

**DOKUZ EYLÜL UNIVERSITY
GRADUATE SCHOOL OF NATURAL AND APPLIED
SCIENCES**

**AN APPLICATION OF
ACTIVITY BASED COSTING
AS A DECISION TOOL**

by
Çağdaş ÇERTUĞ

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İZMİR

**AN APPLICATION OF
ACTIVITY BASED COSTING
AS A DECISION TOOL**

**A Thesis Submitted to the
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In Partial Fulfillment of the Requirements for the Degree of Master of Science
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**by
Çağdaş ÇERTUĞ**

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İZMİR**

M.Sc THESIS EXAMINATION RESULT FORM

We have read the thesis entitled “**An Application of Activity Based Costing as a Decision Tool**” completed by **Çağdaş ÇERTUĞ** under supervision of **Prof. Dr. Edip TEKER** and we certify that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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ada ERTU

AN APPLICATION OF ACTIVITY BASED COSTING AS A DECISION TOOL

ABSTRACT

Hard competition in today's trade conditions in all markets all around the world, make companies to analyze their profitability frequently. In this hard competition, all companies firstly try to protect their profitability and than try to get more profit from their business, without loosing any market share.

Nowadays, managers see the reality that financial numbers are the results and can not be managed directly. To remain competitive in the market, activities and processes must be managed and improved. The best way of managing and improving business starts with analyzing the current situation. For this reason, different techniques started to be used for analyzing profitability. By the help of these techniques, continuous improvement get started to be used in today's management mentality.

In this study, one of the commonly used profitability analyzing tool and decision making tool called Activity Based Costing will be explained with model studies and real studies. Information about Activity Based Costing method and other costing methods will be given. In addition, an alternative method will be used to compare the results and to make a better decision.

The aim of doing this study is to analyze the profitability of a worldwide company's all customers for whole year activity. By the help of this analysis decisions will be taken to improve profitability and to improve the business of the company, without loosing any market share.

Keywords: Activity Based Costing, Activity Based Management, Cost Management, Traditional Cost Management, Modern Cost Management, Direct Costing.

KARAR VERME ENSTRÜMANI OLARAK FAALİYET TABANLI MALİYETLENDİRME UYGULAMASI

ÖZET

Günümüz ticaret koşullarında tüm dünya pazarlarındaki sıkı rekabet firmaların karlılıklarını sık sık analiz etmelerini gerektirmektedir. Sıkı rekabet içinde firmalar öncelikle mevcut karlılıklarını korumaya çalışmakta ve sonra da pazar paylarını kaybetmeden mevcut karlılıklarını arttırmaya çalışmaktadırlar.

Bugünlerde yöneticiler finansal rakamların, sonuçları ifade ettiğini ve bunların direkt olarak yönetilemeyeceği gerçeğini görmüşlerdir. Pazarda rekabetçi kalabilmek için faaliyetlerin ve süreçlerin yönetilmesi ve geliştirilmesi zorunludur. İşin yönetilebilmesi ve geliştirilebilmesi mevcut durumun analizi ile başlamaktadır. Bu nedenle karlılık analizi için değişik yöntemler kullanılmaya başlanmıştır. Bu tekniklerin yardımıyla sürekli iyileştirme, günümüz yönetim anlayışı içerisinde yer almaya başlamıştır.

Bu çalışmada, yaygın olarak kullanılmakta olan karlılık analiz yöntemlerinden ve karar verme enstrümanlarından Faaliyet Tabanlı Maliyetlendirme model çalışmaları ve gerçek çalışmalarla açıklanmaktadır. Faaliyet Tabanlı Maliyetlendirme ve diğer maliyetlendirme yöntemleri hakkında bilgi verilmektedir. Bunlara ek olarak, sonuçların karşılaştırılabilmesi ve daha iyi karar verilebilmesi için alternatif bir yöntem de kullanılmıştır.

Çalışmada amaçlanan, uygulamanın yapıldığı dünya çapındaki firmanın bir yıllık süreçte karlılığının analiz edilmesidir. Bu analiz sonuçlarının yardımıyla verilecek kararlar ile firmanın pazar payını azaltmayacak şekilde karlılığını arttırmak hedeflenmektedir.

Anahtar Sözcükler: Faaliyet Tabanlı Maliyetlendirme, Faaliyet Tabanlı Yönetim, Maliyet Yönetimi, Geleneksel Maliyet Yönetimi, Modern Maliyet Yönetimi, Direkt Maliyetlendirme.

CONTENTS

	Page
THESIS EXAMINATION RESULT FORM.....	ii
ACKNOWLEDGEMENTS.....	iii
ABSTRACT.....	iv
ÖZET.....	v
CHAPTER ONE - INTRODUCTION	Error! Bookmark not defined.
1.1 Introduction.....	1
1.2 Purpose of the Thesis	1
1.3 Structure of the Thesis	2
CHAPTER TWO - COSTING AND COST MANAGEMENT.....	3
2.1 Introduction.....	3
2.2 Costing and Cost Management	3
2.3 Budgeting	4
2.4 Cost Classification	6
2.5 Traditional Cost Management.....	8
2.5.1 Process Costing	8
2.5.2 Job Order Costing	8
2.5.3 Comparison of Job Order Costing and Process Costing.....	9
2.5.4 Variable Costing (Direct Costing or Marginal Costing).....	10
2.5.5 Absorption Costing (Full Costing).....	10
2.5.6 Comparison of Variable Costing and Absorption Costing	11
2.6 Modern Cost Management.....	11
2.6.1 Activity Based Costing	12
2.6.2 Target Costing.....	13
2.6.3 Kaizen Costing (Continuous Improvement)	15
2.6.4 The Theory of Constraints	16
2.6.5 Just In Time Systems	17

CHAPTER THREE - ACTIVITY BASED COSTING	19
3.1 Introduction.....	19
3.2 Definition of Activity Based Costing.....	20
3.3 Difference between ABC and Traditional Costing.....	22
3.4 Comparison of ABC with Just in Time and Theory of Constraints.....	24
3.5 Components of Activity Based Costing.....	26
3.6 Steps for Performing Activity Based Costing.....	27
3.6.1 Analyze Activities.....	28
3.6.2 Gather Costs.....	29
3.6.3 Trace Costs to Activities.....	29
3.6.4 Establish Output Measures.....	30
3.6.5 Analyze Costs.....	30
CHAPTER FOUR - THE USE OF ACTIVITY BASED COSTING.....	31
4.1 Introduction.....	31
4.2 Why Companies Implement Activity Based Costing.....	31
4.3 Benefits of Activity Based Costing.....	34
4.4 Limitations of Activity Based Costing.....	35
4.5 Hints for Implementing Activity Based Costing.....	37
4.6 The Use of Activity Based Costing.....	37
4.6.1 Reengineering and Activity Based Costing.....	38
4.6.2 Benchmarking and Activity Based Costing.....	39
4.7 Activity Based Costing and the Future.....	39
CHAPTER FIVE - THE COMPANY AND THE PRODUCT	41
5.1. Introduction.....	41
5.2. About the Company.....	41
5.3 About the Product.....	42

**CHAPTER SIX - AN APPLICATION OF ACTIVITY BASED COSTING
AS A DECISION TOOL IN A WORLDWIDE COMPANY'S SALES**

DEPARTMENT	44
6.1 Introduction	44
6.2. Model Study of Activity Based Costing	44
6.2.1 Activity Based Costing Model Study Overview	44
6.2.2 Cost Distribution in Activity Based Costing Model Study.....	46
6.2.2.1 Sales Cost.....	46
6.2.2.2 Laboratory Cost.....	49
6.2.2.3 Administration Cost	51
6.2.2.4 Royalty Cost.....	52
6.2.2.5 Warehouse Cost	53
6.2.2.6 Stock Cost	57
6.2.2.7 Transportation Cost.....	62
6.2.2.8 Manufacturing Cost.....	64
6.2.2.9 Finance Cost.....	68
6.2.3 Activity Based Costing Model Study Results.....	69
6.3 The Activity Based Costing Study of the Company for Whole Year Activity	70
6.4. Conclusion	101

CHAPTER SEVEN - AN ALTERNATIVE STUDY WITH DIRECT

COSTING METHOD	106
7.1 Introduction	106
7.2 Model Study of Direct Costing	106
7.2.1 Direct Costing Model Study Overview.....	106
7.2.2 Cost Distribution in Direct Costing Model Study.....	108
7.2.3 Direct Costing Model Study Results.....	109
7.3 The Direct Costing Study of the Company for Whole Year Activity.....	110
7.4. Conclusion	146

CHAPTER EIGHT - CONCLUSION AND DECISION	149
8.1 Introduction.....	149
8.2 Comparison of Two Different Technique Results	149
8.3 Conclusion and Decision.....	156
 REFERENCES.....	158
 ABBREVIATIONS.....	161

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Today's trade conditions drive companies to be in a hard competition in all markets all around the world. Every day competition gets harder and harder. In this hard competition, all companies try to get more profit from their business, without losing any market share.

Nowadays, managers understand that financial numbers are the results and can not be managed directly. Activities and processes of the business must be managed and improved to remain competitive. Therefore different techniques started to be used for analyzing profitability. By the help of these techniques, continuous improvement get started to be used in today's management mentality.

In this thesis Activity Based Costing (ABC), which is one of the commonly used profitability analyzing tool and decision making method, will be explained with model studies and real studies. And also an alternative method will be used to compare the results.

1.2 Purpose of the Thesis

Main objective of this thesis is to analyze the profitability of the customers and take decisions to improve profitability, without losing any market share. A whole year activity of a worldwide company is going to be analyzed to improve the business of the company. And information about Activity Based Costing technique will be given in detail.

1.3 Structure of the Thesis

In Chapter 2, brief explanations about cost management, budgeting and cost classification is given. In addition, Traditional Cost Management, Modern Cost Management, and under these concepts different cost management techniques are mentioned.

In Chapter 3, detailed explanations, components, and steps of Activity Based Costing are given. Activity Based Costing is compared with both Traditional Cost Management and Modern Cost Management techniques.

In Chapter 4, benefits, limitations, and hints for implementing Activity Based Costing are given. And also where and why Activity Based Costing can be used is mentioned.

In Chapter 5, information about the company, the product and coating industry are given.

In Chapter 6, a model study is done in detail to represent the calculation mentality of Activity Based Costing. In addition, whole year activity of the company is analyzed by Activity Based Costing technique, results are evaluated, comments and decisions are made.

In Chapter 7, an alternative method is used on distributing the costs, to compare with the results of Activity Based Costing study. At first alternative method is given in detail in a model study and then whole year activity is analyzed by this method.

Finally, in Chapter 8, comparison is made to see if there is any similarity or any difference between these two method results. And also conclusion is made with a final decision.

CHAPTER TWO

COSTING AND COST MANAGEMENT

2.1 Introduction

The positive difference between the sales revenues and the costs represents the profit. It is sure that firms are always looking for increasing the profit. Increasing profit can be done by increasing the sales prices of the products. Increasing the sales price of product, seems the easiest way to increase profit, but actually it is the difficult way because the sales price is generally determined by the market conditions. And also hard competition in the market, drives the firms to focus on decreasing the costs.

In this chapter, brief explanations about cost management, budgeting and cost classification is given. In addition, Traditional Cost Management, Modern Cost Management, and under these concepts different cost management techniques are mentioned.

