2001) Van Haren Publishing: The Netherlands.

<sup>80</sup> Ibid.

<sup>81</sup> Macfarlane, Ivor & Rudd, Colin, *IT Service Management* (2001) itSMF Ltd: UK. Page 33.

<sup>82</sup> Von Bon, Jan, *Introduction to ITIL* (2001) Van Haren Publishing: The Netherlands.

<sup>83</sup> Macfarlane, Ivor & Rudd, Colin, *IT Service Management* (2001) itSMF Ltd: UK. Page 34.

<sup>84</sup> Ibid. Page 31.

<sup>85</sup> Ibid. Page 46.

<sup>86</sup> Von Bon, Jan, *Introduction to ITIL* (2001) Van Haren Publishing: The Netherlands.

between First-line and Second-line support is a *functional* separation, whereas the distinction between “Incident Management” and “Problem Management” is a *process* separation. The correlation within this dichotomy is as stated above that First-line support is mostly associated with “Incident Management” whereas Second-line support is associated with “Problem Management”. We believe that the definitions and descriptions of these processes and organizational functions will provide a greater understanding for our analytical discussion.

### 3.6 Activity Based Management (ABM)

The purpose of Activity Based Costing is to provide managers with more accurate information regarding costs and activities.<sup>87</sup> The next step in this process is *how* managers can use this information and benefit from it. Kaplan & Cooper (1997) argue that Activity Based Management can be seen as an enhancement or the practical consequence of an ABC model.<sup>88</sup> ABM concerns how managers can utilize the results from ABC in order to enhance profitability and efficiency. In order to achieve this ABM is divided into two sub categories; *Operational* and *Strategic* ABM.<sup>89</sup>

Operational ABM covers the actions that increase efficiency, lower costs - in short, the actions required to do things right. According to Kaplan & Cooper (1997) this can be achieved by increasing or reducing the resource capacity for personnel, hardware and software in order to optimize the resource consumption.<sup>90</sup> In a Service & Support function this may consist of a software upgrade in order to fulfil a need of more information.

Strategic ABM is about doing the right things. In order to do this Kaplan & Cooper (1997) argues that products and services should be evaluated according to their profitability.<sup>91</sup> Products or services that generate more costs than revenues should thereby not be included. For a Service & Support function this may relate to if support for a deliverable shall be provided internally or externally or if an IT deliverable should be purchased or available by a licence agreement.

Generically ABM can be described as a collection of common ideas for how to preserve the benefits of ABC. This means that the necessary resources must exist in order for the activities to be efficient.<sup>92</sup> Since ABC can be applied in very different contexts the outcome of the model has to be adjusted to the specific case. It is however important to know that ABM can not be seen as a *modus operandi* for how companies can come across business opportunities on the market.<sup>93</sup> According to Kaplan & Cooper (1997) its purpose is how to flourish from the benefits of ABC.

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<sup>87</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>88</sup> Ibid.

<sup>89</sup> Ibid. Page 137.

<sup>90</sup> Ibid.

<sup>91</sup> Ibid.

<sup>92</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 96.

<sup>93</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

### 3.7 Discussion of Selected Theories

H. Thomas Johnson, the co-author of *Relevance Lost* (1987) has critically commented the ABC debate arguing that “Activity-based” is a phrase managers hear almost frequently and is used almost as a standard solution to problems that arise.<sup>94</sup> Ax and Ask (1995) argue that the overall debate over ABC has been almost too positive and that managers and academics have accepted the theory rather uncritical.<sup>95</sup> Another consideration is the fact that this essay has its focus on a Service & Support function and for that reason it is relevant to discuss how the selected theories correspond with this specific context.

#### 3.7.1 Limitations

Kaplan & Cooper (1997) argue that ABC can be implemented successfully in both product and service providing organizations.<sup>96</sup> Studies of service intense organizations that have implemented ABC is however rather limited which indicates that there might be difficulties in implementing ABC in Service related organization.<sup>97</sup> In addition to this there are operational difficulties with ABC. Since an activity has to be aggregate and consistent there are limitations in the ability to consequently utilize the model for all consumption of resources. Many of the actions taking part in an IT department are difficult to define as recurring activities. Measuring problems such as what constitutes an activity and what kind of resources that must be included are typical quandaries.<sup>98</sup> Another difficulty is the use of “time” as a cost driver. Having this means that all activities must be measured which is a profound and very time consuming operation. This leads us into the overall drawback with ABC which is its complexity and time consuming implementation.<sup>99</sup> An ABC implementation will most likely consume a lot of time and effort and many organizations do not have the resources or willingness to do this. Activities and cost drivers also change over time. As a result the ABC model has to be constantly updated in order to be useful otherwise it just becomes a static model useful for a certain moment in the process.<sup>100</sup> Since ABM is dependent upon the results from the ABC model the limitations presented also affects this theory. ABM is also greatly coloured by the specific context of the organization. Thereby there are limitations in how the results may be generalized.

#### 3.7.2 Benefits

Kaplan & Cooper (1997) argue with the use of the “Willie Sutton rule” and the “High diversity rule” that ABC should be implemented in functions with large indirect costs; especially if these costs have increased significantly and are difficult to allocate and in functions with a high diversity of products, customers and

<sup>94</sup> Johnson, Thomas, *Relevance Regained* (1992) New York Free Press: Toronto. Page 26.

<sup>95</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 80.

<sup>96</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>97</sup> Larsson, Rolf G., *Prototyping inom ABC och BSC* (2004) Växjö University Press: Växjö.

<sup>98</sup> Gerlach, James et.al., *Cost Management Using ABC for IT activities* (2004) Management Accounting Quarterly.

<sup>99</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö.

<sup>100</sup> Ibid.

processes.<sup>101</sup> As we described in Chapter 1, Service & Support provides a high diversity of products and service and is characterized by a high degree of overhead costs. As a result we believe that the context of the Service & Support function highly correspond with the principals of ABC.

The fact that ABC mainly will be based on interviews with organizational members enables these to affect the outcome of the model. We believe that this fact leads to a model that will be well anchored in the operations and the organization. To include many people in the process of developing a model enhances the presupposition for a positive implementation.<sup>102</sup> In other words the complexity of this theory can be considered positive since it necessitates large parts of the organization to take part in the implementation process.

Since there is a risk that the ABC model will not be properly updated if it is to complex it is important to develop a suitable model that fits the purpose of the organization. Since the selection of activities will be done by a dialogue with BT IT Supply we will have the possibility to develop a model that fits their specific needs.

We further believe that the ITIL framework will be of use in the selection and definition of activities. The applying of ITIL also addresses the limitation of the generalization of ABM since it is well spread around the world. An ABC model that is contacted upon ITIL activities should be useful in other organizations that have applied the framework.

### **3.8 Theoretical Summary**

Our theoretical discussion includes three components of which Activity Based Costing is the most central. This is complemented with the ITIL framework and Activity Based Management which is an enhancement of ABC. ABC was developed due to criticism of traditional ability to allocate overhead and indirect costs. While traditional cost systems often are associated with issues such as how the organization can control costs for financial reporting and departmental cost control, ABC highlights the activities that are being performed and the resources needed for these activities. A developed and implemented ABC model may further be enhanced by a collection of common ideas and tools that together work for a more efficient way of utilizing resources. These are referred to as ABM. The purpose of ITIL is to assist with descriptions of the organizational functions and processes that occur within an IT environment. In addition to this we have critically reviewed our choices and discussed benefits and limitations regarding ABC. Our theoretical tools will be of assistance when analyzing our empirical material in order to address our questions at issue.

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<sup>101</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö.

<sup>102</sup> Andersson, Göran, *Kalkyler som beslutsunderlag* (1997) Studentlitteratur: Lund. Page 138.

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## Chapter 4

### Empirical

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*In this chapter we present our empirical study. The chapter begins with an introduction, followed by a description of the Service and Support function, the selected deliverables and a presentation of the empirical material.*

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#### 4.1 Introduction

The purpose of the organizational description of BT Industries is to clarify the relationship between BT Industries, BT IT Supply and its parent company Toyota Industries. This is followed by a short description concerning our empirical data gathering process. Some of this was accounted for in the methodological section, though it will be more fully explored at this stage. Further, a presentation of the function “Service & Support” will follow. Naturally, our emphasis will be put on this function as it constitutes the core of our study. The chapter ends with a short summary.

#### 4.2 The Organization of BT Industries

In 1946 BT was founded under the name “AB Byggekonomi” as an importer for equipment in the construction and transportation industry. A year later the name was changed to “AB Bygg- och transportekonomi” and BT started its own manufacturing of hand pallet trucks. During the following 30 years BT invented and developed trucks and began to establish international sale and service through a number of sales and service organizations. In 1986 the organization changed its name to BT industries and in 1995 BT industries was listed at the stock market. The acquisition of North America’s The Raymond Corporation in 1997 made BT Industries the world leader in warehouse trucks and through the acquisition of CESAB of Italy in 1999/2000 the product range was extended to also include own manufactured counterbalanced trucks. The BT Industries Group comprises four brands, BT, Raymond, Lift-Rite and CESAB.<sup>103</sup>

In 2000 BT industries was acquired by Toyota Industries Corporation (TICO). Toyota Industries has over the years, from the foundation in 1926, developed into four business segments: Material Handling, Engines, Lomb Machines and Others. After the acquisition, BT Industries became a part of the segment “Material Handling”, specialized in the development and production of trucks. This acquisition led to that the world’s largest manufacturer of warehouse trucks (BT Industries) and the largest manufacturer of counterbalanced trucks (Toyota) created a world leading constellation in industrial trucks.

Toyota Industries is divided in four regions: Europe, North America, Japan and International (the rest of the world). Within each region there are several business segments that consist of Material Handling (MH), Compressors (C), Engines (E)

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<sup>103</sup> <http://www.bt-industries.com/en/ourcompany/btbusiness/history.htm> (2006-11-20)

and Lomb Machines (LM).<sup>104</sup> Within each region and business segment there are several support functions and this essay has its focus on the support function within the division, Toyota Industries IT Supply Europe AB (in this paper known as BT IT Supply or IT Supply).

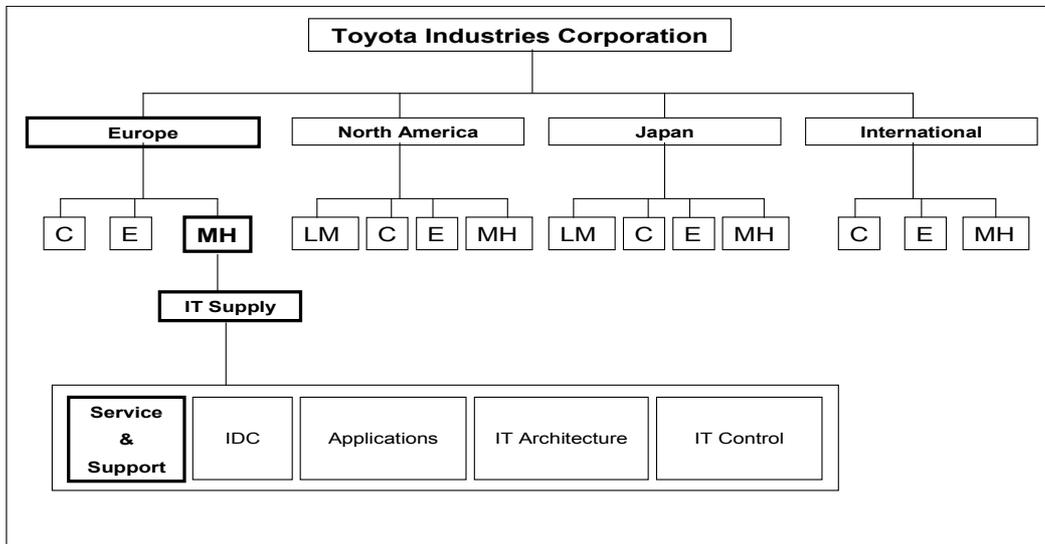


Figure 6 Organization of Toyota Industries Corporation

The purpose of BT IT Supply is to design, develop and maintain IT related solutions for the business segment Material Handling in Europe.<sup>105</sup> The BT IT supply organization is divided into five areas which are “Service & Support”, “IDC”, “Applications” (development & maintenance), “IT Architecture” (mobile & network solutions) and “IT Control”.<sup>106</sup> In addition to the internal servers BT IT Supply also utilizes external servers but the associated applications for these are not utilized in support activities and are not included in this thesis. The function “Applications” are naturally responsible for the maintenance and development of applications. “IT Architecture” consists of mobile & network solutions and “IT Control” is an administrative function. This essay has its focus on the function Service & Support.