2.2 Costing and Cost Management

Costing and Cost Management concepts are not the same concepts. Before the computer systems developed, the information technology of the firms was not good enough. All documentations were done on papers and all calculations were done by hand. Therefore, costing of the products was so difficult to calculate for an accountant. Generally, accountants were choosing Job Order Costing (JOC) method. But some firms were also implementing Process Costing (PC) and getting more proper results when compared to the ones implementing JOC. By the computer revolution in 80ies the most difficult calculations were being solved just in seconds. So many firms started using PC, and be more aware of their costs. By the use of Material Requirements Planning (MRP) and Enterrise Resource Planning (ERP)

systems, the works of accountants became easier. MRP and ERP package programs keep all the data of the firm, make necessary calculations, and also report the results.

After all these computer based improvements, companies started understanding the power of managing costs. Therefore, companies became able to analyze their costs from many different perspectives (unit, total, monthly etc) and also became able to see the utilization of their capacities. By the help of these computer improvements, nowadays companies are able to make future predictions by using their sources (Koker, 2003).

Cost Management is management and control of activities and drivers to calculate accurate product and service costs, improve business processes, eliminate waste, influence cost drivers, and plan operations. The resulting information will have utility in setting and evaluating an organization's strategies.

Generally, cost management tools are used by project managers to approve budget, to plan resources, to estimate and control costs. The need of improving project cost control was determined by Kinsella (2002).

2.3 Budgeting

Budgeting is a tool for cost management. A budget is a document that translates plans into money - money that will need to be spent to get your planned activities done (expenditure) and money that will need to be generated to cover the costs of getting the work done (income). It is an estimate, or informed guess, about what you will need in monetary terms to do your work.

A budget is not:

- A budget is not a written in stone. Where necessary, a budget can be changed, so long as you take steps to deal with the implications of the changes. So, for example, if you have budgeted for ten new computers but discover that you

really need a generator, you could buy fewer computers and purchase the generator.

- A budget is not a simple record of last year's expenditure, with an extra 15% added on to cover inflation. Every year is different. Organizations need to use the budgeting process to explore what is really needed to implement their plans.
- A budget is not just an administrative and financial requirement of donors. The budget should not be prepared as part of a funding proposal and then taken out and dusted when it is time to do a financial report for the donor. It is a living tool that must be consulted in day to day work, checked monthly, monitored constantly and used creatively.
- A budget is not an optimistic and unrealistic picture of what things actually cost and don't underestimate what things really cost in the hopes that this will help you raise the money you need.

The budget is an essential management tool, which helps us for the issues summarized below.

- The budget tells you how much money you need to carry out your activities.
- The budget forces you to be rigorous in thinking through the implications of your activity planning. There are times when the realities of the budgeting process force you to rethink your action plans.
- Used properly, the budget tells you when you will need certain amounts of money to carry out your activities.
- The budget enables you to monitor your income and expenditure and identify any problems.
- The budget is a basis for financial accountability and transparency. When everyone can see how much should have been spent and received, they can ask informed questions about discrepancies.
- You cannot raise money from donors unless you have a budget. Donors use the budget as a basis for deciding whether what you are asking for is reasonable and well-planned.

Budgeting is a difficult and responsible job. In addition to that the budgeting must:

- Understand the values, strategy and plans of the organization or project.
- Understand what it means to be cost effective and cost efficient.
- Understand what is involved in generating and raising funds.

In conclusion, the budget describes in financial terms the future activities of the organization during the period for which it is prepared, and serves as a basis for comparison between plans and actual activities. Horngren et al., (2001) define budget as a quantitative expression of a proposed plan of action by management for specific period, and an aid to coordination what needs to be done to implement the plan.

A distinction is made between two types of budget. Static budget is based on the level of planned activities. Flexible budget is taking into account at actual level of activity for the period, and this is more useful. Mak and Roush (1994) and Frank (1998) notes that nowadays many companies use flexible budget, which allows them to make budget changes when economic conditions change. Mak and Roush (1994) and Frank (1998) also points that flexible budgets are directly related with ABC method, which details of ABC is going to be given in next chapters.

2.4 Cost Classification

Classification of costs is a difficult issue. Different classifications can be done depending on purpose. The commonly used classifications are mentioned below.

If the classification is done according to the time of computation, one of the sub classifications is called historical cost, which considers the costs incurred in the past. The other sub classification is called budgeted or predetermined costs, which points the costs that are expected to be incurred in the future.

Another way of classifying costs is to separate them according to their relation to fluctuations in the activity level. If the costs change directly proportional with the amount of production, then it is called variable costs. Most of the raw material costs are typical elements of variable costs. On the other hand, if the costs are never affected by the production volume in a certain time, these costs are called fixed costs, such as the factory rent. When the factory building is rented, rent amount will be paid whether production goes on or not. However some costs are not easy to be classified as variable costs or fixed costs, because these kinds of costs may change according to the production level but this change is not directly proportional. These costs are known as semi-variable costs (Koker, 2003).

If we classify costs according to the degree of averaging, we see that sometimes managers demand the cost data as total. When the managers demand the cost data as total, total costs occur. Whereas some times, managers need the data of how much a single product costs. Therefore, unit costs get important.

If we classify costs according to functions in the production system, which makes production possible, the costs can be classified as manufacturing costs, selling costs and administrative costs.

If we classify costs according to the ease of traceability to some object of costing, there are direct costs and indirect costs. In order to allocate costs, various allocation bases have to be used, such as production hours of each product, area (square meter) of each department, selling prices of products, etc.

Costs can also be classified as expired costs and unexpired costs. Unexpired costs are measure of assets. In contrast, expired costs are measure of expenses. Unexpired costs, include inventory costs miscellaneous deferred on prepaid costs such as insurance premiums or research outlays that are associated with the revenue of future periods. Expired costs, include the manufacturing cost of goods sold. (Koker, 2003)

There are many cost management techniques. These techniques can be classified in groups of Traditional Cost Management (TCM), and Modern Cost Management (MCM). Explanations about TCM and MCM are going to be mentioned below.

2.5 Traditional Cost Management

Two major types of costing systems are used in manufacturing and many service firms: PC and JOC as costing systems.

2.5.1 Process Costing

A PC system is used where a single, homogeneous product or service is produced. In a PC system, total manufacturing costs are divided by total number of units produced during a given period. The unit cost that results is a broad, average figure. Examples of industries in which PC is used include cement, flour, brick, and oil refining. (Horngren et al., 2001)

2.5.2 Job Order Costing

JOC is used when different types of products, jobs, or batches are produced, typically over a rather short period of time. In a JOC system, direct materials costs and direct labor costs are usually "traced" directly to jobs. Overhead is applied to jobs using a predetermined rate. Actual overhead costs are not "traced" to jobs. Examples of industries in which JOC is used include special order printing, shipbuilding, construction, hospitals, professional services such as law firms, and movie studios.

2.5.3 Comparison of Job Order Costing and Process Costing

There are some similarities between JOC and PC systems:

- The same basic purpose exists in both systems to assign material, labor, and overhead cost to products.
- Both systems use the same basic manufacturing accounts: Manufacturing Overhead, Raw Materials, Work in Process (WIP), and Finished Goods.
- The flow of costs through the manufacturing accounts is basically the same in both systems.

The differences between JOC and PC occur because the flow of units in a PC system is more or less continuous and the units are essentially indistinguishable from one another. Under PC:

- A single homogenous product is produced on a continuous basis over a long period of time. This differs from JOC in which many different products may be produced in a single period.
- Total costs are accumulated by department, rather than by individual job.
- The department production report is the key document showing the accumulation and disposition of cost, rather than the job-cost sheet.

TCM systems often allocated service overhead costs to services or departments primarily to distribute the overhead for financial reporting purposes. Costs are attributed by a one step process (costs per services or customers) using simplistic allocation methods often producing inaccurate and misleading information. In many service institutions the distribution of overhead was seen to be unimportant or irrelevant.

The common trend for many of those service institutions who chose to allocate overhead costs was to do so, on some high level, and often arbitrary, measure such as revenue, labor costs, number of employees or direct costs.

The traditional approach to cost allocation consists of three basic steps: accumulate costs within a production or non-production department; allocate non-production department costs to production departments; and allocate the resulting (revised) production department costs to various products, services, or customers. Costs derived from this traditional allocation approach suffer from several defects that can result in distorted costs for decision making purposes. For example, the traditional approach allocates the cost of idle capacity to products. Accordingly, such products are charged for resources that they did not use. Seeking to remedy such distortions, many companies have adopted a different cost allocation approach called Activity Based Costing.

There are two traditional forms of product costing techniques. These are Absorption Costing (sometimes called Full Costing) and Variable Costing (sometimes called Direct Costing or Marginal Costing). These methods differ only in how they treat fixed manufacturing overhead costs.

2.5.4 Variable Costing (Direct Costing or Marginal Costing)

Variable Costing (VC) includes only variable production costs in product costs. Direct materials, direct labor and variable manufacturing overhead costs would ordinarily be included in product costs under VC. Fixed manufacturing overhead is not treated as a product cost under this method. Rather, fixed manufacturing overhead is treated as a period cost and is charged against income each period.

2.5.5 Absorption Costing (Full Costing)

Absorption Costing (AC) treats all production costs as product costs, regardless of whether they are variable or fixed. Under AC, a portion of fixed manufacturing overhead is allocated to each unit of product.

2.5.6 Comparison of Variable Costing and Absorption Costing

VC differs from AC in only one key respect. Only variable costs (i.e. those assumed to change in strict proportion to changes in the level of output) are considered to be the costs of products. This will include both direct and indirect variable costs. For balance sheet and trading account purposes this will mean that the cost of stocks is based on only variable manufacturing costs. But, for management purposes, businesses may attribute both manufacturing and non manufacturing variable costs to products in order to estimate each product's (or product group's) contribution towards profits and fixed period costs. (The contribution for a product is simply its selling price minus the variable cost per unit). Under VC, fixed costs are simply treated as a cost of doing business in the period and not a product cost.

It is important to recognise that under both AC and VC, product cost will be the sum of direct costs plus a share of indirect costs. Under AC both fixed and variable indirect costs are assigned to products; under VC only variable indirect costs are assigned to products. It is important to stress this because debates about cost accounting are often conducted as though the overhead cost allocation problem arises only in absorption when it also arises in VC although to less extent.

2.6 Modern Cost Management

By the improvement in the computer systems, and the hard competition between companies, brought out more detailed cost management techniques. These cost management techniques are known as MCM techniques. MCM techniques started using in the industry very often. Several MCM techniques used for cost management, but the commonly used one is ABC.

2.6.1 Activity Based Costing

ABC is an alternative to the traditional way of accounting. Traditionally, it is believed that high volume customers are profitable customers, a loyal customer is also a profitable one, and profits will follow a happy customer. Studies on customer profitability have unveiled that the above is not necessarily true. ABC is a costing model that identifies the cost pools, or activity centers, in an organization and assigns costs to products and services (cost drivers) based on the number of events or transactions involved in the process of providing a product or service. As a result, ABC can support managers to see how to maximize shareholder value and improve corporate performance.

ABC has helped enterprises in answering the market need of better quality products at competitive prices. Analyzing the product profitability and customer profitability, the ABC method has contributed effectively for the top management's decision making process. With ABC, enterprises are able to improve their efficiency and reduce the cost without sacrificing the value for the customer.

ABC is a powerful tool that helps in understanding the efficiency and effectiveness of products and services produced. It also helps provide insights into the "overall" value chain at a strategic and tactical level. ABC has many strategic and tactical uses. ABC can:

- identify the value contributed by activities, business segments, etc. through a comprehensive understanding of costs and related dynamics to help focus attention on target outcomes;
- identify opportunities to effectively use delivery channels to enhance outcomes;
- determine how much it costs to service students through modes of delivery;
- differentiate between activities provided to different student or customer segments;
- provide information for the effective utilization of the institution's resources;
- identify the incremental operating expenses to support growth;

- identify cost management opportunities;
- provide information to improve process efficiency; and
- provide a robust infrastructure to support the planning process.