### 4.3 Empirical Data Gathering

The empirical material was assembled through a series of qualitative interviews, a questionnaire, studies of documents and informal talks. Together with our Project Host at BT we formulated an interview schedule with key employees including service desk operators, technicians and managers. The first interview was with the Service Desk manager. He provided us with an overview of the Service Desk and its main objectives, together with a wide assortment of statistics from working hours to number of handled errands. Much of the interview targeted the current cost system of the Service Desk and the distinction between the tasks for the

<sup>104</sup> Interview with Gisela Fagerstedt, Manager IT Supply, 2006-12-07

<sup>105</sup> Interview with Gisela Fagerstedt, Manager IT Supply, 2006-12-07

<sup>106</sup> Interview with Ronny Ideskär, IT Controller, 2006-12-07

Service Desk and the Technicians.<sup>107</sup> The next interview was with an operator at the Service Desk.<sup>108</sup> The focus of this interview was on specific tasks, statistics and time consumption regarding different activities. The interest in time consumption originated from the idea to use “time” as a cost driver. From these two interviews however, we realized that there were limitations concerning the understanding of “costs” and “time consumptions” for specific tasks. Neither the operators nor managers could give us information concerning how much time an operator nor a technician spend supporting a specific product or providing a specific service. Neither did they have the knowledge of the cost of supporting a specific product or a specific service.

Additional to this we conducted interviews with the Manager of IDC (the function responsible for the computer centre containing all internal servers), Technicians, two different controllers and the Director of BT IT Supply. The interview with the manager of IDC provided us with information concerning servers, associated applications and maintenance costs. From the Technicians we obtained material concerning specific tasks, daily routines and statistic material relating to support activities.

The two forthcoming interviews provided us with different perspectives regarding the role of an IT Controller.<sup>109</sup> The controller at BT IT Supply informed us about the technical hitches in pricing IT deliverables, recharge rates and engaging support agreements without knowing the actual costs. The situation he stated is at present characterized by an arbitrary pricing method rather than pricing based on rational knowledge.<sup>110</sup> This limited knowledge also affects the bargaining power towards external suppliers of IT deliverables. When negotiating a price for a support agreement a better cost understanding enhances the possibility of taking a cost rational decision.

The other controller represented IS Promotion.<sup>111</sup> This function is responsible for the purchase of IT related deliverables for BT Europe. The relation between BT IT Supply and IS Promotion is that BT IT Supply sells IT deliverables to IS Promotion. The controller at IS Promotion presented us with a perspective as an internal buyer. He explained the shortcomings in engaging negotiations when there is a lack of knowledge concerning the costs related to the negotiated or offered price for support. He also underlined that an understanding for the cost structure has increased due to more restricted tax regulations regarding internal transactions. Inaccurate pricing of internal transactions of deliverables may lead to misleading corporate accounting related to group contribution among subsidiaries. These two interviews were very interesting and useful since they presented an insight into the considerations from both a seller’s perspective and a buyer’s perspective of IT deliverables. Some of our interviews were also complemented by supplementary questions. The fact that we spent three working days at BT enabled us to ask further questions which were of great importance.

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<sup>107</sup> Interview with Hans Berg, Service Desk Manager, 2006-12-07

<sup>108</sup> Interview with Camilla Ask, Service Desk Operator, 2006-12-08

<sup>109</sup> Interview with Ronny Ideskär, IT Controller, 2006-12-06

<sup>110</sup> Interview with Ronny Ideskär, IT Controller, 2006-12-06

<sup>111</sup> Interview with Morgan Bjernersjö, Controller, 2006-12-06

Due to the limited information regarding time consumption we found it necessary to complement our interviews with a questionnaire. The intention was to measure how much time and how many errands the Service Desk and the Service Group handle over a period of one week. This would illustrate that certain errands necessitate more support capacity than others and should therefore be charged with a larger cost. The use of “time” as a cost driver also made it possible to measure the capacity utilization. Based upon the interviews with the operators at the Service Desk, the Service Desk Manager and statistic we came to the conclusion that one week represented a fairly correct indicator of the annual total workload. One of the outcomes from our initial interviews led to the conclusion that a similar time measuring questionnaire would be difficult to conduct on the Service Group. The reason behind this setback was that errands supported by the technicians are often related to time period’s exciding several days or weeks. Different technicians are also involved in the same errands at different occasions which enhance the difficulties in tracing how much time a specific errand has consumed. Even though the Support Group has a program registering the technician’s working hours, the working hours for specific incidents are not registered.<sup>112</sup> These circumstances made us abandon the idea of measuring time consumption for the technicians and instead use statistics to measure number of supported errands.

#### **4.4 The Service & Support Function**

Service & Support at BT IT Supply allows internal customers and users (within Material Handling in Europe) to access the appropriate services supporting their activities and businesses. The function is dependent on several components: Firstly, there are two major applications; Remedy and Unicenter. The former of these two is an application handling registration and logging of errands. Whenever an errand arrives it is logged in Remedy. This is done in order to structuralize and facilitate the support process. The procedure also allows the support function to register which division that utilizes the support function. This is an important procedure since only users with support licenses with BT IT Supply are allowed to engage in the support activities. The license for Remedy has been purchased and has remaining write-offs. In order to run Remedy seven different servers are needed. Each server has a yearly cost that includes service and maintenance. The seven servers are placed in the computer centre handled by IDC. Remedy also consumes 75 % of the working hours of a full-time technician responsible for upgrading and support.<sup>113</sup> In addition to this BT IT Supply has an agreement with an external supplier that provides support for Remedy. For this support agreement BT IT Supply is charged with an annual fee.

Remedy is shared among many functions at BT in addition to Service & Support which means that many divisions have to bear the cost for Remedy. Bases on statistics of utilization we have been able to assess that 60 % of the total amount of errands logged in Remedy are associated with Service & Support. We have used the total number of logged errands relating to Service & Support and contrasted

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<sup>112</sup> Interview with Tommy Adolfsson, Technician, 2006-12-07

<sup>113</sup> Interview with Hans Berg, Service Desk Manager, 2006-12-07

this with the total amount among all the divisions This will provide us with a percentage that can be dedicated to Service & Support.

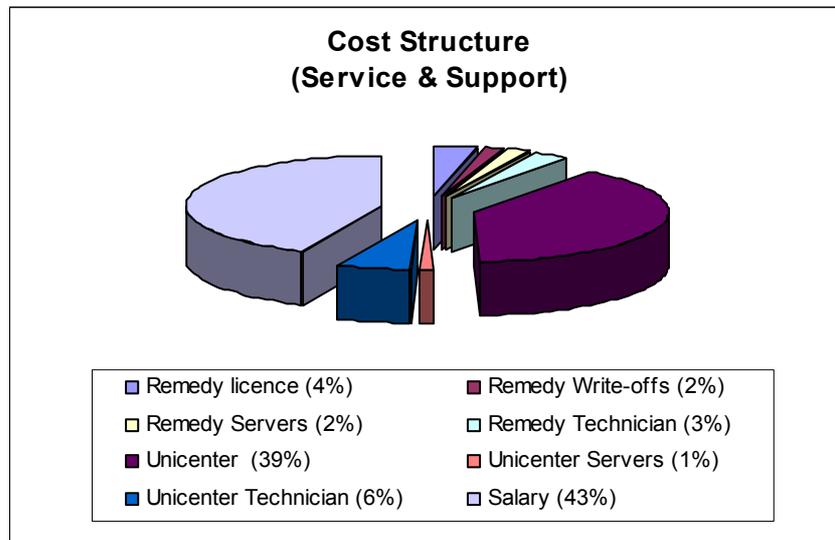


Diagram 1 Cost Structure of Service & Support

Based on the information from our interviews the utilization of Remedy is distributed 70/30 between the Service Desk and the Service Group where 30% is to be accounted to the Service Group and 70% to the Service Desk. These figures are based upon the interviews with both operators and technicians and represent an estimation of the utilization. The number of errands registered from the Service Desk exceeds the number of errands from the Support Group. The Service Group is however very dependent on the application in their support activities whereas it is not reasonable to allocate the whole cost to the Service Desk. However, a 50% division between the two is not a satisfactory allocation since the Service Desk de facto has more errands and therefore should bare the majority of the cost. Based on the interviews we estimated a ratio of 70 % to the Service Desk and 30% to the Service Group.

Unicenter is the other major application and is used to monitor servers and web platforms. When Unicenter detects an errand this is visualized through large LCD screens located both in the Service Desk and at the Service group. Unicenter has not been purchased instead BT IT Supply pays an annual license for this application. In addition to this Unicenter requires four servers for which a yearly cost of service and maintenance is paid. The application also requires one full-time technician for support and upgrading related tasks. As opposed to Remedy Unicenter is not shared by as many functions at BT. The only two functions utilizing Unicenter are the Service Desk and the Service Group which mean that the total cost will be allocated to Service & Support. From our interviews we obtained a ratio between the Service Desk utilization and the Service Group utilization where the majority of the Unicenter cost, 90%, should be allocated to the Service Group. The remaining 10% goes to the Service Desk.<sup>114</sup>

<sup>114</sup> Interview with Tommy Adolfsson, Technician, 2006-12-15

#### 4.4.1 The Service Desk

The Service Desk plays an important role since it serves as the front for the entire IT department. For the end user, the Service Desk acts as a link to the IT organization and ensures that the customers get help with their requests.<sup>115</sup> Hence, the users need not look for somebody who can solve their problem; this is the reason why the Service Desk exists - to give service and support to the customer. The Service Desk at IT Supply is rather small and consists of four operators. These are divided according to a rotating scheme that specifies their individual responsibilities. Number one is responsible for all errands that arrive through telephone. Number two handles all incoming errands arriving via e-mail, web and surveillance. Number three and four assists number one and two in the supporting process.

The setting in which they operate is a glass room in a newly built annex surrounded by an open office architecture. Outside the glass room the Service Desk Manager and the technicians are positioned. This group gets forwarded the requests and errands that could not be dealt with in the Service Desk. A typical request arriving at the Service Desk can be a Microsoft related problem such as Outlook.<sup>116</sup> At this level the operators are often skilled and capable of solving the problem directly. More complex issues concerning server malfunctions are normally forwarded to the technicians in the Service Group.

There are four possible communicating tools used in order to report an error or to request a service: Telephone, e-mail, web and by surveillance. Depending on the nature of the errand it is then categorized into a specific category and set at a priority level. Example of a category can be the e-mail system MailMarshal. Depending on the importance of the errand it is also classified into a priority. There are four types of priorities. Number four means that the errand has to be solved within 4 days, priority three means 2 days, priority two 4 h and priority 1 immediately. An errand that cannot be solved by the Service Desk is passed on to a relevant service group.

If someone is reporting errands by telephone the individual is told to state user name and phone number. This information is then used in order to log the incident in Remedy. All errands are also recorded. If the errand is reported by e-mail then the e-mail address is logged instead of the phone number. Incidents that are reported by the web application are already registered in Remedy. The initial purpose with this application was to transfer the work load from the Service Desk to the end user. When reporting an incident through this application the customer is logging the errand in Remedy himself or herself. Consequently, the Service Desk operators do not have to do the logging procedure. Very often however, these errands are not properly categorized and therefore the Service Desk has to control each errand and the idea of shifted work load vanishes. According to the same procedure as for “telephone” and “mail” the Service Desk then tries to solve the errand emerging from the web application. Incidents may also be detected on different surveillance screens (Unicenter). By these the Service Desk is able to supervise server operations. If an incident is detected by Unicenter the incident is

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<sup>115</sup> Macfarlane, Ivor & Rudd, Colin, *IT Service Management* (2001) itSMF Ltd: UK. Page 101.