ABC concerns itself with the way in which indirect costs (all indirect costs including both manufacturing and non-manufacturing indirect costs) are best associated with the production of different products and product groups. It is, therefore, necessary to consider the traditional method for doing this, before considering what changes supporters of ABC propose. Of course, systems of cost allocation will vary from firm to firm, but one can describe the traditional nature of general practice.

Traditional systems do not necessarily use labour hour bases for overhead allocation. Other bases used include a direct labour cost basis, a direct materials cost basis or machine hours basis with a tendency towards a growth in the latter as production becomes more dominated by technology in many industries. ABC advocates usually claim, however, that the labour hour or labour cost basis is still the most widely used basis.

ABC then becomes the basis of Activity Based Management (ABM). Budgets can also be drawn up on such a basis integrating activity based cost savings with budget targets as ABC. More details about Activity Based Costing, like components, limitations, advantages, steps for application, and hints for implementing will be explained in the next chapters. In the next chapters, also difference between Traditional Costing and Activity Based Costing will be mentioned.

2.6.2 Target Costing

Target Costing (TC) is like a planning tool that helps us to identify the features to be improved and helps us in setting targets for designing and cost reduction. In Japan, TC is much more important, but nowadays it is started to be taken under

consideration also in other countries. TC is to design products and services which have the attributes that the market requires at the price that it is prepared to pay.

First step of TC is to study on the market needs and understand the market expectations to identify the attributes of the next generation products must have and the maximum market selling price. The company may have superior knowledge of what can be provided to the market. According to the market, sometimes understanding the needs of the customer, can be done by trying to understand the customer's customers needs too. This will usually also involve a marketing analysis to identify market segments and how product attributes fit with each segment. It will also include understanding the capacities of competitor companies to deliver such attributes at relevant costs (Kocaturk, 2006).

Second step of TC is to identify what activities the company must do, in order to deliver those product attributes. These activities are then costed and the total cost compared to the cost level likely to be consistent with selling at the acceptable market price after deducting a desired profit (Kocaturk, 2006).

Traditional Costing is usually described as a process of identifying costs of products as they are being produced with prices fixed by adding a profit to the cost. TC does not start with product cost, starts with market price. Then deducts the profit element to leave allowable product cost as the residual. As used in Japan, this approach also seems to have the advantage of enabling the enterprise to operate with less detailed costing systems for ongoing operations. Cooper and Kaplan (1999) says that "in TC approach, the cost of a new product is no longer an outcome from the product design process; it becomes an input into process". Horngren et al., (2001) mentions that TC is not a cost-plus pricing method, it is a price-led method, which means it begins with price, quality, and functionality and then price is defined by customer.

2.6.3 Kaizen Costing (Continuous Improvement)

The Japanese refer to continuous improvement as kaizen. To the Japanese, kaizen means to strive relentlessly to increase quality, efficiency and effectiveness in all areas of life including personal, family, social, and work. Although this concept definition may sound somewhat individualistic, the Japanese emphasize small incremental, but cumulative holistic improvements. The continuous improvement approach is illustrated by the Shewhart-Deming plan-do-check-action or plan-do-study-action (PDCA or PDSA) cycle as shown below in Figure 2.1.

- The plan step includes identifying a problem, or potential for improvement, and developing a plan for the problem's solution.
- The do step includes a trial run of the planned solution which is evaluated in the check step. Correctly evaluating the trial run depends on an understanding of the variation in the system. It is important not to confuse common causes with special causes of variation.
- The check step includes revisions to the plan where they appear to be needed.
- The final action step represents the implementation of the plan.

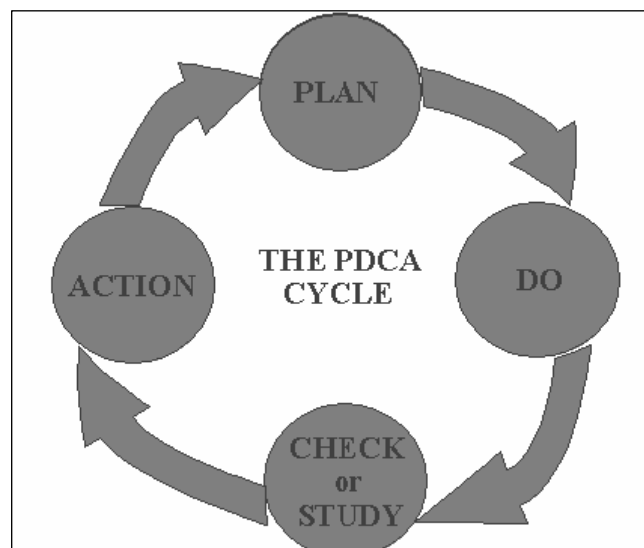


Figure 2.1 Shewhart-Deming continuous improvement cycle

Some Japanese companies link a TC planning process with a kaizen process once the products are in production. Kaizen essentially tries to ensure that everyone in the company continually reconsiders how the task is undertaken and whether there is a better way of doing it. It is not so much a costing routine as the outcome of developing an organizational culture of collaborative learning at all levels of the company.

2.6.4 The Theory of Constraints

The Theory of Constraints (TOC) was developed by Eli Goldratt and originally presented in a novel entitled *The Goal*. TOC is similar to Just in Time in that it has elements of a philosophy as well as practice. The TOC philosophy is applicable to any type of organization, while the practice elements apply mainly to companies that produce products to customer specifications.

Conceptually the TOC is based on the idea that any company has identifiable constraints, thus management should identify the most binding constraints and manage them so that resources are used most efficiently. The goal is simply to make money, now and in the future. According to Goldratt and Cox (1984), the way to make money is to maximize a global measure referred to as throughput, while minimizing two other global measures referred to as inventory and operating expense. The main idea is to focus on these global measures rather than focusing on local, or subsystem measurements.

Goldratt and Cox (1984) have introduced the term “throughput” in the cost accounting phase of TOC. Even though, the term is so similar to “output” it has a different meaning. Throughput is the difference between selling price and the cost of materials. According to Louderback and Patterson (1996), throughput is selling price minus material cost minus energy cost but offers no rationale for including energy costs to the exclusion of other variable costs. For Goldratt (1990), the TOC describes methods to maximize operating income when faced with some bottleneck and no bottleneck operations.

It defines three measurements:

- Throughput contribution equal to revenues minus direct materials costs of the goods sold.
- Investment equal to the sum of materials costs in direct materials, WIP, and finished goods inventories; R&D costs; and costs of equipment and buildings.
- Operating costs equal to all operating costs (other than direct materials) incurred to earn throughput contribution. Operating costs include salaries and wages, rent, utilities, and depreciation Goldratt (1990).

The objective of TOC is to increase throughput contribution while decreasing investments and operating costs. TOC considers a short-run time horizon and assumes that operating costs are fixed costs. The steps in managing bottleneck operations are:

- Step1: Recognize that the bottleneck operation determines throughput contribution of the system as a whole.
- Step2: Find the bottleneck operation by identifying operations, with large quantities of inventory waiting to be worked on.
- Step3: Keep the bottleneck operation busy and subordinate all no bottleneck operations to the bottleneck operation. That is, the needs of the bottleneck operation determine the production schedule of no bottleneck operations (Horngren et al., 2001).

2.6.5 Just In Time Systems

Just in Time (JIT) is more appropriately thought of as a philosophy because, even though it includes a variety of techniques, it is much more than a collection of management practices. There is considerable support for the argument that successful implementation of a JIT system requires an entirely different mentality, or attitude, on the part of management and workers than the typical attitudes underlying traditional business practices and relationships. Although a precise or operational definition of JIT has not been developed, it basically involves the elimination of

waste and excess by acquiring resources and performing activities only as they are needed by customers at the next stage in the process. For example, inventory buffers are viewed as an evil in that they hide problems such as defective parts, production bottlenecks, long machine set-ups and competitive behavior within the company.

A more comprehensive definition of JIT can be developed by considering the main elements that are attributed to successful JIT systems. These elements can be separated into two broad categories including attitude and practice. While the elements of attitude can be adopted by any organization, the elements of practice are mainly applicable to companies involved in repetitive manufacturing. From an accounting viewpoint, these are companies that would normally use the process cost accumulation method.

A JIT system requires an attitude that places emphasis on the following:

- Cooperation with a value chain perspective,
- Respect for people at all levels,
- Quality at the source,
- Simplification or just enough resources,
- Continuous improvement, and
- A long term perspective.

A JIT system also incorporates the following practices:

- JIT purchasing,
- Focused factories,
- Cellular manufacturing,
- JIT production,
- JIT distribution,
- Simplified accounting, and
- Process oriented performance measurements.

CHAPTER THREE

ACTIVITY BASED COSTING

3.1 Introduction

Activity Based Costing is a method for developing cost estimates in which the project is subdivided into discrete, quantifiable activities or a work unit. The activity must be definable where productivity can be measured in units. (e.g. number of samples versus man-hours) After the project is broken into its activities, a cost estimate is prepared for each activity. These individual cost estimates will contain all labor, materials, equipment, and subcontracting costs, including overhead, for each activity. Each complete individual estimate is added to the others to obtain an overall estimate. Contingency and escalation can be calculated for each activity or after all the activities have been summed. ABC is a powerful tool, but it is not appropriate for all cost estimates.

Nowadays, managers understand the importance of managing the underlying processes, activities, and transactions of the business. Financial numbers are the result and can not be managed directly. Activities and processes, the common denominator of the horizontal organization, must be managed and improved to remain competitive.

In this chapter, detailed explanations will be given about ABC. ABC is compared with both TCM and MCM techniques. In addition, components and steps of ABC are mentioned.

3.2 Definition of Activity Based Costing

Definitions of Activity Based Costing vary, but the main idea is same.

ABC is a budgeting and analysis process that evaluates overhead and operating expenses by linking costs to customers, services, products and orders. It allows managers to see which products or services are profitable or losing money.

ABC is a cost accounting system used by countless private-sector companies today, crosscutting a variety of industries including manufacturing, telecommunications, financial services, and technology (Roztocki et al., 1999).

ABC is a method of allocating costs to products and services. It is generally used as a tool for planning and control. It was developed as an approach to address problems associated with TCM systems, which tend to have the inability to accurately determine actual production and service costs, or provide useful information for operating decisions (Lascola et al., 2000).

ABC is a costing model that identifies the cost pools, or activity centers, in an organization and assigns costs to products and services (cost drivers) based on the number of events or transactions involved in the process of providing a product or service.

It's an unwritten rule respected by many in the business world that you generally treat your best customers the best. The problem is, do you really know who your best customers are, or do you think you know? The majority of business people have the false perception that the best customer is the one that accounts for the largest portion of your income every year. This is not always the case for the simple reason that the same customer may be responsible for the biggest part of your expenses also. There is a solution to the problem and it is as simple as ABC. ABC is, if correctly applied and utilized can rank your customers in terms of profitability.

ABC is a costing method that provides managers with useful information they need regarding the contribution that each customer makes to overall profitability. Also, ABC allows managers to see how to maximize performance and implement sound profit growth strategies.

ABC is a systematic, cause & effect method of assigning the cost of activities to products, services, customers or any cost object. ABC is based on the principle that "products consume activities" (Kocaman, 1999).