<sup>116</sup> Interview with Camilla Ask, Service Desk Operator, 2006-12-05

logged in Remedy and then handled according to the same procedure as for telephone, mail and web.

The four operators in the Service Desk share about the same salary which represents about 71 % of the total cost structure in the Service Desk.<sup>117</sup> Another major identified cost concerns the licence fee for Unicenter and Remedy. Costs associated with these software concerns the seven servers that Remedy operates by, one technician spending 75 % of his working hours supporting Remedy and the annual paid Service & Support-agreement. Costs associated with Unicenter are licence fees, the four servers and the working hours of a full-time technician.

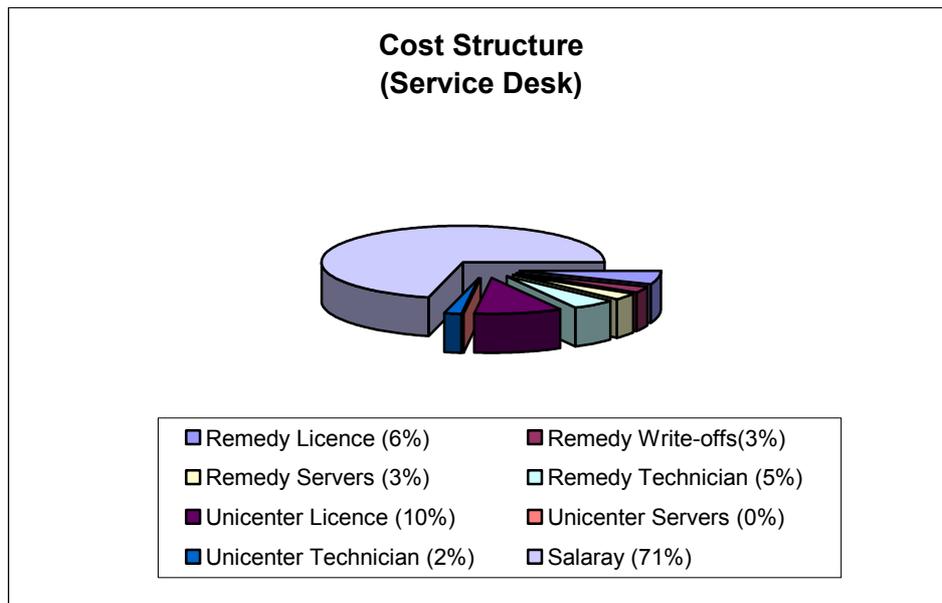


Diagram 2 Cost Structure Service Desk

A part from these there are a few minor remaining costs generated by the Service Desk such as telephone costs and some other hardware. These are shared by many functions within the IT department and represent a marginal portion of the total cost structure

#### 4.4.2 The Service Group

The technicians at the Service Group complement the Service Desk in solving more complicated requests. They have different competence areas for which they handle errands, for example Network and Web platform related issues. The Service Group is comprised by eight technicians and, as mentioned before, they are positioned next to the Service Desk. They work around different working stations and are placed in an open environment, which enhances the informal communication among them. As opposed to the Service Desk the Service Group goes beyond providing support and deals with various software and hardware installations and improvements. An interviewee informed us that he was at the moment involved with an upgrade process of Unicenter, which consumed almost

<sup>117</sup> Interview with Hans Berg, Service Desk Manager, 2006-12-06

all of his working time.<sup>118</sup> The fact that the Service Group is involved in tasks that do not exclusively relate to support constitutes a major difference between the Service Desk and the Service Group.

This difference in tasks also relates to the competence discrepancy of the operator, where technicians generally have more detail skills about certain areas. Hence, this skill will be used to more than answering incoming incidents from the Service Desk. According to our interviews the ratio between the supports related tasks and other tasks is about 25/75 %, where 25% of the working hours are devoted to support of incoming errands from the Service Desk and detected errands by Unicenter.<sup>119</sup> The other 75 % are devoted to installations, maintenance, and upgrading and repair activities.<sup>120</sup>

The technicians normally begin their day by supporting errands that have been passed by the Service Desk and checking if new errands have been detected by Unicenter during the night. Unicenter runs 24 h per day and is a comprehensive surveillance system for servers and web platforms. It works proactively since it detects problems at an early stage. As a result Unicenter is an important tool for the Service Group. The other communication entrance of errands goes through Remedy and consists of errands that have been forwarded from the Service Desk. As mentioned the Service Group encompasses different specialists with different competence areas. Depending on the nature of the errand the Service Desk has hopefully assigned the errand to the correct technician.

As opposed to the costs of the Service Desk the largest cost for the Service Group consists of the application Unicenter which represent 59%. Salaries only represent 25 % of the total cost structure and there is no significant difference among the eight technicians.<sup>121</sup> Due to the ratio of 25% that were devoted to solving incoming errands from the Service Desk and from Unicenter, it is only this amount that will be charged from the salary resource in our calculations. The remaining 75% is devoted to upgrades and installations. Since our focal point of this study is to measure costs related to support, these other tasks will not be taken into account.

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<sup>118</sup> Interview with Tommy Adolfsson, Technican, 2006-12-05

<sup>119</sup> Interview with Tommy Adolfsson, Technician, 2006-12-05

<sup>120</sup> Interview with Erik Nåbo, Manger IDC and Tommy Adolfsson, Technician, 2006-12-06

<sup>121</sup> Statistics provided by Gisela Fagerstedt

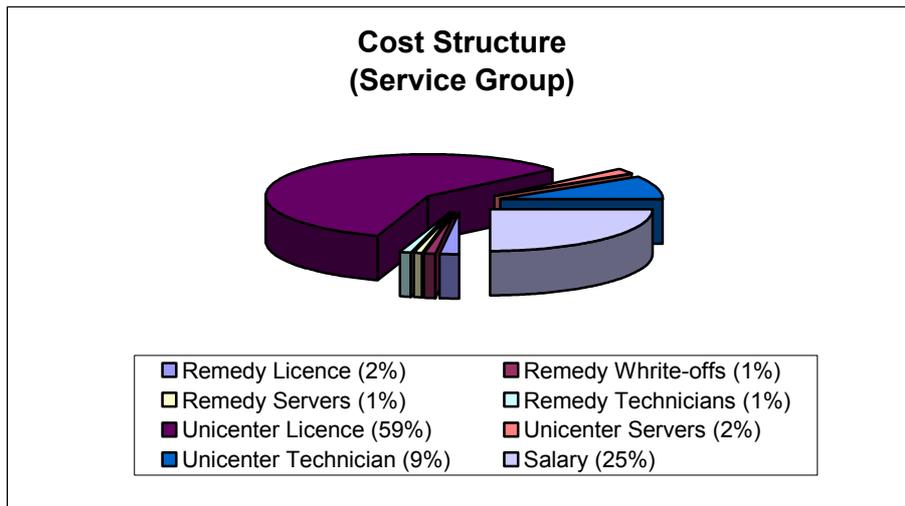


Diagram 3 Cost Structure Service Group

## 4.5 Supported Deliverables

Since the underlying purpose in this study is to trace cost for support to specific deliverables we find it relevant to present a clear definition and description of these. The Service & Support function of BT IT Supply supports a wide range of deliverables, everything from Microsoft related difficulties in Outlook to advanced server malfunctions. The complexity among the different deliverables is vast. We begin by presenting an overview of all the services and products supported by IT Supply according to their own classification.<sup>122</sup>

### Categorize of supported deliverables

<ul style="list-style-type: none"> <li>- Backup/Restore</li> <li>- Business Applications</li> <li>- Hardware</li> <li>- MailMarshal</li> </ul>	<ul style="list-style-type: none"> <li>- Network</li> <li>- Password Reset</li> <li>- Request</li> <li>- Software</li> <li>- Printer</li> </ul>
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Figure 7 Categorize of supported deliverables

Every time an incoming errand arrives to the Service Desk it must be classified according to these categories. They represent both specific products (MailMarshal, the mail system used at BT) and services (Requests).

<sup>122</sup> Interview with Hans Berg, Service Desk Manager, 2006-12-07

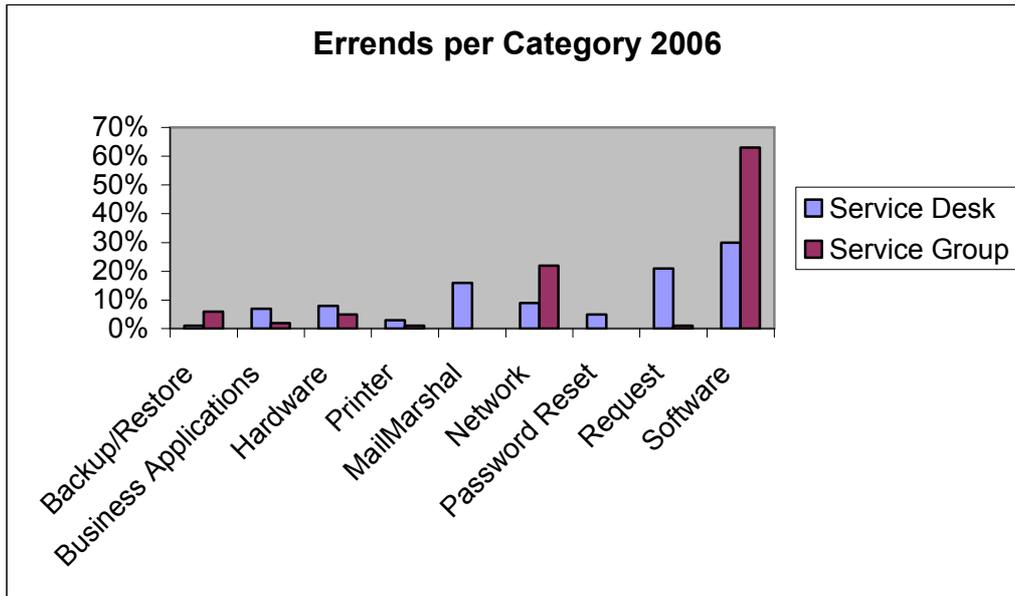


Diagram 4 Errands per category and support function

Within these categories sub categories exist which represent the next step in the logging process of an incoming incident.<sup>123</sup> As illustrated above there is a great variation between the numbers of errands on the different categories. This figure also tells the difference between the Service Desk and the Service group.

#### 4.5.1 Selection of Deliverables

Based on the present categories and from consultation with BT IT Supply the selected deliverables of this thesis were determined. We performed a reorganization of the total amount of supported deliverables in order to increase the degree of relevance in our final cost objects. The selection was made from statistics of the number of supported errands per deliverable and in consultation with our Project Host. The purpose was to capture the deliverables with most interest for BT IT Supply and with the highest frequency of support.

We extracted some of the specific software from the software category and used these as specific cost objects. For some software the cost significance of each product was so low that only assembled together with other products in the same category a significant cost allocation could be made. That is why for example “other software” is placed as a special group. The web platform was also extracted from the category Business applications. This was the only deliverable in the category that had a significant impact on the support. Further on, we have chosen these following nine deliverables:

<sup>123</sup> See Appendix 3

**Selected Deliverables**

<ul style="list-style-type: none"> <li>- <b>Network</b></li> <li>- <b>Hardware</b></li> <li>- <b>Servers</b></li> <li>- <b>Requests</b></li> <li>- <b>Other software</b></li> </ul>	<ul style="list-style-type: none"> <li>- <b>Citrix</b></li> <li>- <b>Exchange</b></li> <li>- <b>MailMarshal</b></li> <li>- <b>Web platform</b></li> </ul>
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Figure 8 Selected Deliverables

An important notion is that these deliverables are a variety of both products and services. Network relates to a service when the Service Desk or the Service Group assists users to gain access to the network. Hardware relates to incidents regarding desktops, laptops and printers. In the original classification of this category Servers was also included. We decided to extract this and have it as a separate cost object, because of its importance for the IT setting. When it comes to laptops, desktops and printers we believe that these can be viewed as one group which is why we have these under the category hardware. “Servers” represents all server related issues.

Next deliverable is called “Requests” and represents a service which includes answering all kinds of questions regarding a great variety of products and services. One of the Service Desk operators told us that answering these questions almost made them feel like telephone operators at an information desk. “Request” also includes handling back-up issues and creating accounts for customers. We believed that it would be interesting to show the cost of this service which is why we will select it as a cost object.

Our next deliverable is called “Other Software” which includes all other software supported by the Service Desk and the Service Group. These constitute of BT workplace, Matrix, Easy Production, Microsoft and Other. The reason why these software are not separated as specific products is because of their marginal affect on the costs. We decided to exclude Citrix, Exchange and MailMarshal, and use these as separate software because of their importance at IT Supply. This was also discussed with our Project Host. But for the rest of the software; these have been grouped together into one pool.

Citrix is a distributor that provides secure access to applications from a wide range of clients. Exchange is messaging platform from Microsoft. MailMarshal is the e-mail system of BT and Web Platform is the intranet at BT.

**4.5.2 Support of Deliverables**

The Service Desk personnel and the Technicians in the Service Group unfortunately lacked information regarding time consumption spent on supporting the deliverables. Therefore we created a questionnaire which was handed out to the operators in the Service Desk for a period of one week. From this we achieved

time consumption based on the different deliverables. The result from this questionnaire is presented in the figure below. The next figures present the same distribution “per errand” instead of “time”.

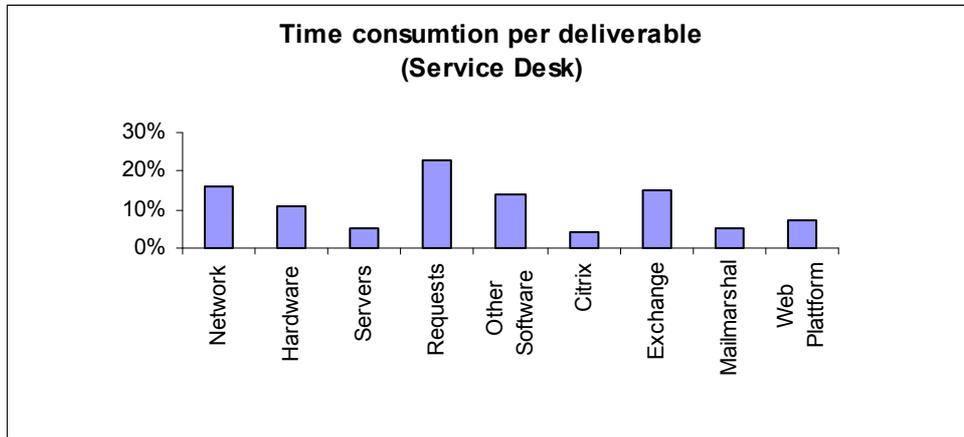


Diagram 5 Time consumption per deliverable (Service desk)

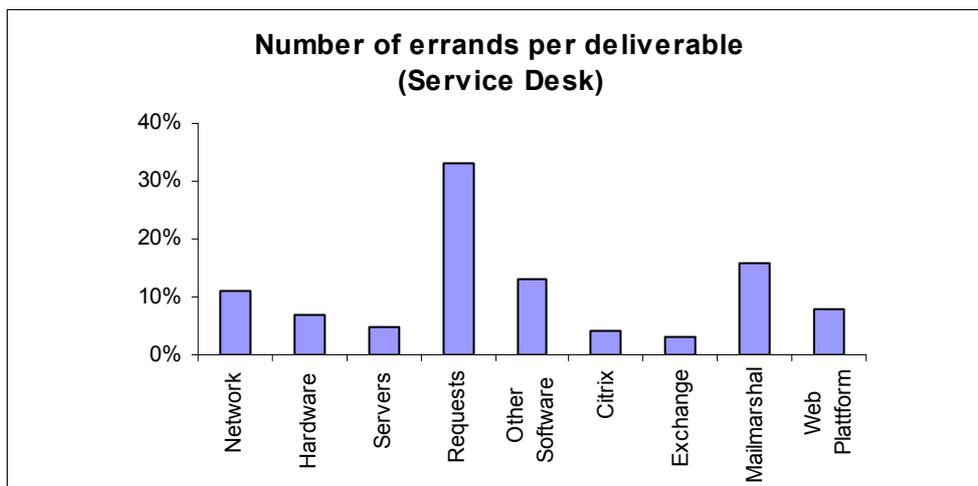


Diagram 6 Numbers of errands per deliverable (Service Desk)

According to both interviews and statistics a one week study represents a good estimate of the annual situation. The variety among errands differs mostly within the week where Mondays are often charged with the highest amount of errands. As the week progresses the amount declines. The statistics over a period of one year is however relatively consistent with a short decline during the summer. Based upon the working hours for the operators in the Service Desk (except lunch break) the questionnaire also revealed used and latent capacity. Of a total of 8460 minutes 2868 were dedicated to support of errands. The proportions are illustrated below.

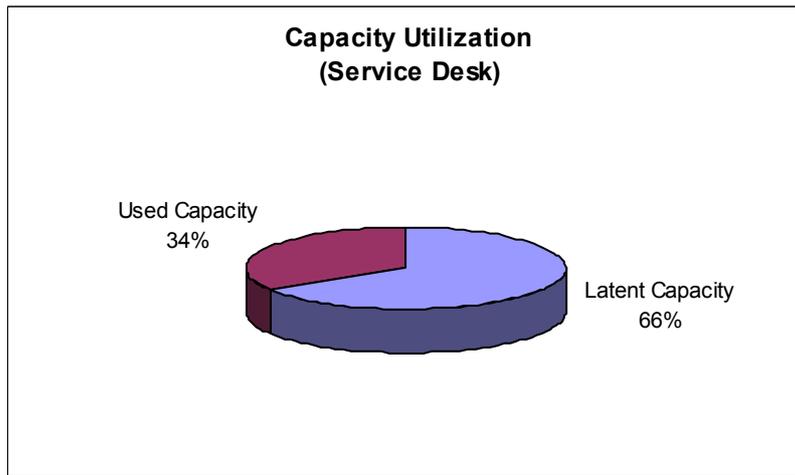


Diagram 7 Capacity Utilization (Service Desk)

The time consumption for the Service Group per deliverable was more difficult to obtain. Sometimes the technicians work simultaneously with many errands for several days making the measurement of time consumption difficult. Diagram 8 shows number of errands divided on the deliverables supported by the Service Group.

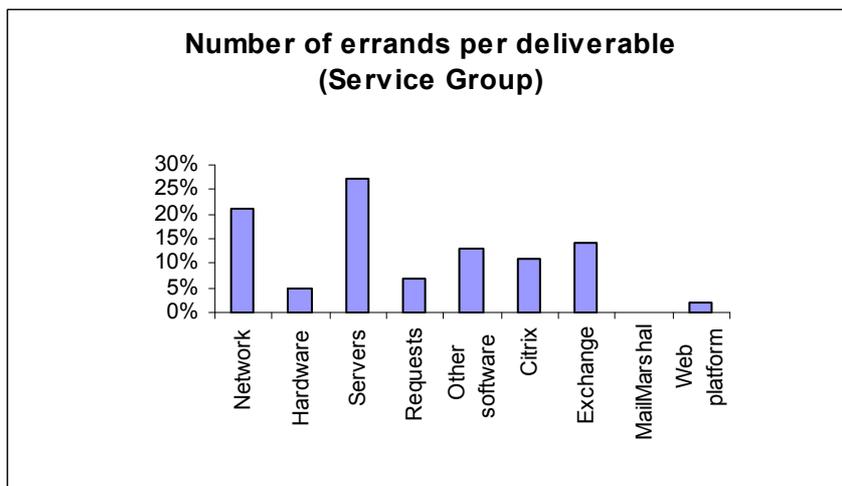


Diagram 8 Numbers of errands per deliverable (Service Group)

## 4.6 Empirical Summary

We began this chapter with an organizational description of BT being a subsidiary of Toyota Industries. We then, rather quickly, scoped down our perspective and explored the specifics of Service & Support with focus on the Service Desk and the Service Group. At the time for this study the knowledge was rather limited concerning costs in this department. As a result the whole division has recently been reorganized in order to gain a better cost understanding.

Being a support function delivering IT products and services to other functions within MH Europe, IT Supply gets its income from support agreements with other divisions. The price for these support agreements are today not based on the

actual costs, but on an arbitrary pricing method. This problem is increasing due to more restricted tax regulations regarding internal transactions and a higher demand for accurate pricing methods.<sup>124</sup>

All relevant material regarding the Service & Support function has been disclosed in this chapter. Its two constituents the Service Desk and the Service Group have been examined for which we have presented both relevant statistics and clear assignment descriptions. In the next chapter this material will be dissected and scrutinized with the use of our theoretical framework: Activity Based Costing.

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<sup>124</sup> Interview with Morgan Bjernersjö, Controller, 2006-12-06

## Chapter 5

### Analysis

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*In this chapter the theoretical foundation will be used to analyze the empirical material with the intention to address the questions at issue. The purpose is to create an ABC model that can enhance the understanding and allocation of costs*

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#### 5.1 Introduction

Based on the present theories, this chapter aims to construct an ABC model that will approach our first two questions at issue. These are: which activities, resources cost objects and cost drivers that can be identified and how much of the indirect and overhead costs that should be allocated to the cost objects? We begin with a reminder of the cost objects and the relevance of ABC in an IT setting. Further, we follow the implementation procedure presented in the theoretical chapter and finally present a full scale model and a discussion concerning operational and strategic ABM. This discussion will approach our third question at issue which deals with the ABC model's potential for managerial decision making.

#### 5.2 Cost Objects

The purpose of an ABC model is to determine the final costs for the cost objects, which is why we consider it appropriate to bear these in mind when taking part of the analysis. The model below demonstrates the cost objects of the ABC model.

##### Cost Objects

- Network	- Citrix
- Hardware	- Exchange
- Servers	- MailMarshal
- Requests	- Web platform
-Other Software	

Figure 9 Cost Objects

#### 5.3 Implementation of the ABC Model

As mentioned in the theoretical chapter the process of implementing an ABC model needs to consider two questions. The first refers to *where* the organization initially should look for the potential benefits from implementing ABC. The second question concerns during *which conditions* the model will have the greatest impact. The answer to these questions was recognized by two rules, the “Willie Sutton Rule” and the “High Diversity rule”.<sup>125</sup> The first of these two rules

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<sup>125</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

recognizes that organizations should notice areas with large indirect costs that are difficult to allocate. The second rule argues that an ABC model should be implemented in organizations with a high diversity of products, customers and processes.<sup>126</sup>

The empirical material reveals that Service & Support provides different levels of Support. The Service Desk allows internal customers access to a service that can support their daily activities. For the more complicated matters the Service Desk passes incidents further to the technicians in the Service Group. Because of its central role as a front to the majority of internal customers and the wide range of incidents the Service Desk covers a high diversity of products, services and customers. The fact that the Service Group is involved in the same errands as the Service Desk makes this function highly applicable for the High Diversity rule as well.

At the Service Desk salaries represent a major cost pool of the total cost structure. The other expenses include software and hardware. In the Service Group salary is not as dominant mostly because of Unicenter, the server surveillance application. These IT related tools are in many cases shared by both the Service Desk and the technicians. As a result a majority of the costs are indirect and needs to be allocated to a wide range of products and services (cost objects). Since both the Service Desk and the technicians are involved in a high diversity of products and services combined with an extensive indirect cost mass we argue that both the “Willie Sutton rule” and the “High Diversity rule” are fulfilled. Hence, the context of the Service & Support function is considered a very interesting setting for an ABC implementation. The other reason for developing an ABC model is the fact that up until today no advanced cost allocation study has been made concerning Service & Support at BT IT Supply. In the up coming budget this function will compose a specific cost centre which makes this study even more interesting. This pragmatic cause constitutes our final reason why this cost allocation study has been made.