ABC methods enable managers to cost out measurements to business simplification and process improvement. Productivity can be improved when waste is eliminated or reduced and when information replaces the expenditure of capital; for example, when computer-based product definitions are available for the creation of parts on demand instead of physical parts in storage awaiting possible future demand. Productivity also can be improved when costs, risks, and rewards are shared among organizations the case when business functions and rules are shared and data are integrated. Productivity is a measurement of the performance of activities. Activities can be perceived as consumers of resources in production of materials, services, events, or information. Activities are the common denominator between business process improvement and information improvement.

Documenting and understanding activities is necessary in order to improve the business process, since activities are the building blocks of business processes. When employees understand the activities they perform, they can better understand costs based on the activities. Traditional financial information is reorganized by ABC into a form that makes sense to the casual functional user, in addition to the usual information that tells them how they spend money, it also tells them what to do with the money. This ability to place costs on activities and their outputs provides a clear metric for improvement, whether for determining improvement priorities in the long-term or for measuring near-term success. ABC allows functional users to characterize the value of, or need for, each activity, getting rid of the waste before automating (or reautomating) activities (Reengineering handbook, n.d.).

3.3 Difference between ABC and Traditional Costing

The traditional approach to determining the cost per claim processed is to divide the cost of the claims processing operation by the number of claims processed to obtain a cost per claim. Another problem with the traditional approach to determining the cost per claim is that during a period in which there is a decline in the number of claims processed, the cost per claim will increase.

ABC has proven to be a more accurate means of determining the cost of products in situations in which there are multiple products, and the products make diverse demands on the various activities through which the products pass. ABC was first introduced into manufacturing situations where there were multiple tangible products that made diverse demands upon the activities in the manufacturing process. A recent improvement in ABC was designed to eliminate the fluctuations in cost per claim as the quantity of claims processed changes from one accounting period to another.

According to Somogyi et al. (n.d.), common problems associated with TCM systems are:

- Traditional systems look backward; thus, organizations have trouble using this information to influence the future. With traditional systems, there are no answers to the question “what does it say about current or future processes and practices?”
- Traditional cost accounting techniques for capturing cost are flawed; hence, allocation methods do not reflect the true cost across the operations of a business. As a result, operational management tends to ignore cost accounting information.
- There is a lack of alignment as reporting of costs does not reflect the true flow of processes in the business.
- Traditional cost accounting systems encourage dysfunctional behavior by supporting the “ship at all costs” mentality.

- In a traditional cost accounting system, there is a lack of customer focus. There is no differentiation between activity costs and added value to customers.
- Standard costing does not identify key cost drivers, specifically for overhead costs. Therefore, the constant change and development of organizations is not examined.
- Standard costing does not point out how to improve current processes or leverage the learning curve.

The difference between Traditional Costing and ABC is summarized in Table 2.1.

Table 2.1 Difference between traditional costing and activity based costing (Granof et al., 2000)

	Activity Based Costing	Traditional Costing
Cost Pools	ABC systems accumulate costs into activity cost pools. These are designed to correspond to the major activities or business processes. By design, the costs in each cost pool are largely caused by a single factor—the cost driver.	Traditional costing systems accumulate costs into facility-wide or departmental cost pools. The costs in each cost pool are heterogeneous—they are costs of many major processes and generally are not caused by a single factor.
Allocation Bases	ABC systems allocate costs to products, services, and other cost objects from the activity cost pools using allocation bases corresponding to cost drivers of activity costs.	Traditional systems allocate costs to products using volume-based allocation bases: units, direct labor input, machine hours, and revenue dollars.
Hierarchy of Costs	Allows for non-linearity of costs within the organization by explicitly recognizing that some costs are not caused by the number of units produced.	Generally estimates all of the costs of an organization as being driven by the volume of product or service delivered.
Cost Objects	Focuses on estimating the costs of many cost objects of interest: units, batches, product lines, business processes, customers, and suppliers.	Focuses on estimating the cost of a single cost object—unit of product or service.
Decision Support	Because of the ability to align allocation bases with cost drivers, provides more accurate information to support managerial decisions.	Because of the inability to align allocation bases with cost drivers, leads to over costing and under costing problems.
Cost Control	By providing summary costs of organizational activities, ABC allows for prioritization of cost-management efforts.	Cost control is viewed as a departmental exercise rather than a cross functional effort.
Cost	Relatively expensive to implement and maintain.	Inexpensive to implement and maintain.

3.4 Comparison of ABC with Just in Time and Theory of Constraints

Philosophically JIT, TOC and ABM are much the same. All three concepts emphasize continuous improvement by systematically removing waste from the system. However, from a practice perspective these concepts are quite different.

JIT emphasizes focused factories, a cellular plant layout and kanban inventory control. These practice elements are applicable in repetitive production or assembly operations. The TOC, on the other hand, emphasizes a scheduling algorithm that balances the flow of work through a job shop with the inevitable bottlenecks and other constraints. While JIT places emphasis on zero inventories, TOC allows for inventory buffers at bottleneck operations. However, this does not represent a conflict between the two approaches because the manual kanban system and the TOC computer scheduling routine are not competing. The JIT kanban system is applicable in a continuous flow, or process environment, while the TOC scheduling algorithm is applicable in a JOC environment. Both JIT and TOC emphasize a simplified accounting system. A variety of simplified back flush accounting methods evolved from the JIT concepts, while throughput accounting was developed from the TOC. The combination of these two ideas produces a throughput costing back flush system that is consistent with both philosophies because it encourages managers to produce only what is needed. Although JIT and TOC are different, there appear to be no fundamental conflicts between the underlying philosophies or practices.

Although ABM includes the continuous improvement concept, the main practice element of ABM focuses on activity accounting, i.e., activity costing and activity based product costing. Therefore, ABM is also accounting based management. ABC (the cost assignment dimension of ABM) generates accurate product costs by tracing costs to activities and from activities to products using a variety of activity measures. This enhanced emphasis on accounting creates a fundamental difference between ABM and the other two approaches. JIT and TOC both focus on improving the company's processes, reducing waste and balancing the flow of work. Accounting is not the center of attention. In fact, accounting plays a diminished role in JIT and

TOC systems. Accurate product costs are obtained in JIT through a focused plant, cellular layout and decentralized services. On the other hand, product costing appears to be a non-issue in the TOC where the goal is to simultaneously increase throughput while reducing inventory and operating expenses.

This discussion has led us to an interesting and very important controversial question. Are JIT and TOC production and simplified accounting systems compatible with ABM? Some of the arguments on each side of this issue are provided below.

Critics of ABC contend that reorganizing a factory into dedicated cells that are focused on producing a few similar products eliminates the need for elaborate ABC systems. Simplified back flush systems satisfy the accounting requirements, therefore using ABC with JIT is just another form of waste. While ABC may provide more accurate product costs in a TOC job shop environment, the risk of overemphasizing financial measurements at the expense of non-financial measurements is too great. The performance measurement system should place emphasis on managing the processes and work that people do, not on the financial results. If the cost accounting system is the center of attention, managers will be distracted from the critical success factors such as cycle time, quality, flexibility and responsiveness to customer needs.

Proponents of ABM argue that the JIT and TOC continuous improvement concepts are important and are part of the ABM methodology. However, although JIT practices are designed to improve processes, cycle time, quality and other aspects of performance, they cannot replace, or eliminate the need for management decision support systems. According to Fritsch (1997), TOC offers a push system instead of a pull system of JIT by optimizing the WIP and capacities of machines. Activity based product costing provides the information needed to determine which products, distribution channels and customers are profitable. In addition, activity costing reveals the financial consequences of those improvements.

Kee and Schmidt (2000) also work on TOC, ABC and their comparison. As known in literature Kee theory has a powerful part with merging ABC with

mathematical programming. Beyond Kee's researches, many other mathematical experts recommend models for planning and product mix decisions (Koker, 2003).

3.5 Components of Activity Based Costing

An important function of ABC is for the organization's activities to be defined as value added or non value added. Value added activities are those for which the customers are usually willing to pay (in some way) for the service. Non-value added are activities that create waste, result in delay of some sort, add costs to the product, or for which the customer is not willing to pay.

Resources are assigned to activities to allow them to be conducted; performing the activity results in a cost that can be priced, which can be assigned to the primary output. It is through ABC, that an organization can begin to see actual costs against individual activities, and find opportunities to streamline or reduce the costs, or eliminate the entire activity, especially if there is no value added.

The components of Activity Based Costing are summarized below in Figure 3.1.

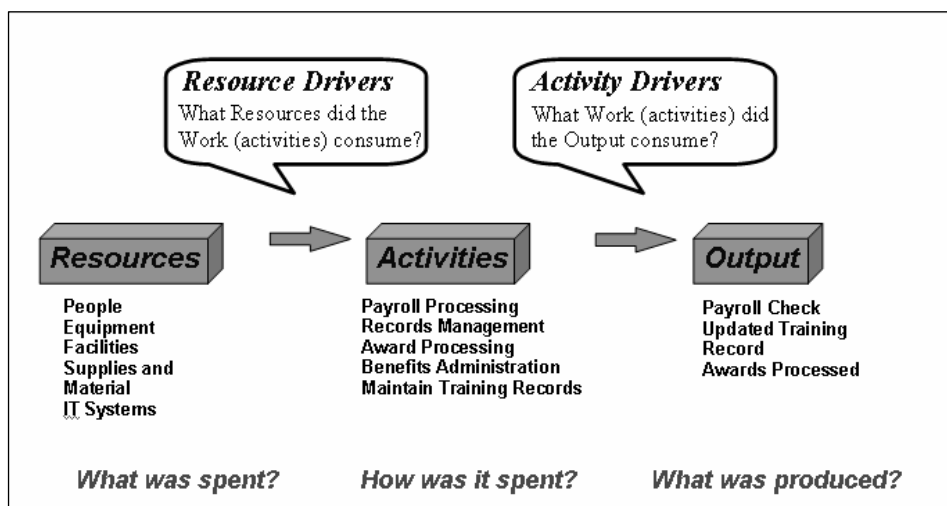


Figure 3.1 Components of activity based costing model (BPR online learning center, n.d.)

The following chart diagram will help to see how Activity Based Costing works.

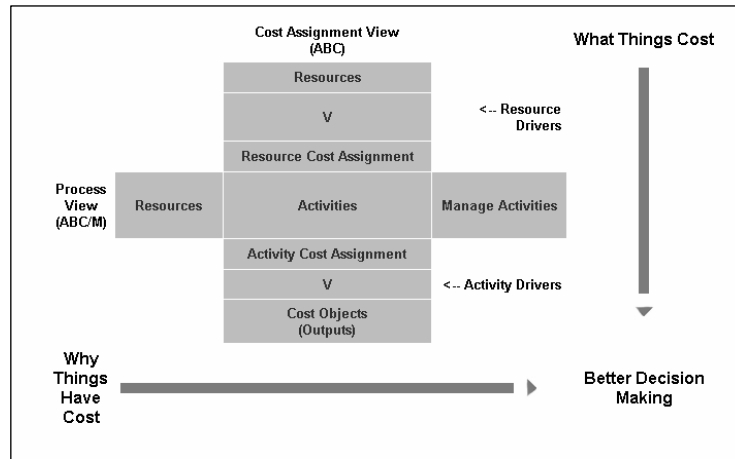


Figure 3.2 How activity based costing works (ABC guidebook, n.d.)

Related terms used in Figure 3.1 and Figure 3.2 are given below to understand the figures better.