In the theoretical chapter we described the development of an ABC model as a process with interdependent steps.<sup>127</sup> In order to be systematic and stay consistent our analytical process will follow the same structure. Consequently, it will be divided into the steps described below, where each step will be carefully explored and discussed:

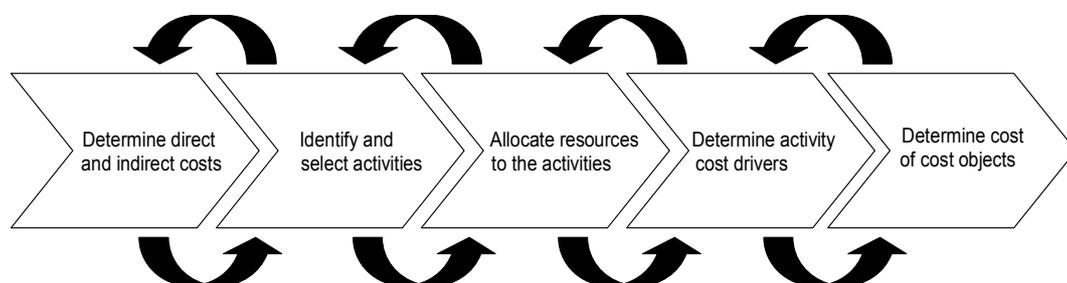


Figure 10 The implementation process of ABC

<sup>126</sup> Ax, Christian, et.al., *Den nya ekonomistyrningen* (2002) Liber ekonomi: Malmö. Page 270.

<sup>127</sup> Ibid.

## 5.4 Determine Direct and Indirect Costs

All direct costs will bypass the ABC calculation and go directly to the cost object.<sup>128</sup> If a cost can be directly traced to a certain cost object, there is no need for a cost distribution through activities. The empirical material reveals that there are no significant costs that can be considered as direct. Both the operators and the technicians are involved in varied tasks and services which mean that several cost objects share their time. There is at present no system that directly traces how much time each employee spends on different tasks. As a result there is limited knowledge concerning how much time a specific errand consumes. Hence, how much it costs. Next to “salaries” the other major indirect cost consist of IT related tools. This hardware and software can to some extent be traced to different cost objects but there is no specific hardware or software that only supports one specific cost object. The major IT tools Remedy and Unicenter are used by both the Service Desk and the Service Group in their supporting of different cost objects.

## 5.5 Identify and Select Activities

Selecting activities is an important notion of the ABC model. The definition of an activity varies a lot and depends on the chosen level of analysis. Generally, an activity can consist of everything from a detailed description of a certain task to a more general description such as a whole department within a company. When choosing activities it is important to bear in mind that the choice of activities often affects the cost of developing and maintaining the model.<sup>129</sup> Having very detailed activities can create a large apparatus just in order to keep track of all these. Detailed activity modelling is usually needed for operations planning and process improvement, but when it comes to Cost Management more general activity models are often sufficient.<sup>130</sup> Activities often constitute of concrete assignments which is why we find it appropriate to begin with the different functions within the division or the organization.<sup>131</sup>

A central criterion in our selection of activities was that these must have a significant affect on the cost objects. There is no need in determining activities for the sake of having many, at least not from a Cost Management perspective. A central difference between an ABC model and a traditional cost model is that in the latter the resources are consumed directly by the cost objects, whereas in the ABC model the activities are consumed by the cost objects. The selected activities play therefore an important role for the final allocation.

Our second criterion when selecting activities was that we wanted to choose activities with different resource consuming. If the selected activities consume the same amount of resources the basic idea with an ABC model diminishes. This resource would then be equally divided between the activities and from a Cost Management perspective the use of a traditional cost system would depict the

<sup>128</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

<sup>129</sup> Gerlach, James et.al. *Determining the Cost of IT Services* Sep 2002/Vol 45. No 9. Page 122.

<sup>130</sup> Gerlach, James et.al. *Determining the Cost of IT Services* Sep 2002/Vol 45. No 9. Page 123.

<sup>131</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 63.

same result on the final cost objects. Hence, we saw it as an imperative to choose activities with a different resource consumption pattern.

Our third criterion in the selection of activities was based on what BT IT Supply wanted us to investigate. Their anticipation with this study was to be able to trace the costs of the products and services that were being supported. The width of the ABC model could accordingly not be too large, but on the other hand a microscopic analysis was not either desirable. The ideal situation was to select activities that also could work as a foundation in a larger ABC context. Since the Service & Support function at BT IT Supply will comprise a specific cost centre in next year's budget, the use of more general activities were desirable.

These criteria eventually led to the selection of First-line and Second-line support as our two main activities which are defined according to the ITIL framework. First-line support is responsible for recording, classifying, matching, solving, and assigning to other support groups. Second-line is primarily involved in investigation and solving incidents forwarded by First-line.<sup>132</sup> There is a clear distinction in all above mentioned categories between these activities which make them very interesting. It can be more easily understood if one looks at it from an "errand perspective". When an errand arrives either by telephone, mail or web application it goes directly to the Service Desk. From this point on it has two choices: It can either stay and be solved in this function, or it can pass on to the next level of support where more specialized technicians take over. If it stays in First-line support then the final cost object will only be charged with resources needed for "First-line". If it needs more specialized support and gets passed on to Second-line it will be charged with resources from both First-line and Second-line and will consequently be more expensive. The distinction between these two levels of support constitutes the most significant difference in resource consumption within the "Service and Support" function. Consequently, the costs for these two levels of support are different. The salary between the employees is also different as well as the amount of IT related tools needed. Using these as our activities will show the difference between First-line and Second-line in their resource consuming and how this affects the cost objects. It will also show the total support cost for a deliverable going through both levels of support.

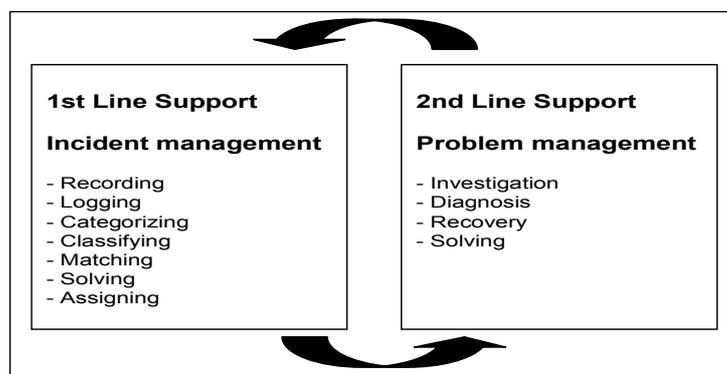


Figure 11 Selected Activities

<sup>132</sup> Von Bon, Jan, *Introduction to ITIL* (2001) Van Haren Publishing: The Netherlands. Page 42.

Within these two activities we have defined interrelated sub processes which the activity is based on. These sub processes are based on the IITL framework and will work as a better understanding of the activity. Furthermore, we will in more detail explain the selected activities First-line and Second-line support.

### 5.5.1 First-line Support

First-line support is conducted through its organizational application the Service Desk. This is an important role since it serves as the front for the entire IT department and is the operational interface between IT and the users.<sup>133</sup> The variety of errands being reported to the Service Desk covers everything from basic Microsoft related issues to advanced server problems. All errands are reported through mail, telephone, and web application or by surveillance. These four communication tools are the only communication entrance to the Service Desk. One of the key objectives of the Service Desk is to provide support for errands and to return to normal service level as soon as possible. This correlates strongly with the definition of “Incident Management” whereas this process constitutes First-line support’s main responsibility.<sup>134</sup> Another important task for First-line support is to keep track and log all incoming incidents which is yet another important notion of “Incident management”. Regardless of whether the incident can be solved by First-line or Second-line support the logging procedure becomes an important concept for both levels of support. Since it enables the errand to be traced and saved.

The definition of the activity First-line support comprises all those actions that relates to “Incident Management” taken in the Service Desk such as logging, handling and process incoming incidents. Those requests and services that cannot be solved by the Service Desk will be passed on to a technical specialist in Second-line support. This process is symbolized in figure 11 by the combining arrows from First-line to Second-line.

### 5.5.2 Second-line Support

The daily routines in Second-line support differ a lot from the ones in First-line support. In the latter the operators solely handle incoming errands, whereas the tasks in Second-line support are of greater variety. The technicians at Second-line support are also involved with other tasks such as software upgrade operations and new software and hardware installations. These tasks are however not affiliated with support activities and will therefore not be included in our calculations.

“Problem Management” is the process mostly associated with Second-line support. The focus of this process is to resolve the underlying root cause of errands and prevent them from recurring. An important step in this process is to proactively identify and resolve problems and known errors thus minimizing incident occurrences.<sup>135</sup>

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<sup>133</sup> Macfarlane, Ivor & Rudd, Colin, *IT Service Management* (2001) itSMF Ltd: UK. Page 11.

<sup>134</sup> Von Bon, Jan, *Introduction to ITIL* (2001) Van Haren Publishing: The Netherlands.

<sup>135</sup> Macfarlane, Ivor & Rudd, Colin, *IT Service Management* (2001) itSMF Ltd: UK. Page 19.

The operators at Second-line support normally begin their day by solving errands passed by from First-line support and from the surveillance application Unicenter. During the day they are also involved in support activities with emergency errands. Second-line support does not only focus on temporary incident solving but also has its emphasis on investigating the underlying root of the incident. When solving an incident the solution is filed and described in Remedy in order to assist First-line if the incident reoccurs. This sub process is symbolized by the arrow from Second-line to First-line. Through our interviews we have been able to calculate a percentage between tasks that relates to “Problem Management” and the other assignments. From this calculation we can distribute an adequate cost mass that associates only to “Problem Management” affiliated tasks forwarded from First-line support.

Our definition of the activity Second-line support comprises all those actions that relates to “Problem Management” such as incidents forwarded from First-line support that already has been logged. A common incident can be a server breakdown for which the competence only can be found in Second-line support. Additional to this, the activity Second-line support involves incidents reported by the surveillance application Unicenter. This plays an important role in the Service & Support function since it supervises all servers. These two actions together constitute the activity Second-line support.

### 5.6 Allocation of Resources to the Activities

The selection of resources constitutes a fundamental base in an ABC model. The resources build the elementary cost mass that will be distributed to the cost objects through the chosen activities. In this selection process it is almost impossible to account all of the resources which is why a demarcation must be made and only resources with a significant impact should be included. Our empirical material reveals that the Service & Support function incorporates several major resources necessary in order to deliver IT services. Due to confidentiality this figures will be presented in percentage instead of absolute figures.

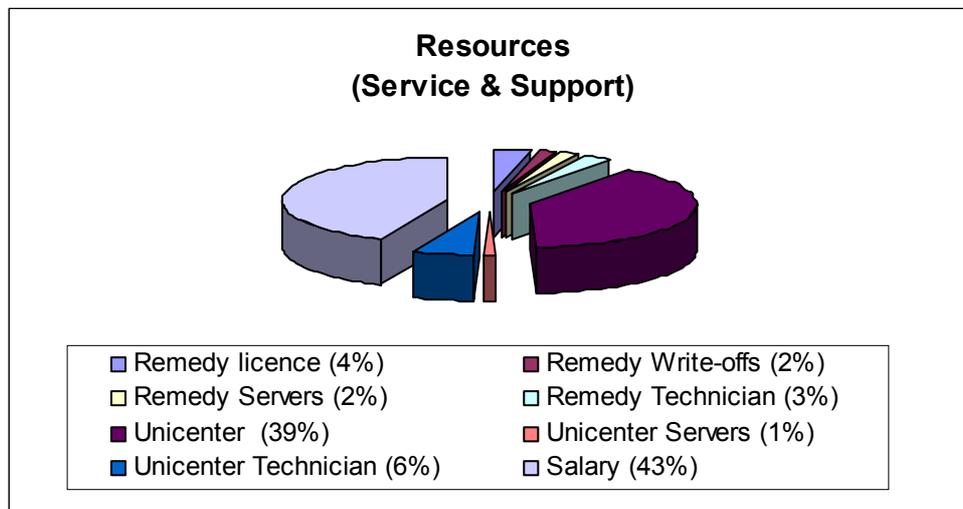


Diagram 9 Resources Service & Support

The cost of Unicenter, the surveillance application mainly used in Second-line support, is based on an annual licence fee. In addition to this it needs 4 servers and the working hours of a full time technician. Within the Unicenter cost pool these three costs are accounted for:

- Annual Support and licence agreement
- 4 Servers
- One full-time technician

Remedy, which is the logging software, plays an important role both in First-line and in Second-line. Remedy was initially bought for a fixed price but in addition to this Remedy requires an annual licence and support agreement, 7 servers and 75% of a full time technician. A very important notion is that Remedy is used by more functions at BT than IT Supply. Consequently, not all Remedy costs should be charged to Service & Support. In order to cope with this problem we managed to find out the amount of transactions done in Remedy by Service & Support and compared this with the transactions made by other functions and divisions. In this calculation we used the total transaction amount during 2005. The ratio between these figures would create a reliable percentage of the costs that ought to be allocated to Service & Support. The ration showed that 60% of the total transactions in Remedy were done by the “Service & Support”-function. Hence, 60% of the Remedy cost pool will be used in our calculations. Within the Remedy cost pool these four costs are accounted for:

- Write offs from the initial purchase
- Annual Service and Support agreement
- 7 Servers
- 75% of a full-time technician

An additional process in the distribution of resources to the activities regards capacity utilization.<sup>136</sup> Since our empirical material presented us with the opportunity we have considered this possibility. However, we believe that the nature of a Service Desk is to be considered as a constant stand by function. As a result the cost objects should also bear the cost for this stand by. If capacity utilization had been accounted for, only 34 % of the resources (Costs) should have been allocated to the cost objects.

### **5.6.1 Resource Allocation to First-line Support**

The “Incident Management” process represents the foundation within First-line support. In order to conduct this process all the resources of Service & Support with exception of the Service Group salary, has to be accounted for. These resources are however shared by both First and Second line. Hence, their individual consumption also must be determined. Neither First nor Second line can perform whiteout Remedy and based upon the empirical material the importance of Remedy is consider to be divided 70%/30% between First-line and Second-line. As a result 70% percent of the Remedy recourse was allocated to First-line support. For Unicenter the utilization and importance differ and based

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<sup>136</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

upon the empirical material 10 % of the Unicenter cost was to be accounted in First-line Support.

**Resources Selection First-line**

- Remedy Licence 70%	- Unicenter Licence 10 %
- Remedy Write – offs 70 %	- Unicenter Servers 10 %
- Remedy Servers 70 %	- Unicenter Technician 10 %
- Remedy Technician 70 %	- Salaries Operators 100 %

Figure 12 Resource Selection First-line

According to this distribution of resources the following cost structure emerges:

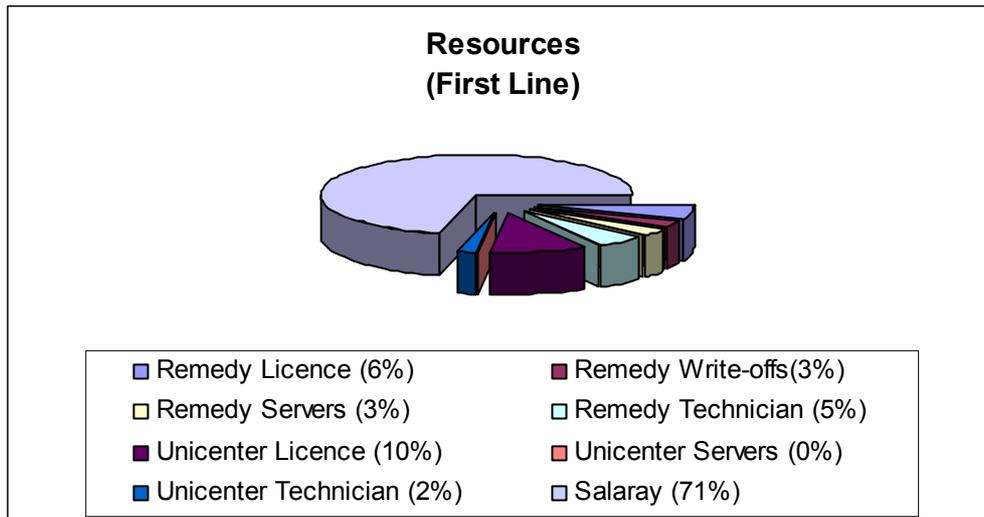


Diagram 10 Resources First-line

Salaries for the operators represent the majority of expenses and constitute 79 % of the total cost structure. This includes the four operators that belong to the Service Desk. They operate on a rotating schedule and all four are involved in the different sub processes within the activity. As a result the four operators are considered as one resource pool and not as four unique.

**5.6.2 Resource Allocation to Second-line Support**

The technicians at Second-line are involved in giving support but this activity does not constitute all of their working hours. Since their daily routines involve other tasks than “Problem Management” we must make a time allocation between these different assignments. The empirical material reveals that 25 % of the technicians’ working hours are related to “Problem Management” and therefore only 25 % of their salary will be used in our calculation. Since there is no significant difference between the eight technicians salary this is considered as one cost pool. The Remedy cost pool will be allocated with 30 % and since Unicenter exclusively is used for incident detection the reaming of this resource will be allocated to Second-line, by 90 %.

**Resource Selection Second-line**

- |                            |                             |
|----------------------------|-----------------------------|
| - Remedy Licence 30 %      | - Unicenter Licence 90 %    |
| - Remedy Write – offs 30 % | - Unicenter Servers 90 %    |
| - Remedy Servers 30 %      | - Unicenter Technician 90 % |
| - Remedy Technician 30 %   | - Salaries Technicians 100% |

Figure 13 Resource Selection Second-line

Based on these calculations the following cost structure for Second-line support emerges.

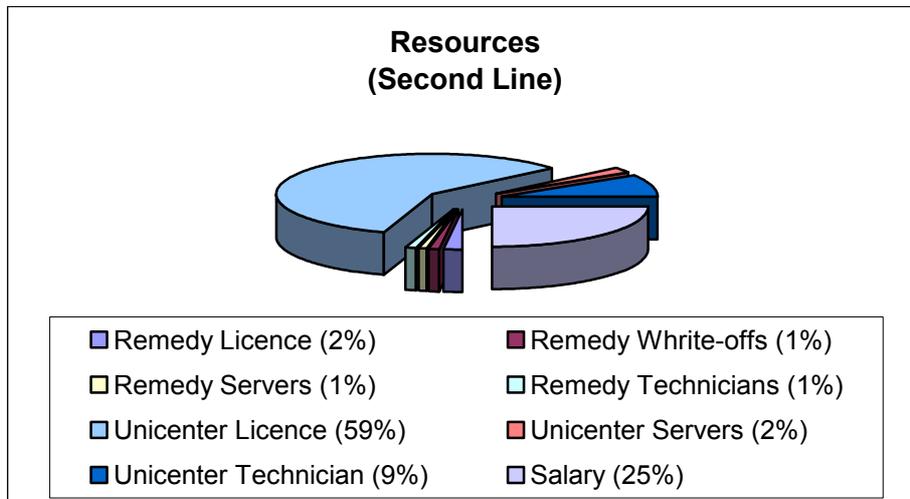


Diagram 11 Resources Second-line

**5.7 Determine Activity Cost Drivers**

When the activities and the resources are determined it is time to select the Activity Cost Drivers. These will measure the rate at which an activity contributes to a cost object. An important criterion is that a cost driver must illustrate the diversity in how the activity is being consumed by the cost objects.<sup>137</sup>

Due to the present circumstances unique cost drivers for First and Second-line have been selected. For First-line support the percentage of time each operator directs to the cost objects will be used as activity cost driver for salary. These percentages were obtained from the questionnaire handed out to the operators in the Service Desk. We believe that the time related cost drivers are the most satisfactory and accurate cost driver to use, since they encompass the time diversity spent on the cost objects. Providing support to a more complicated product will consume more time than answering a simple password question. Accordingly, using “time” as Activity Driver is the most suitable choice. The other resources will be distributed by a transaction related cost driver. We believe that the utilization of Remedy and Unicenter will be better distributed using this type of driver. The amount of time an errand consumes does not affect the capacity usage

<sup>137</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

of the application. An errand taking one minute to solve is handled in Remedy according to the same sub processes as an errand taking 20 minutes. Each notification in Unicenter is handled according to the same sub processes and will therefore also have a transaction related cost driver.

Due to the measuring difficulties we were not able to hand out a similar questionnaire to the technicians in Second-line support. Thereby the model will not include time related cost drivers for this activity. Instead “number of incidents” will be used as a cost driver. We do believe that “time” represents a more accurate cost driver than “number of incidents” but given the circumstances “nr of incidents” was the most feasible cost driver to use. In accordance with First-line support the cost drivers for Remedy and Unicenter associated resources will be allocated by transaction related cost drivers.

Finally, we want to make an interesting notion when it comes to the selection of cost drivers. One might think that the three different communication ways into the Service Desk; telephone, mail and web application, would constitute as different activity cost drivers. At the initial phase of this study we contemplated this possibility, but during the process we realized it was a false assumption. The amount of resources consumed is equal regardless of which entrance way an incident has. Consequently, these three different entrances do not drive the costs separately. “Time consumption” or “Number of errand” is the same regardless of the communication entrance.

## **5.8 Determine Cost of Cost Objects**

Figure 14 on next page depicts the complete illustration of the ABC process. The nine resources have been distributed to the activities according to the chosen cost drivers. Furthermore, we see how these activities are consumed by the cost objects. If there had been any direct costs these would have been allocated at the same time. “Network” which is a service provided to the different users at BT involves problems when logging on to a network. Providing support for this service consumes 9,2% of the total resources. The next cost object “Hardware” encompasses support for laptops desktops and printers. This cost accounts for 4,5 % of the total resources. Servers take on a large cost mass, mainly because of the surveillance system Unicenter, at a total of 48,6%. “Requests” deals with rather simple questions regarding status issues and general questions. This service consumes 10,3% of the total resources. “Other Software” is a collection of Microsoft related software, Matrix and BT Workplace. These consume 7,3 % of the resources. Citrix, the distributor providing secure access to applications consumes 3,4% and Exchange the Microsoft messaging platform consume 7%. MailMarshal, the in house mailing system accounts for 2,6% of the total resources. Web platform which is the intranet consumes 7,1% of the resources.

## **5.9 The ABC Model**

The model begins with the identified resources which already have been defined. These resources are allocated with resource drivers obtained from the interviews and statistics. These were presented in the analysis and the empirical section. By the use of these resource drivers the expenses for Labour, Software and Hardware

have now been distributed to First-line and Second-line support. Furthermore, these costs are distributed among the different cost objects with the use of two different drivers: Transaction related and Time related. Finally the total resource consumption of the cost objects is presented. A full scale illustration of the developed model is depicted below.