- Resources are people and machines.
- The resource driver is the measure of the frequency and intensity of the demands placed on resources by activity.
- Activities are the processes performed by people and machines.
- Activity drivers measure the frequency and intensity of the demands placed on activities by cost objects enabling costs to be assigned to cost objects.
- Cost objects are the products, services produced.
- Cost drivers are the factors that affect the cost of an activity, e.g. poor quality.

3.6 Steps for Performing Activity Based Costing

Managers identify five activities that need to occur in order to determine Activity Costs;

1. Analyze Activities
2. Gather Costs
3. Trace Costs to Activities

4. Establish Output Measures
5. Analyze Costs

These steps should be performed by the core Business Process Improvement team, committed by top management to work on a Business Process Improvement project full time if available, or part time on the effort with possible support from Business Process Improvement contractors. This process can take anywhere from a few days to a few months, depending on level of detail, complexity of an organization's processes, and commitment of team resources.

3.6.1 Analyze Activities

First the scope of the activities to be analyzed must be identified. It is suggested that the program include at least a half dozen organizational units having a common functional orientation and preferably also a common budget somewhere in the reporting chain. The depth and detail of analysis will be determined by activity decomposition, since activity decomposition is complete when one common or homogeneous primary output per activity is reached. This is where the core team can use activity models as a basis for selecting and interviewing key people associated with the business process.

A determination then is made if an activity is value or non-value added; also if the activity is primary or secondary, and required or not needed. Value added is determined if the output of the activity is directly related to customer requirements, service or product, as opposed to an administrative or logistical outcome that services the providing organization. For instance, if the output of an activity were an inventory report or updates for products (for which there are customers), the output would be non value added, but necessary to the organization. (e.g. overhead) A major goal of reengineering is to reduce non-value added activities and eliminate those that are not necessary. Primary activities directly support the organization's mission while secondary activities support primary activities. Required activities are those that must always be performed while discretionary activities are performed only

when allowed by the operating management. Analyzing activities phase can be summarized as shown below in Figure 3.3.

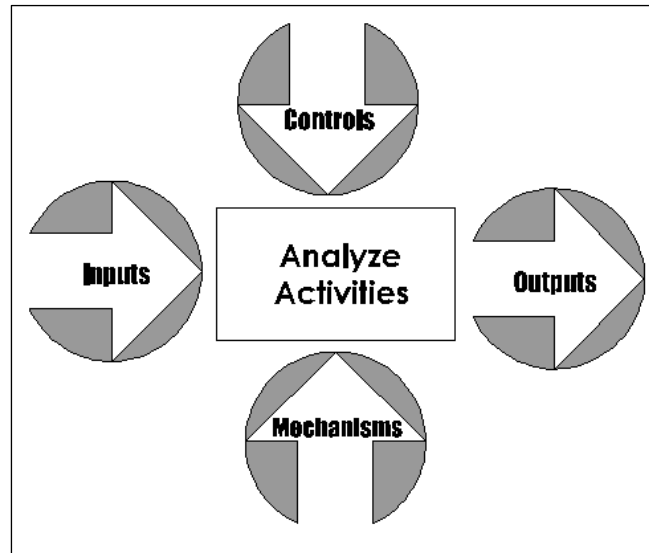


Figure 3.3 Analyzing activities phase (ABC guidebook, n.d.)

3.6.2 Gather Costs

In this step costs are gathered for the activity producing the products or services provided as the outcome. These costs can be salaries, expenditures for research, machinery, office furniture, etc. These costs are used as the baseline activity costs. When documents for the costs incurred are not available, cost assignment formulas may be used.

3.6.3 Trace Costs to Activities

In this step the results of analyzing activities and the gathered organizational inputs and costs are brought together, which produces the total input cost for each activity. A simple formula for costs is provided - outputs consume activities that in turn have consumed costs associated with resources. These leads to a simple method to calculate total costs consumed by an activity - multiply the percent of time

expended by an organizational unit, e.g. branch, division, on each activity by the total input cost for that entity. Here we are not calculating costs, just finding where they come from.

3.6.4 Establish Output Measures

In this step the actual activity unit cost is calculated. Even though activities may have multiple outputs, only one is identified as the primary output. Activity unit cost is calculated by dividing the total input cost, including assigned costs from secondary activities, by the primary activity output volume; the primary output must be measurable and its volume or quantity obtainable. From this, a bill of activities can then be calculated which contains or lists a set of activities and the amount of each activity consumed. The amount of each activity consumed is extended by the activity unit cost and is added up as a total cost for the bill of activity.

3.6.5 Analyze Costs

In the final step, the calculated activity unit costs and bills of activity are used to identify candidates for improving the business processes. The thing to keep in mind is that the identification of non-value added activities occurs through this process with a clarity that allows us to eliminate them, and at the same time permits the product or service to be provided to the customer with greater efficiency.

CHAPTER FOUR

THE USE OF ACTIVITY BASED COSTING

4.1 Introduction

ABC is a powerful tool for cost management, but there still a great deal of confusion exists around it. Especially the actions should be done, according to the results of ABC is under discussion. Schneeweiss (1998) suggests that using ABC as a planning and decision tool will bring advantages to companies.

In this chapter, benefits, limitations, and hints for implementing ABC are explained. Where and why ABC can be used is mentioned.

4.2 Why Companies Implement Activity Based Costing

Somogyi et al. (n.d.), says that companies choose to implement activity based cost management for a number of reasons ranging from strategic to operational in nature. They include:

Ability to Improve Customer / Product / Service Analysis:

- Customer/Product Profitability: Identify how much is actually spent to service customers and provide products. Historically, customer and product profitability systems do not represent the true relationship of what drives the costs to be incurred.
- Identify Hidden Costs: Examples include small order quantities, low volume products, unique products, customer service demands, and considerable expediting.
- Redesign of Unprofitable Products/Customers: Redesign the processes used to make those products. Evaluate and set target costs.

Operations Performance Analysis:

- What-if Analysis: Develop an ABC model to perform and demonstrate the direct linkage between tactical decisions and cost consequences.
- Cost Management: Provide market area managers with relevant cost information for activities over which they have control.
- Cost of Capacity: Identify the cost of capacity to support scheduling and investment decisions. Optimize activity capacity utilization.
- Costs of Quality: Identify and quantify manufacturing costs of quality.

Organization Reengineering:

- Business Diagnostic: Indicate areas with high improvement potential, typically a focus of reengineering task groups. A process management initiative results from the knowledge of how much is spent on data gathering and manipulation as opposed to the value-added analysis.
- Support Staff Rationalization: Identify and quantify opportunities for support-cost reduction. Evaluate opportunities for consolidation.
- Charge Intercompany Service Costs: Identify costs associated with internal services and establish a basis for internal service charges.
- Asset Management: Classify and rank assets/properties in terms of cost and effort required. Assets can be assessed in terms of their fully loaded cost, which can be compared to their size and value to rank investments.
- Interplant Benchmarking: Establish cost targets for interplant benchmarking.
- Explore Outsourcing: Evaluate the cost of outsourcing certain operations rather than producing in-house.

While ABC is a powerful toolkit, there still exists a great deal of confusion around it. When trying to implement a cost management system, one of the hardest questions to get management to articulate is which of the three views of cost they are concerned about. Many times managers confuse these three views, thereby dramatically, complicating the potential solution they seek. The three views of cost can be thought of as financial, operational, and strategic. As Figure 4.1 shows, these

three views of cost focus on different variables, including the time frame; the users and the uses of the cost information; the levels of aggregation; the reporting frequencies; and the types of measurements used (Somogyi et al., n.d.).

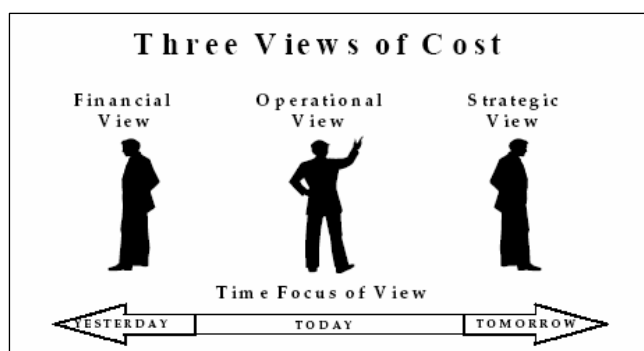


Figure 4.1 Three views of cost (Somogyi et al., n.d.)

Financial View of Cost: The financial view of cost can be compared to a man facing backwards, because of its adherence to the historical cost concept. The financial controller, tax manager, and treasury department use this type of cost information to value inventory and report to shareholders, lenders, and tax authorities. The level of information and aggregation required under this view of cost is high, and often company-wide. Auditors and accountants use the financial view to address periodic reporting requirements. The reporting frequency is often monthly, but can be quarterly or annually. The type of measures used is almost exclusively financial. Although this view receives the most attention, it is usually ineffective for operational and strategic uses.

Operational View of Cost: The operational view of cost is used for internal analysis. The operational view of cost focuses on the cost information needed to manage on a day-to-day basis. Line managers, process improvement teams, quality teams, and day-to-day managers use operational cost information as an indicator of performance and to determine if activities are adding value. Interestingly, operational managers are most comfortable with, and often use, physical measures rather than financial measures. Examples of physical measures include the number of units

produced, the first pass quality, or temperature of each batch. These measures can easily be quantified in cost terms, but the operating manager really does not manage the dollars. Instead, he or she must manage physical activities. By understanding the root causes of problems, managers use this type of costing to identify where improvements can be made.

Strategic View of Cost: The strategic view of cost differs from the financial and operational views in that it is the forward looking view of cost. The users are concerned with improving tomorrow's results; yesterday and today are important only in how they help explain how to improve tomorrow. Investment justification, TC, life cycle costing, and make/buy decisions benefit from the strategic view. The strategic planner, cost engineer, and people doing product sourcing use this view to determine how to change future costs and improve future profitability.

4.3 Benefits of Activity Based Costing

The benefits of ABC can be listed as:

- ABC makes it possible to determine total production costs traced to outputs.
- ABC targets areas needing management attention.
- ABC encourages the consideration of alternative methods of production.
- ABC highlights operational efficiency and inefficiency.
- ABC identifies financial benchmarks for activity performance.
- ABC generates more information to measure and reward performance, and prioritizes activities for cost reductions.
- ABC provides a common managerial framework among support activities. (Mabberly, 1996), (Cokins, 1997).

4.4 Limitations of Activity Based Costing

ABC is successively implemented in many firms. Instead of this, some failures were also seen during implementation. According to Cokins (1997), common reasons of failures are listed below:

- When ABC projects are launched from the finance or accounting department (or are excessively staffed by accountants), they are usually perceived by those that the project is intended to help as another meaningless financial or managerial exercise.
- Financial accounting tends to be “outside the comfort zone” of most individuals. The new accounting data can not be sourced upon potential users.
- There is an impression that simply computing the new ABC data for users is a gracious act. Without a plan, even if people look at the data, they will learn a lot, but they won’t necessarily get anything done.
- The ABC information becomes “a second set of books” thus competing with the “official” accounting system. Employee performance measures are often linked to the official system, which can consequently encourage bad behavior.
- The resistance to change can be greatly underestimated by the ABC project team.
- The degree of disbelief on the new calculated numbers is always underestimated by the ABC project team. With accurate tracing of costs, the resulting costs of certain products, services, or process outputs can differ dramatically from their costs as allocated in traditional methods.
- ABC adversely affects some parties. For example, product line managers responsible for products with marginal profitability as calculated with the traditional allocation data will balk when they recognize that the ABC calculations can further shift costs into their products and therefore make their products unprofitable.
- The design of the ABC system is over engineered, excessively detailed, or flawed in some manner such that the data are not viewed as useful.