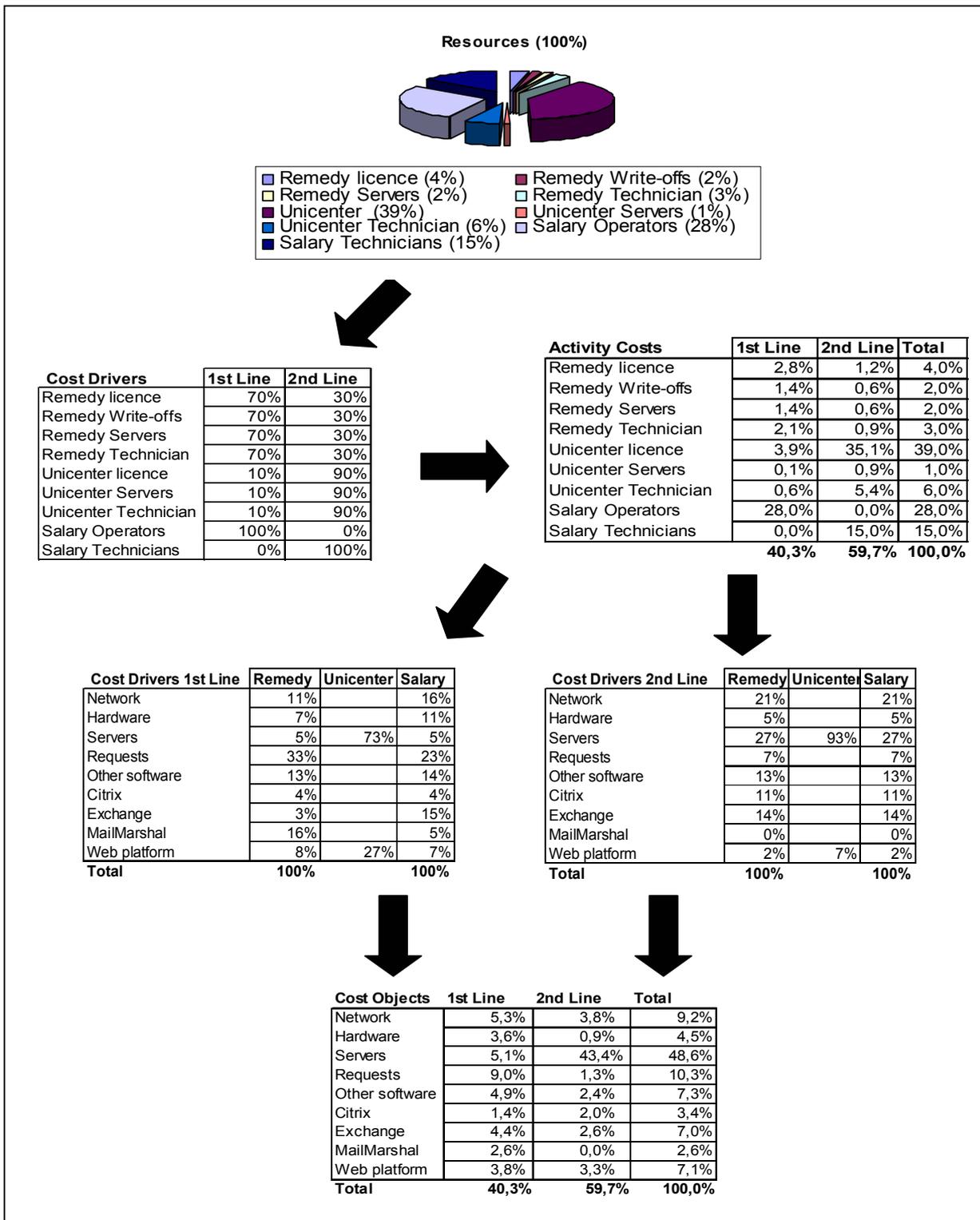


Figure 14 The ABC Model for Service and Support

### 5.10 A Fictive Version of the ABC Model

Due to confidentiality we are not able to present the actual figures in the ABC model. Instead we have used percentage as an indicator of the total cost structure. This however may be confusing for the reader. As a result we intend to further explain and illustrate the developed model by the use of fictive numbers. The model is exactly the same as the one presented in 5.9 and represents the same proportions. In our fictive model the entire cost mass of Service & Support incorporates € 1 000 000.

#### Fictive Resources

- Remedy Licence: € 40 0000	- Unicenter Licence: € 390 000
- Remedy Write – offs: € 20 000	- Unicenter Servers: € 10 000
- Remedy Servers: € 20 000	- Unicenter Technician: € 60 000
- Remedy Technician: € 30 000	- Salaries technicians: € 150 000
- Salary Operators: € 280 000	

Figure 15 Fictive Resources

These resources will further be allocated by the use of the calculated resource drivers to First-line and Second-line support. The percentage of the resource cost drivers are depicted in the model. For example, 70 % of Remedy licence, write-offs, servers and working hours of a technician will be allocated to First-line support and 30 % to Second-line.

The next step is to distribute the activity costs by the use of activity cost drivers to the different cost objects. In First-line support the cost driver for Remedy and Unicenter is transaction related and refers to the amount of incidents being reported. In order to distribute the expense for “salary” the cost driver is time related and discloses “time consumption” per cost object. In Second-line however the cost drivers are only transaction related. Consequently, the allocation is in correlation of how many errands a specific cost object generates. Figure 16 is an excerpt of Activity cost drivers for First-line support. Here the cost object consumption of activity First-line support is depicted.

Cost Drivers 1 <sup>st</sup> Line	Remedy	Unicenter	Salary
Network	11%		16%
Hardware	7%		11%
Servers	5%	73%	5%
Requests	33%		23%
Other software	13%		14%
Citrix	4%		4%
Exchange	3%		15%
MailMarshal	16%		5%
Web platform	8%	27%	7%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Figure 16 Activity cost Drivers First-line

The model on next page illustrates the entire ABC process where the resources are first allocated to the activities and then distributed among the cost objects.

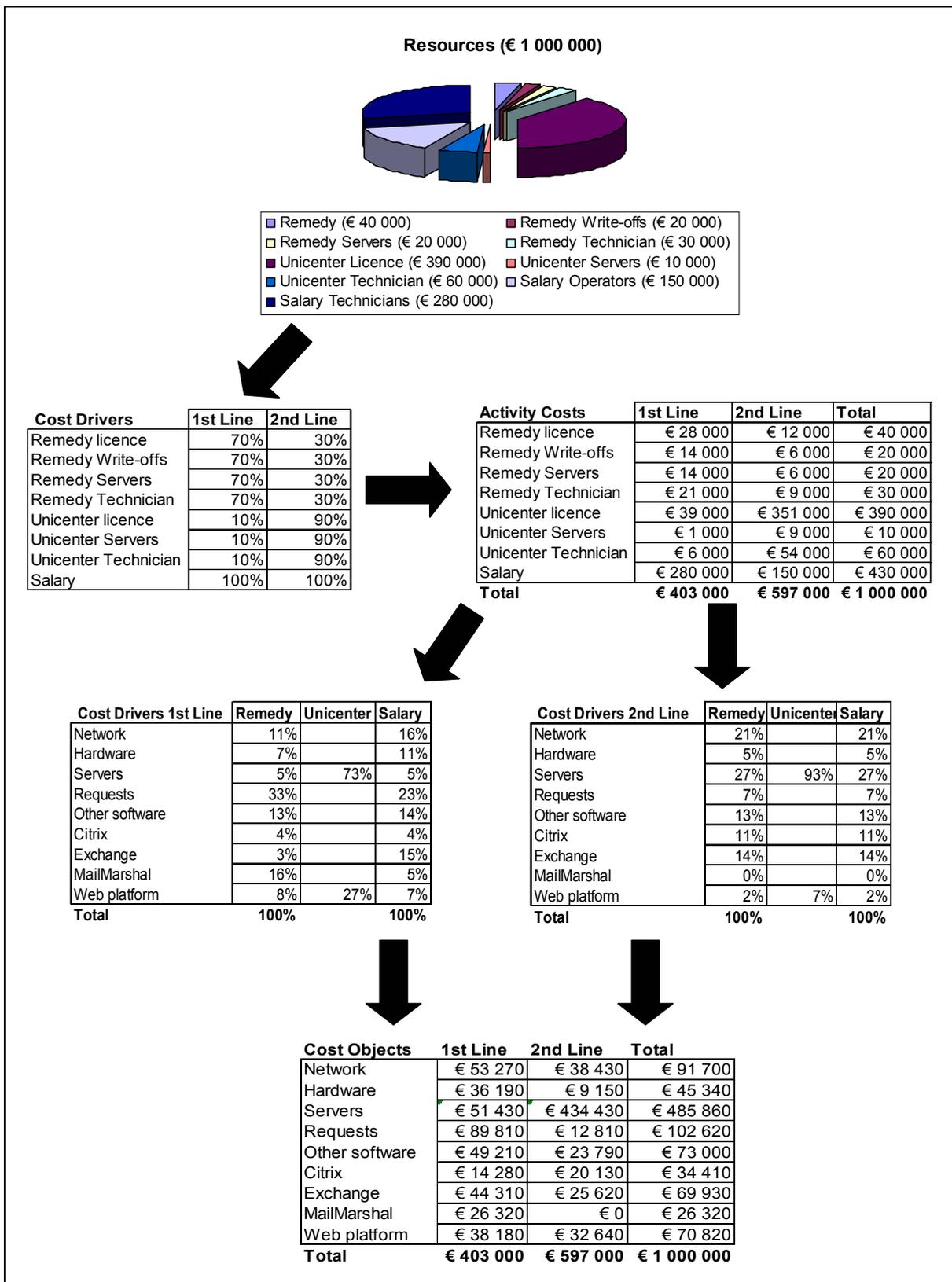


Figure 17 A fictive version of the ABC model

## 5.11 Activity Based Management

Kaplan & Cooper (1997) argue that developing an ABC model is the first step towards company-wide implementation. It enables managers to view its operations in terms of how resources are consumed.<sup>138</sup> This is of elevated significance in the case of BT IT Supply since Service & Support never has been a cost centre. If a division never has been accountable for the costs it generates then naturally an initial ABC model will help managers to think in terms of resources consumed. We argued in the theory chapter that the idea with ABC is to provide managers with more accurate information regarding the cost structure. The next step in this process is *how* managers can use this information and benefit from it.

ABM can be seen as an enhancement or the practical consequence of an ABC model. It is through ABM managers are able to steer the processes in the organization to enhance profitability and efficiency.<sup>139</sup> The basic principles of ABM are that it refers to an entire set of actions that can be taken, on a better informed basis, with activity-based costing information ABM accomplishes this through its two applications *operational* and *strategic* ABM.<sup>140</sup> The former covers the actions that increase efficiency, lower costs - in short, the actions required to do things right. Strategic ABM is about doing the right things. Generically ABM can be described as a collection of common ideas and tools that together work for a more efficient way of utilizing resources. This does not mean that a small amount of resources are preferably to use, only that the resource utilization must be efficient.<sup>141</sup>

### 5.11.1 Internal Pricing and Recharge Rates

The results presented in the analysis can be very useful when undertaking strategic decisions. Firstly, it creates a foundation for possible tracing of costs to the different divisions utilizing the support function. Having provided a ground for a cost allocation to the different deliverables in our ABC model, the next step would then be to charge the divisions with a recharge rate according to how much IT resources they consume. If a certain division at BT is overrepresented in the utilization of the Service & Support function then this division consequently must be charged with the associated costs. This type of information can work as a ground for reorganization and to increase efficiency among the different divisions. This discussion leads us to the complexity of setting an appropriate price for the IT deliverables. We found out from the interviews that this is difficult since proper cost knowledge up until today has been deficient. The pricing method has for a long time been characterized by an arbitrary method not based on factual cost data. Enhanced cost knowledge is essential when negotiating support agreements with different divisions.<sup>142</sup> We were informed about the shortcomings in these negotiations when there is a lack about the related costs. In order to clarify this we

<sup>138</sup> Kaplan, Robert S. & Cooper, Robin. *Cost and Effect* (1997) HBS Press: Boston.

<sup>139</sup> Ibid.

<sup>140</sup> Ibid. Page 137.

<sup>141</sup> Ax, Christian & Ask, Urban, *Cost Management* (1995) Studentlitteratur: Lund. Page 96.

<sup>142</sup> Interview with Morgan Bjernersjö, Controller, 2006-12-06

will look at Citrix as an example which works as a database for other software and plays an important role for the IT setting at BT. The results illustrate that Citrix accounts for 3,4% of the total resource consumption. If the cost for supporting Citrix exceeds the revenue from the current support agreement this ought to be renegotiated in order to cover the actual cost. Inaccurate pricing of internal transactions of deliverables may also lead to misleading corporate accounting. Since there are legal regulations for group contributions and other internal transactions a lack of understanding for the cost structure may obstruct the possibility to face these regulations. The results presented in the analysis facilitate and provides a ground for the above mentioned dilemma where a clear cost structure emerges.

### 5.11.2 Purchasing of Deliverables

In order to estimate and evaluate a purchase price for a deliverable it is important that all associated costs are to be accounted for. Which of the deliverables demand a high utilization of the support resources and which do not? This must be contrasted with the importance and the degree to which the deliverable is used among the divisions. We continue with our Citrix example and see that it consumes 3,4% of the support resources which is a marginal figure compared with some of the other deliverables. The results presented in the ABC analysis can work as a chart for tracing the *factual* costs to certain deliverables. If a product or service is associated with a high degree of support cost, then this cost must be taken into account and added to the initial purchase price, in order to come up with the total cost of the deliverable. Some products and services may have a low purchase price, but if the product or service demands a high degree of support, then the total cost (purchase + internal / external support) rises. This creates a false illusion and may lead to bad long-term investments. An initial low-priced product or service may demand a high degree of support and the cost for this must be taken into account when the total price of the deliverable is determined. It may be more profitable to outsource the deliverable than provide support internally. We argue that there must be an alignment between the initial purchase price and the support costs. A clear understanding of the relationship between these two variables creates a foundation for fruitful decision making regarding IT purchase.

Based upon the results and the discussion above a basis for negotiating purchase prices has been established. A central question is whether it is profitable to purchase a product with or without an included service agreement? If it turns out that a certain deliverable is associated with a high support cost, then it might be profitable to consider outsourcing of this deliverable. On the other hand, if it turns out that only a marginal cost is associated, then it is profitable to let it stay in the internal support. These are thoughts that IT Supply must take into consideration.

## Chapter 6

### Conclusions

*This chapter begins with a summary of our results. A discussion will follow that combines our results with the overall predicament with determining IT costs. Next part will consist of further research steps within this area. It all ends with a chapter called Suggestions for BT IT Supply. This part comprises regular advice to IT supply.*

### 6.1 Results

The purpose of this essay was to identify and allocate costs for providing support for IT deliverables and to describe how BT IT Supply can benefit from applying ABC. The identified resources consist of hardware, software and personnel and the activities have been defined as First-line and Second-line support. These activities consist of several sub processes which also have been defined and described. The cost drivers are both time related and transaction related and determine the resource and activity allocation to the selected cost objects. Figure 18 depicts the percentage of these costs distributed among the following cost objects:

#### Cost allocation to the cost objects

Network 9,2%	Hardware 4,5%
Server 48,6%	Request 10,3%
OtherSoftware 7,3%	Citrix 3,4%
Exchange 7,0%	MailMarshal 2,6 %
	Web Platform 7,1%

Figure 18 Cost allocation to the cost objects

These figures are useful for pricing and the evaluation of the current service agreements between BT IT Supply and other divisions at BT. Having illuminated the resource distribution per deliverable it will be possible to compare the support cost with existing support agreements. New support agreements can with this information be based upon the actual cost instead of approximations. The results also provide a base for purchasing and outsourcing considerations since it enables BT to calculate the *actual* price (purchase price + support price) for the deliverables. In addition, the information makes it possible to evaluate whether to have external or internal support, whether to purchase a deliverable or have it provided through a licence agreement and to which extent outsourcing is considered the most profitable solution. The final ABC model also depicts the difference in resource consumption between deliverables going through both levels of support. Products and services that only require support from First-line are less expensive compared to deliverables requiring support from both First-line and Second-line. The difference in resource allocation between these are illustrated in the ABC model.

## 6.2 Discussion

When we began this cost allocation study BT IT Supply desired enhanced knowledge about the cost structure of the Service & Support function and how this cost mass should be distributed between the different deliverables. The Manager of the Service Desk had no budget responsibility which is a plausible reason for the lacking cost information. As we described in the introduction many publications relate IT to increased business value but few studies are linking Cost Management to IT more closely. This may create a false illusion about IT as something that does not generate solid costs. The high degree of intangibility and the tricky way of measuring costs is the major challenge. This has been the situation at BT IT Supply for a long time and up until today the Service & Support function has not been constituted as a specific cost centre, which will be changed in the budget of 2007. Being able to manage costs is imperative in order for organizations to stay competitive. Depicting all expenses with the use of an ABC model and letting managers think in “resource consumption”-terms enhances the likelihood for increased cost awareness. The ABC model developed in this thesis is supposed to be seen as an initial suggestion for how to allocate costs within a Service & Support setting. It is however important to bear in mind that an ABC model is never static and is never complete; it evolves over time endlessly as long as it is in use.<sup>143</sup> We have provided BT IT Supply with a model for how to allocate costs associated with support of IT deliverables.

## 6.3 Implications for Further Research

During the process of conducting this study we have come across and contemplated issues regarding further research. For future researchers we believe that the usage of time driven cost drivers in Second-line support is the first noteworthy aspect. Having this will provide an even more accurate percentage on the final cost objects. However, these cost drivers demand more detailed information concerning time consumption of different deliverables.

As the process of understanding the cost structure evolves it may also be intersecting to expand the theoretical discussion with other theories such as pricing of deliverables, strategic competition and Balanced Score Card. The BSC may be especially of use in a study of an entire IT division. Since this study has been conducted at a specific function further research may have its aim on other parts of the IT division. A similar study can for example be carried out at IDC (the Server Administration Department).

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<sup>143</sup> Kaplan, Robert S. & Cooper, Robin, *Cost and Effect* (1997) HBS Press: Boston.

## 6.4 Suggestions for BT IT Supply

The present situation at BT IT Supply is characterised by a wish for enhanced understanding of the cost structure, especially regarding the Service & Support function. This study has presented suggestions for how to approach this problem. The information and knowledge provided are suggested to be used in situations such as outsourcing considerations, purchase and pricing of deliverables. This was discussed in 5.8.1 and 5.8.2. The thesis has also approached some restrictions with implications on the results. In the empirical section we discussed our initial ambition of measuring time consumption for both First-line and Second-line. This aspiration was, however, not possible to accomplish within Second-line due to the complexity of the technicians' operations. In this section we aim to sum up the arguments from our conclusions and formulate some advice and suggestions for BT IT Supply.

The purpose of operational ABM is to optimize the resource consumption by either an increase or a decrease of the resource capacity (in this case referring to Personnel, Software or Hardware resources). Our advice to BT IT Supply will be discussed concerning how these three resources can be further optimized? In the analysis of the personnel resource we decided not to take into account the issue regarding latent resource utilization. The reason for this was that a Support function per definition is a standby function and we argue that the cost for this idle time ought to be distributed among the deliverables. We have although presented a figure for this (Diagram 7, page 41) and in order to include this in the calculations only a minor arithmetic adjustment is needed. The predicament with latent utilization is very complicated to relate to the efficiency of the operators since it is difficult to distinguish the difference between idle time and inefficiency. Instead we argue that a clearer selection of responsibility areas among the operators in the Service Desk in combination with a new time measurement in the support application Remedy can create potential for a more accurate allocation of the personnel resource. One must contrast this with the benefits of having a rotating schedule and come up with a suitable solution.

We suggest that BT IT Supply should utilize the possibilities in Remedy to measure time consumption per supported errand. Given that each errand is provided with a specific errand number, a time measurement would allow a specific errand to be traced through the entire support process. This measurement would provide BT IT Supply with the possibility to upgrade our presented model by using time as a cost driver for the salary allocation in Second-line support. By time we mean the efficient time usage spent on each errand. Another suggestion for improvement is to be able to measure the utilization difference between the divisions at BT. Based on this BT IT Supply can assess a plausible cost for its services distributed among its divisions. This can have a strategic meaning in the sense that underlying reasons behind the utilization difference can emerge. If a certain division is utilizing a higher capacity of a specific deliverable, then perhaps this usage must be further investigated. It will also be possible to benchmark the divisions in order to shed light on the utilization differences. A clearer distinction of responsibility areas among the operators can also be useful in order to link salaries to specific deliverables. This necessitates a difference in salary between the operators and a clear and present task responsibility. If one individual with a

certain salary provides support for specific deliverable, then this deliverable should only be charged with the salary from this operator. In this way a more accurate resource allocation can be made. At the present the four operator's tasks in the Service Desk are similar. If this situation however changes and the Service Desk expands with a specialization towards more individual responsibility areas, further activity identification within the Service Desk may be of interest. This illustrates and indicates the necessity to understand that an ABC model is never static and is never complete; it evolves over time and needs constant upgrades. This may sound self-evident but is important to underline. Based on this BT IT Supply can use this thesis as a component in the creation of a larger ABC model for the entire IT department. The Service Desk Manager can with the use of our ABC model tell the price of the supported deliverables going through both levels of support. Accordingly, the model is to be seen as a constituent in a larger ABC context. Therefore, our final advice for BT IT Supply would be to continue the development of the ABC framework created in this thesis. This will create an enhanced knowledge of IT related costs which hopefully will lead to future prosperity for BT IT Supply.

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## 7.2 Electronic

<http://www.bt-industries.com/en/ourcompany/btbusiness/history.htm> (2006-11-20)

## 7.3 Verbal

Adolfsson, Tommy, *Technician*, 2006-12-06

Adolfsson, Tommy, *Technician*, 2006-12-15

Berg, Hans, *Service Desk Manager*, 2006-12-05

Bjernerjö, Morgan, *Controller IS Promotion*, 2006-12-06

Ask, Camilla, *Operator Service Desk*, 2006-12-05

Ask, Camilla, *Operator Service Desk*, 2006-12-14

Fagerstedt, Gisela, *Manager IT Supply*, 2006-12-07

Nåbo, Erik, *Manager IDC*, 2006-12-06

Ideskär, Ronny *Controller IT Supply* (Project Host), 2006-12-05

Ideskär, Ronny *Controller IT Supply* (Project Host), 2006-12-06

Ideskär, Ronny *Controller IT Supply* (Project Host), 2006-12-07

## Appendix 1 – Questionnaire

Supporting of errands today (Monday)

Fill in current support of errands according to the categories in Remedy. Please observe that there is a distinction between mail, telephone, surveillance and web. Every sub category is also represented in addition to the main categories. Tank You for Your time!

Example

### Business Application

	CAD	CAD - Other	Easy Test	Easy production	Web Plattform
Phone					3 (Min)
Mail	4, 10 (Min)				
Web					
Surv					

### Request

	Account
Phone	
Mail	
Web	
Surv	

### Mailmarshal

	Mailmarshal
Phone	
Mail	
Web	
Surv	

### Password reset

	Password
Phone	
Mail	
Web	
Surv	

### Printer

	Local	Network
Phone		
Mail		
Web		
Surv		

**Backup /  
Restore**

	Data Base	File backup
Phone		
Mail		
Web		
Surv		

**Network**

	Active Direct	AT&T	Other	Firewall	Ipass	Wireless
Phone						
Mail						
Web						
Surv						

**Hardware**

	Desktop	Laptop	Other
Phone			
Mail			
Web			
Surv			

**Software**

	BT Workpalce	Citrix	Microsoft	Matrix
Phone				
Mail				
Web				
Surv				

**Business Application**

	CAD-Catia	CAD-Other	Easy Test	Easy Production	Web platform
Phone					
Mail					
Web					
Surv					

## Appendix 2 - Interview Questions

1. Can you describe your position?
2. What are the responsibilities for the Service Desk?
3. How many operators work in the Service Desk?
4. How is the Service Desk organized?
5. How many workstations are there?
6. How many products does the Service Desk support?
7. How many services does the Service Desk support?
8. How many operators are answering the Phone, mail etc?
9. What is the total salary?
10. What other costs are related to the Service Desk?
11. Do you at the present know which factors that are affecting the costs?
12. How is the process for errands that cannot be handled by the Service Desk?
13. What types of technicians are there?
14. How many technicians are part the Support Group??
15. How do you recharge rate for errands that demand Support Group?
16. How do you recharge rate for your costs?
17. What costs are related to the Service Group?
18. Does each errand receive a specific number?
19. How do you estimate how much time a specific errand consumes?
20. How is IT' related service charged?
21. Which cost is generally associated with the IT' division?
22. What does Service & Support supply BT Europe with?
23. Do you know which costs that are associated with Service and Support?
24. Which costs are BT Europe charged from IT' supply?
25. Can you describe your normal working routines?
26. Which activities are performed by the operators and the technicians?
27. How is the relationship between IT' Supply and Europe?
28. Which function will the new organization include?
29. What where the main objectives for the reorganization?
30. What is the reason for the difficulty of understanding the costs?
31. If you do not understand your cost structure today, how do you price you services and products?
32. How does IT' Supply charge the other functions?
33. How many servers are associated with Service and Support and how is the distribution among the applications?
34. Which divisions does BT' IT' Supply support?
35. Do you have statistics of the number of supported errands for the Service Desk and the Support Group?
36. Which resources are required for the Service Desk and the Service Group?

## Appendix 3 – Selection of Deliverables