By the way, Cokins (1997) determines that users can show resistance to ABC system because of the following statements:

- Sales and marketing team do not know how to react nor take appropriate actions once they are confronted with the new winners and losers of profitability, whether they are products, services or customers.
- ABC does not provide all the information for products and customer planners to make decisions. More information is used by managers to decide on customer and product related actions.
- The ABC project is viewed as another competing improvement program rather than as enabling data to aid existing improvement programs.

Under the special conditions mentioned below, there are some organizational difficulties on ABC success:

- If ABC projects take too long, they lose momentum and people lose interest.
- If the pilot site is strictly a cost-centre without profit-and-lost responsibility or not based on market-driven selling prices, people pay less attention.
- There is minimal diversity in the number of features of end products or services (e.g. final cost objects).
- A higher-level organization unit autocratically mandates ABC. It stipulates a predefined, standard set of activity definitions. This precludes and stifles user involvement and interest (Koker, 2003).

As a result, we can say that ABC has some limitations like,

- Some costs may require allocations to departments and products.
- Some costs that can be identified with specific products are omitted.
- In some cases, it is expensive to develop and implement; and also very time consuming.
- The resistance to ABC makes it difficult to implement.

4.5 Hints for Implementing Activity Based Costing

- **KEEP IT SIMPLE**

When determining the cost of drivers for each activity, we should not get too many details that can't be explained. However, a system that is too general may not be accurate enough.

- **TRAIN CUSTOMERS IN ADVANCE**

Customers, whether internal or external, need to be prepared for the changes to come. We should educate customers to prepare them before you start the implementation process.

- **HAVE A BALANCED TEAM**

We should get input from all parties involved: finance staff, IT staffs human resources and consultants.

- **START WITH A PILOT STUDY**

We should start with the worst department, where we are sure to have some successes. We will be able to get faster buy-in from upper management if we can quickly point to cost savings.

- **PERSUADE MANAGEMENT TO CHANGE**

ABC implementation must have the support of all levels in an organization. ABC requires a new way of thinking for all parties.

- **ESTABLISH A REASONABLE TIME FRAME**

For implementing ABC, six to twelve months is aggressive, but reasonable. Too much time will lose the momentum of the people involved. ABC can live on forever, but the initial implementation must be well planned.

4.6 The Use of Activity Based Costing

Mabberley (1996), supports to use ABC for strategic cost management, for product costing, for customer profitability, and for operational cost management. For strategic cost management part, ABC is used for strategic planning and risk management. For product costing, ABC is used for product profitability analysis.

The use of customer profitability of ABC is the aim of this study. For operational cost management, ABC is used as performance management, cost reduction Maberly (1996).

Cooper (1998), claims that ABC usage is getting more and more everyday by the help of using different management tools in different areas. Especially, for strategic cost management, business process improvement teams generally use ABC to get better understanding of the firm's current position and to take the right actions to carry the firm to the future. By the way, ABC is commonly used as a reengineering and benchmarking tool.

4.6.1 Reengineering and Activity Based Costing

Reengineering teams can use ABC to determine the cost and benefits associated with their reengineered processes and systems. This cost and benefit analysis will then become part of the overall business case for the project.

An ABC approach will account for:

- Activities / processes (comparing before and after the reengineering project)
- The frequency and cost of the activity/process (comparing before and after the reengineering project)
- The do-nothing scenario (what would happen if we do not do the project)
- Which processes provide value (e.g. are needed to attract and retain customers, result in operational savings)

An example of the steps needed to develop ABC data for the reengineering teams are:

- The first step is, defining the major business processes and key activities of the organization. This is called as getting the process map.
- The second step is, tracing operating costs and capital charges to key activities. Reengineering teams should use existing accounting and financial

data which includes labor and capital equipment expenses and any other resource that can be changed / eliminated. Some reports to analyze include: budget, general ledger, supplier invoices.

- The third step is, linking activities to processes and identifying the cost drivers. The best way to do this is to actively engage the doers of the process. If the reengineering team has the doers of the process, they can identify where the costs come from and they can then seek out data from that source.
- The fourth step is, summarizing the total costs for each process.
- After processes are reengineered then the "new" costs must be tabled (BPR online learning center, n.d.).

4.6.2 Benchmarking and Activity Based Costing

Using ABC for benchmarking;

- Helps to define process to be benchmarked, because we must know our own process before we benchmark.
- Uncovers what data to ask of benchmarking partners, like high cost areas and the scope of activity.
- Helps to identify our current performance measure.
- Helps to track improvement efforts toward s the target.

4.7 Activity Based Costing and the Future

In the developing world, all companies should plan their future in an appropriate way. This way passes through controlling and managing costs. Without checking the costs, not any firm can continue longer.

The companies that survive will be those that can answer the following questions:

- How do we access all of this data?
- What do we do with it?

- How do we shape the data and put it in a form with which we can work?
- What will happen when we apply technologies developed during the information age for the information age?

In these days many companies use ABC software tools all around the world. But in our country, ‘excel sheets’ are commonly used for implementing ABC, which I also used for this thesis.

Some of the ABC software tools currently used on the world market is:

- HyperABC and HyperLite-Armstrong Laing.
- NetProphet-Hyperion Solutions Corporation.
- Oros Framework, Easy ABC Plus, Easy ABC Quick-ABC Technologies, Inc.
- dABC Costing-Computer Related Technology.
- Dekker Trakker Activity-Based Cost and Performance-Dekker, Ltd.

Clearly, as information technology evolves, organizations will increase their effectiveness. Further, as markets change, companies and organizations will run into global competitors that increasingly look to information and information technology for competitive advantage.

CHAPTER FIVE

THE COMPANY AND THE PRODUCT

5.1. Introduction

The practice of this thesis was done in a worldwide coating company's Turkey unit. In this chapter brief explanation about the company, the products and coating industry is going to be given.

5.2. About the Company

The company is a member of a group, which is one of the world's major manufacturers of paints, coatings and powder coatings. This group is a global group with 67 companies and 39 production facilities on five continents. The group had in 2005 a sales income of 1042 million USD (United States Dollar) with 5009 employees. The group develops, produces and sells cost effective paint and coatings products, and provide customer service and technical support, to residential, marine and industrial markets worldwide.

The group's sales income in 2004 was 901 million USD and increased approximately %15.6 and reached to 1042 million USD in 2005. Operating profit in 2004 was 73 million USD, and increased approximately %13.0 and reached to 83 million USD in 2005. Return of assets ratio was %12.0 and operating margin was %8.0 in 2005 with a total asset of 760 million USD.

The company is a leading international powder coatings manufacturer dedicated to develop, produce, and promote thermosetting powder coatings used for protecting and cost effectively enhancing commodity items' appearance, in a profitable way.

The company has an unmatched distribution network expanded to cover over 75 countries worldwide. The company's current operations include 11 manufacturing facilities all around world.

One of the manufacturing units of the company is located in Turkey, which the practice for this thesis is done according to the datum taken from. Turkey unit is being working for about 17 years with over 100 workers. It is the market leader with sold amount of goods, with reliability and with quality.

The competition is really very hard in this market with two major local producers and one worldwide producer. There are also more than four minor local producers and other worldwide producers trying to be a part of the Turkish market.

5.3 About the Product

Powder coating is entirely a dry finishing process. It is composed of grinded particles of resins, pigments and other raw materials that are electrostatically charged and sprayed on objects to be coated.

The objects to be coated are electrically grounded, so that the charged particles adhere to them until melted and fused together into a smooth coating in a curing oven, resulting in a uniform and durable high quality finish.

There are two types of powder coatings, thermosetting and thermoplastic powder coatings. Thermosetting powder coatings are the most commonly used. They undergo an irreversible chemical change during the curing process and will not soften back to the liquid phase when reheated. Thermoplastic powder coatings will

repeatedly melt when subjected to heat, will solidify when cooled, and are especially well suited for thick film applications capable of extreme performance requirements.

The company's product portfolio caters to the architectural, functional and industrial market segments with products engineered for everything from domestic appliances to pipelines and rebar coatings to aluminum extrusions.

CHAPTER SIX

AN APPLICATION OF ACTIVITY BASED COSTING AS A DECISION TOOL IN A WORLDWIDE COMPANY'S SALES DEPARTMENT

6.1 Introduction

Because of the secrecy rules of the company, all calculation details of ABC for each customer cannot be shown. Therefore, a minimized model study is prepared to show all the details of the calculation and to show the calculation mentality of ABC applied to all customers of the company.

6.2. Model Study of Activity Based Costing

6.2.1 Activity Based Costing Model Study Overview

ABC is done annual in order to classify customers according to their profitability and make decision to increase profitability and improve business across the market.

Model study is done on six customers as listed below in Table 6.1.

Table 6.1 Customer names and customer codes

Customer Code	Customer Name
C1001	CustomerA
C1002	CustomerB
C1003	CustomerC
C1004	CustomerD
C1005	CustomerE
C1006	CustomerF

Net values earned from the customers used in the model study are explained in Table 6.2. Total net value for these customers for this period is 16735 €.

Table 6.2 Total net value for ABC period (€)

Customer Code	Total Net Value for ABC Period (€)
C1001	1540
C1002	6742
C1003	1690
C1004	3546
C1005	1455
C1006	1762
	Total Net Value = 16735 €

Sales team used in model study consists of four people as listed in Table 6.3. One of them is the sales manager, whose costs are distributed to the customers over other salesman.

Table 6.3 Salesman List

Salesman Code	Salesman Name
S01	Salesman1
S02	Salesman2
S03	Salesman3
S04	Sales Manager

Total working hours for ABC period in the model study is 160 hours per person, which represents twenty working days or one month.

6.2.2 Cost Distribution in Activity Based Costing Model Study

Costs are classified under nine groups. These cost groups are,

- Sales Cost
- Laboratory Cost
- Administration Cost
- Royalty Cost
- Warehouse Cost
- Stock Cost
- Transportation Cost
- Manufacturing Cost
- Finance Cost

6.2.2.1 Sales Cost

Sales cost includes all costs for sales activities, such as salaries of salesman, salesman's automobile expenses, salesman's cellular phone bills, sales office rental and other sales expenses. Finance department announces total value of cost centers for sales cost as 3500 €.

Hours spent for each customer by each salesman are listed below in Table 6.4. Total hours spent for each customer by each salesman is 415 hours.

Total working hours of sales staff can be calculated by multiplying total working hours for ABC period per salesman and the number of salesman as $160 \times 4 = 640$ hours. Total hours spent for other activities not related directly to customers equals to subtraction of total hours spent for customers by sales staff from total working hour of sales staff as $640 - 415 = 225$ hours. Sales Cost is distributed according to value based on hours spent per customer and value based on net value per customer.

Table 6.4 Hours spent for each customer by each salesman

Salesman Code	Customer Code	Hours Spent
S01	C1001	32
S01	C1003	47
S01	C1006	39
S02	C1001	69
S02	C1004	45
S02	C1002	37
S03	C1006	68
S03	C1004	35
S03	C1005	43
Total hours spent for each customer by each salesman = 415		

Percentage of sales cost that will be distributed based on hours spent for each customer equals to division of total hours spent for customers by sales staff to total working hour of sales staff as $(415/640)*100 = 65 \%$. Sales cost value that will be distributed based on hours spent for each customer equals to $(3500/100)*65 = 2275\text{€}$.

Percentage of Sales Cost that will be distributed based on net value of each customer equals to 35 %. Sales cost value that will be distributed based on net value of each customer equals to $(3500/100)*35 = 1225 \text{€}$.

Total hours spent to each customer by salesman are given in Table 6.5, sales cost value based on hours spent per customer is given in Table 6.6 and sales cost value based on net value per customer is given in Table 6.7.

Table 6.5 Total hours spent to customers by sales team

Customer Code	Total Hours Spent
C1001	101
C1002	37
C1003	47
C1004	80
C1005	43
C1006	107

Table 6.6 Sales cost value based on hours spent per customer

Customer Code	Sales Cost Value (Hours (%))	Sales Cost Value (€) (Based on Hours)
C1001	$(101/415)*100 = 24.3$	$(2275/100)*24.3 = 552.83$
C1002	$(37/415)*100 = 8.9$	$(2275/100)*8.9 = 202.48$
C1003	$(47/415)*100 = 11.3$	$(2275/100)*11.3 = 257.07$
C1004	$(80/415)*100 = 19.3$	$(2275/100)*19.3 = 439.07$
C1005	$(43/415)*100 = 10.4$	$(2275/100)*10.4 = 236.60$
C1006	$(107/415)*100 = 25.8$	$(2275/100)*25.8 = 586.95$

Table 6.7 Sales cost value based on net value per customer

Customer Code	Sales Cost Value (Net Value (%))	Sales Cost Value (Based on Net Value)
C1001	$(1540/16735)*100 = 9.2$	$(1225/100)*9.2 = 112.70$
C1002	$(6742/16735)*100 = 40.3$	$(1225/100)*40.3 = 493.67$
C1003	$(1690/16735)*100 = 10.1$	$(1225/100)*10.1 = 123.72$
C1004	$(3546/16735)*100 = 21.2$	$(1225/100)*21.2 = 259.70$
C1005	$(1455/16735)*100 = 8.7$	$(1225/100)*8.7 = 106.58$
C1006	$(1762/16735)*100 = 10.5$	$(1225/100)*10.5 = 128.63$

Total sales cost by customer is summarized in Table 6.8. Sales Cost by customer is the sum of sales cost according to value based on hours spent per customer and value based on net value per customer.

Table 6.8 Sales cost by customer

Customer Code	Cost Value (€)
C1001	$552.83 + 112.70 = 665.53$
C1002	$202.48 + 493.67 = 696.15$
C1003	$257.07 + 123.72 = 380.79$
C1004	$439.07 + 259.70 = 698.77$
C1005	$236.60 + 106.58 = 343.18$
C1006	$586.95 + 128.63 = 715.58$

6.2.2.2 Laboratory Cost

Laboratory cost includes all costs for laboratory activities, such as salaries of laboratory staff, laboratory equipment costs, sample preparation costs, technical service visit costs and other laboratory expenses. Finance department announces total value of cost centers for laboratory cost as 1800 €.

Laboratory staff used in model study consists of three people as listed in Table 6.9. Total working hours of laboratory staff can be calculated by multiplying total working hours for ABC period per laboratory staff and the number of laboratory staff as $160 \times 3 = 480$ hours.

Table 6.9 Laboratory Staff List

Laboratory Staff Code	Laboratory Staff Name
L01	LabStaff1
L02	LabStaff2
L03	LabStaff3

Time spent for customer visit and sample workshop by laboratory staff is listed below in Table 6.10 and total hours spent by laboratory staff per customer is summarized in Table 6.11. Total hours spent by laboratory staff for all customers for model study period is 298 hours.

Table 6.10 Time spent for customer visit and sample workshop by laboratory staff

Laboratory Staff Code	Customer Code	Visit (hour)	Sample (hour)
L01	C1001	4	7
L02	C1001	16	19
L03	C1001	5	8
L01	C1002	36	11
L02	C1002	22	9
L01	C1003	5	8
L02	C1003	8	17
L03	C1003	56	9
L03	C1004	13	7
L02	C1005	4	3
L01	C1006	7	10
L02	C1006	6	8

Table 6.11 Total hours spent by laboratory staff per customer

Customer Code	Total Hours Spent by Laboratory Staff
C1001	59
C1002	78
C1003	103
C1004	20
C1005	7
C1006	31
Total hours spent by laboratory staff for customers =298	

Total hours spent by laboratory for production equals to subtraction of total hours spent by laboratory staff for customers from total working hour of laboratory staff as $480-298=182$ hours.

Percentage of laboratory cost that will be distributed based on hours spent for each customer equals to division of total hours spent for customers by laboratory staff to total working hour of laboratory staff as $(298/480)*100 = 62.1\%$. Laboratory cost that will be distributed based on hours spent for each customer equals to $(1800/100)*62.1 = 1117.8$ €. The distribution of laboratory cost per customer is given in Table 6.12.

Table 6.12 Laboratory cost per customer

Customer Code	Laboratory Cost (%)	Laboratory Cost (€)
C1001	$19.8 = (59/298)*100$	$(1117.8/100)*19.8 = 221.33$
C1002	$26.2 = (78/298)*100$	$(1117.8/100)*26.2 = 292.86$
C1003	$34.6 = (103/298)*100$	$(1117.8/100)*34.6 = 386.76$
C1004	$6.7 = (20/298)*100$	$(1117.8/100)*6.7 = 74.89$
C1005	$2.3 = (7/298)*100$	$(1117.8/100)*2.3 = 25.71$
C1006	$10.4 = (31/298)*100$	$(1117.8/100)*10.4 = 116.25$

The 37.9 % percentage of laboratory staff's work is directly related with manufacturing. Therefore, this 37.9 % percentage will be added to manufacturing cost.

6.2.2.3 Administration Cost

Administration Cost (ADMC) is the cost of management. ADMC includes the staff salaries except sales, laboratory and manufacturing departments (salaries of finance department and human resources department), all rental costs, electricity bills, water bills, energy costs, insurance policy costs, and all other management costs.

Finance department announces ADMC for the model study as 4000 €. ADMC is distributed to customers according to the ratio of their net value over total net value of all model study customers. The distribution of ADMC is listed in Table 6.13.

Table 6.13 Administration cost per customer

Customer Code	ADMC (%)	ADMC (€)
C1001	$(1540/16735)*100 = 9.2$	$(4000/100)*9.2 = 368$
C1002	$(6742/16735)*100 = 40.3$	$(4000/100)*40.3 = 1612$
C1003	$(1690/16735)*100 = 10.1$	$(4000/100)*10.1 = 404$
C1004	$(3546/16735)*100 = 21.2$	$(4000/100)*21.2 = 848$
C1005	$(1455/16735)*100 = 8.7$	$(4000/100)* 8.7 = 348$
C1006	$(1762/16735)*100 = 10.5$	$(4000/100)*10.5 = 420$

6.2.2.4 Royalty Cost

The company is a worldwide company therefore royalty is paid at the end of every month. Royalty is calculated according to the product type, sales amount and net value earned from customers. The ratio of royalty shows differences between product types and it is renewed every year.

Finance department announces the royalty cost for the model study as 80 €. It is distributed to customers according to the ratio of their net value over total net value of all model study customers. The distribution of royalty cost is listed in Table 6.14.

Table 6.14 Royalty cost per customer

Customer Code	Royalty Cost (%)	Royalty Cost (€)
C1001	$(1540/16735)*100 = 9.2$	$(80/100)*9.2 = 7.36$
C1002	$(6742/16735)*100 = 40.3$	$(80/100)*40.3 = 32.24$
C1003	$(1690/16735)*100 = 10.1$	$(80/100)*10.1 = 8.08$
C1004	$(3546/16735)*100 = 21.2$	$(80/100)*21.2 = 16.96$
C1005	$(1455/16735)*100 = 8.7$	$(80/100)*8.7 = 6.96$
C1006	$(1762/16735)*100 = 10.5$	$(80/100)*10.5 = 8.40$

6.2.2.5 Warehouse Cost

Warehouse cost is distributed to customers according to warehouse activities, ordering activities, and invoicing activities. Warehouse cost includes warehouse staff salaries, warehouse equipments maintenance costs (e.g. forklift, etc.), and all other warehouse expenses.

Finance department announces warehouse cost for the model study as 2100 €. The warehouse cost distribution to activities is shown in Table 6.15.

Table 6.15 Warehouse cost distribution to activities

Activity	Percentage	Cost (€)
Warehouse activities	35 %	$(2100/100)*35 = 735$
Ordering activities	35 %	$(2100/100)*35 = 735$
Invoicing activities	30 %	$(2100/100)*30 = 630$

Warehouse activities cost forms the 35 % of warehouse cost and it is distributed to customers according to the amount sold to the customer. Total amount in kg sold to customers is shown below in Table 6.16 and warehouse activities cost distribution is shown in Table 6.17.

Table 6.16 Total amount (kg) sold to customers

Customer Code	Total Amount Sold (kg)
C1001	475
C1002	1985
C1003	385
C1004	1050
C1005	490
C1006	515
Total amount sold for ABC period = 4900 Kg	

Table 6.17 Warehouse activities cost distribution

Customer Code	Warehouse Activities Cost (%)	Warehouse Activities Cost (€)
C1001	$(475/4900)*100 = 9.8$	$(735/100)*9.8 = 72.04$
C1002	$(1985/4900)*100 = 40.5$	$(735/100)*40.5 = 297.68$
C1003	$(385/4900)*100 = 7.8$	$(735/100)*7.8 = 57.33$
C1004	$(1050/4900)*100 = 21.4$	$(735/100)*21.4 = 157.25$
C1005	$(490/4900)*100 = 10.0$	$(735/100)*10.0 = 73.50$
C1006	$(515/4900)*100 = 10.5$	$(735/100)*10.5 = 77.20$

Ordering activities cost forms the 35 % of warehouse cost and it is distributed to customers according to the number of orders taken from the customers. Total number of orders taken from each customer is shown below in Table 6.18 and ordering activities cost distribution is shown in Table 6.19.

Table 6.18 Orders according to customers

Customer Code	Total Orders
C1001	17
C1002	37
C1003	32
C1004	112
C1005	34
C1006	68
Total orders taken for ABC period: 300	

Table 6.19 Ordering activities cost distribution

Customer Code	Ordering Activities Cost (%)	Ordering Activities Cost (€)
C1001	$(17/300)*100 = 5.7$	$(735/100)*5.7 = 41.90$
C1002	$(37/300)*100 = 12.3$	$(735/100)*12.3 = 90.40$
C1003	$(32/300)*100 = 10.7$	$(735/100)*10.7 = 78.65$
C1004	$(112/300)*100 = 37.3$	$(735/100)*37.3 = 274.15$
C1005	$(34/300)*100 = 11.3$	$(735/100)*11.3 = 83.05$
C1006	$(68/300)*100 = 22.7$	$(735/100)*22.7 = 166.85$

Invoicing activities cost forms the 30 % of warehouse cost and it is distributed to customers according to the number of invoices issued for each customers. Total number of invoices issued for each customer is shown below in Table 6.20 and invoicing activities cost distribution is shown in Table 6.21.

Table 6.20 Invoices according to customers

Customer Code	Total Invoices
C1001	9
C1002	29
C1003	27
C1004	42
C1005	65
C1006	38
Total invoices issued for ABC Period: 210	

Table 6.21 Invoicing activities cost distribution

Customer Code	Invoicing Activities Cost (%)	Invoicing Activities Cost (€)
C1001	$(9/210)*100 = 4.3$	$(630/100)*4.3 = 27.09$
C1002	$(29/210)*100 = 13.8$	$(630/100)*13.8 = 86.94$
C1003	$(27/210)*100 = 12.8$	$(630/100)*12.8 = 80.64$
C1004	$(42/210)*100 = 20.0$	$(630/100)*20.0 = 126.00$
C1005	$(65/210)*100 = 30.9$	$(630/100)*30.9 = 194.67$
C1006	$(38/210)*100 = 18.2$	$(630/100)*18.2 = 114.66$

Warehouse activities cost, ordering activities cost, invoicing activities cost, and total warehouse cost for each customer is summarized in Table 6.22.

Table 6.22 Warehouse cost distribution to customers

Customer Code	Warehouse Activity Cost (€)	Ordering Activity Cost (€)	Invoicing Activity Cost (€)	Total Warehouse Cost (€)
C1001	74.04	41.90	27.09	141.03
C1002	297.68	90.40	86.94	475.02
C1003	57.33	78.65	80.64	216.62
C1004	157.25	274.15	126.00	557.40
C1005	73.50	83.05	194.67	351.22
C1006	77.20	166.85	114.66	358.71

6.2.2.6 Stock Cost

Stock cost is the financial cost of finished goods in stock. Company has stocks of finished goods at factory warehouse, in Istanbul warehouse, and in consignment warehouse. It was decided to work with consignment stock system with some customers to eliminate the production and delivery problems. These customers arranged a special consignment stock area for these finished goods. There are also second grade products and expired finished goods in stock, which creates stock cost to the company.

Closing stock of finished goods at factory warehouse, Istanbul warehouse and consignment stocks are listed in Table 6.23, Table 6.24, and Table 6.25 with their landed cost. Closing stock of second grade products and expired finished goods are listed in Table 6.26 and Table 6.27 with their landed cost.

Landed cost of stock items is the cost which includes all steps that a product passes through beginning from origin (from raw material phase) to the end as a product at stock area.

Table 6.23 Stocks in factory warehouse

Item Code	Item Quantity (kg)	Landed Cost (€)
X	156	187.20
Y	20	67.00
Z	1458	1968.30
T	21	34.65

Table 6.24 Stocks in Istanbul warehouse

Item Code	Item Quantity (kg)	Landed Cost (€)
X	15	18.15
Y	4	13.12
Z	20	33.60
H	60	48.00

Table 6.25 Consignment stocks

Item Code	Item Quantity (kg)	Landed Cost (€)
H	160	136.00
M	35	155.75

Table 6.26 Second grade stocks

Item Code	Item Quantity (kg)	Landed Cost (€)
X	120	162,00
T	65	100,75

Table 6.27 Expired finished goods

Item Code	Item Quantity (kg)	Landed Cost (€)
Z	15	17.25
H	160	136.00

Table 6.28, summarizes the total quantity and value of all finished goods in all locations for ABC end period. Table 6.29, shows the quantity sold items to each customer.

Table 6.28 Total quantity and value of all finished goods in all locations ABC end-period

Quantity&Cost		Item Code	X	Y	Z	T	H	M
Factory Warehouse	Quantity (kg)		156	20	1458	21	0	0
	Landed Cost (€)		187.20	67.00	1968.30	34.65	0	0
Istanbul Warehouse	Quantity (kg)		15	4	20	0	60	0
	Landed Cost (€)		18.15	13.12	33.60	0	48.00	0
Consignment Stock	Quantity (kg)		0	0	0	0	160	35
	Landed Cost (€)		0	0	0	0	136.00	155.75
Second Grade Stock	Quantity (kg)		120	0	0	65	0	0
	Landed Cost (€)		162.00	0	0	100.75	0	0
Expired Finished Goods	Quantity (kg)		0	0	15	0	160	0
	Landed Cost (€)		0	0	17.25	0	136.00	0
Total Quantity (kg)			291	24	1493	86	380	35
Total Landed Cost (€)			367.35	80.12	2019.15	135.40	320.00	155.75

Table 6.29 Quantity sold items to each customer

Customer Code	Quantity of Sold Items to Customers						Total Quantity Sold to Customers(kg)
	X	Y	Z	T	H	M	
C1001	150	0	0	145	0	180	475
C1002	185	0	0	950	0	850	1985
C1003	0	175	0	0	0	210	385
C1004	0	0	0	0	1050	0	1050
C1005	0	490	0	0	0	0	490
C1006	0	0	115	0	400	0	515
Total Quantity Of Items (kg)	335	665	115	1095	1450	1240	4900

For calculating the stock cost, assumptions made as TRL interest rate is 29 % and EURO interest rate is 3.5 %. By these assumptions the formulas for calculating the stock cost for TRL based and EURO based customers are given below. The base currency and payment terms of the model study customers are summarized in Table 6.30.

Formula for stock cost for TRL base currency

$$\text{stock_cost_value} = ((\text{credit_days}/360) * ((\text{euro_rate} + \text{trl_rate})/100)) * ((\text{total_landed_cost_for_item}/100) * \text{percentage_of_customer_purchase_for_item})$$

Formula for stock cost for EURO base currency

$$\text{stock_cost_value} = ((\text{credit_days}/360) * ((\text{euro_rate})/100)) * ((\text{total_landed_cost_for_item}/100) * \text{percentage_of_customer_purchase_for_item})$$

Table 6.30 Customer base currency and payment terms

Customer Code	Base Currency	Payment Term
C1001	TRL	60 days
C1002	TRL	45 days
C1003	EURO	90 days
C1004	EURO	40 days
C1005	EURO	30 days
C1006	TRL	120 days

By using the formulations all stock costs by customers for all items are calculated below in Table 6.31, Table 6.32, Table 6.33, Table 6.34, Table 6.35, and Table 6.36.

Table 6.31 Stock cost by customer for item X of sold amount 335 kg

Customer Code	Quantity (kg)	Percentage (%)	Stock Cost (€)
C1001	150	$(150/335) * 100 = 44.8$	$((60/360) * ((29+3.5)/100)) * (367.35/100) * 44.8$ = 8.90
C1002	185	$(185/335) * 100 = 55.2$	$((45/360) * ((29+3.5)/100)) * (367.35/100) * 55.2$ = 8.20

Table 6.32 Stock cost by customer for item Y of sold amount 665 kg

Customer Code	Quantity (kg)	Percentage (%)	Stock Cost (€)
C1003	175	$(175/665)*100=26.3$	$((90/360)*(3.5/100)*(80.12/100)*26.3 = 0.18$
C1005	490	$(490/665)*100=73.7$	$((30/360)*(3.5/100)*(80.12/100)*73.7 = 0.17$

Table 6.33 Stock cost by customer for item Z of sold amount 115 kg

Customer Code	Quantity (kg)	Percentage (%)	Stock Cost (€)
C1006	115	$(115/115)*100=100$	$((120/360)*((29+3.5)/100))*(2019.15/100)*44.8$ $= 218.70$

Table 6.34 Stock cost by customer for item T of sold amount 1095 kg

Customer Code	Quantity (kg)	Percentage (%)	Stock Cost (€)
C1001	145	$(145/1095)*100 = 13.2$	$((60/360)*((29+3.5)/100))*(135.4/100)*13.2$ $= 0.97$
C1002	950	$(950/1095)*100 = 86.8$	$((45/360)*((29+3.5)/100))*(135.4/100)*86.8$ $= 4.77$

Table 6.35 Stock cost by customer for item H of sold amount 1450 kg

Customer Code	Quantity (kg)	Percentage (%)	Stock Cost (€)
C1006	400	$(400/1450)*100=27.6$	$((120/360)*((29+3.5)/100))*(320/100)*27.6$ $=9.57$
C1004	1050	$(1050/1450)*100=72.4$	$((40/360)*(3.5/100))*(320/100)*72.4$ $=0.90$

Table 6.36 Stock cost by customer for item M of sold amount 1240 kg

Customer Code	Quantity (kg)	Percentage (%)	Stock Cost (€)
C1001	180	$(180/1240)*100=14.5$	$((60/360)*((29+3.5)/100))*(155.75/100)*14.5$ $=1.22$
C1003	210	$(210/1240)*100=16.9$	$((90/360)*(3.5/100))*(155.75/100)*16.9$ $= 0.23$
C1002	850	$(850/1240)*100=68.6$	$((45/360)*((29+3.5)/100))*(155.75/100)*68.6$ $=4.34$

After the calculations, a summary representing the stock costs of each item for each customer is given in Table 6.37.

Table 6.37 Stock cost by customer

Customer Code	Stock Cost of each item for each customer (€)						Stock Cost by Customer (€)
	X	Y	Z	T	H	M	
C1001	8.90	0.00	0.00	0.97	0.00	1.22	11.09
C1002	8.20	0.00	0.00	4.77	0.00	4.34	17.31
C1003	0.00	0.18	0.00	0.00	0.00	0.23	0.41
C1004	0.00	0.00	0.00	0.00	0.90	0.00	0.90
C1005	0.00	0.17	0.00	0.00	0.00	0.00	0.17
C1006	0.00	0.00	218.70	0.00	9.57	0.00	228.27

6.2.2.7 Transportation Cost

Transportation Cost (TRNC) includes all sold products transportation and it is calculated according to customer locations. Customers are classified in three geographical regions. These regions are Istanbul region, Ankara region, and Izmir region. The regions are related with region multipliers, where region multipliers are determined according to the distance from the factory. The region names and region multipliers are shown in Table 6.38.

Table 6.38 Transportation regions and region multipliers

Region Code	Region Name	Region Multiplier
Region01	Istanbul Region	1.0
Region02	Ankara Region	1.2
Region03	Izmir Region	1.4

Finance department announces TRNC for the model study as 850 €. The quantity sold to customers by region classification is given in Table 6.39.

Table 6.39 Quantity sold to customer by region classification

Customer Code	Region Code	Quantity Sold (kg)
C1001	Region01	475
C1002	Region01	1985
C1003	Region02	385
C1004	Region02	1050
C1005	Region02	490
C1006	Region03	515

Cost per quantity according to all regions sales is calculated in the formulation given below as 0.1548 €. By the help of cost per quantity, the regional TRNC are calculated in Table 6.40.

Cost per Quantity= Total Transportation Cost / Regional Total Quantity

$$= 850 / ((2460*1.0) + (1925*1.2) + (515*1.4))$$

$$= 0.1548 \text{ €}$$

Table 6.40 Transportation cost per region

Region Code	Quantity Sold (kg)	Cost per Region = (Quantity*Region Multiplier)*Cost per Quantity (€)
Region01	2460	(2460*1.0)*0.1548=380.8
Region02	1925	(1925*1.2)*0.1548=357.6
Region03	515	(515*1.4)*0.1548=111.6

TRNC per customer is calculated in Table 6.41 by using cost per region, quantity sold per region, and quantity sold to the customer in that region.

Table 6.41 Transportation cost per customer

Customer Code	Region Code	Cost per Region (€)	Quantity Sold per Region (kg)	Quantity (kg)	TRNC (€)
C1001	Region01	380.8	2460	475	$(380.8/2460)*475$ =73.53
C1002	Region01	380.8	2460	1985	$(380.8/2460)*1985$ =307.27
C1003	Region02	357.6	1925	385	$(357.6/1925)*385$ =71.52
C1004	Region02	357.6	1925	1050	$(357.6/1925)*1050$ =195.06
C1005	Region02	357.6	1925	490	$(357.6/1925)*490$ =91.02
C1006	Region03	111.6	515	515	$(111.6/515)*515$ =111.60

6.2.2.8 Manufacturing Cost

Manufacturing Cost (MNFC) includes all costs for manufacturing activities. The manufacturing activities are production activities and quality control activities. Production activities include salaries of manufacturing staff, manufacturing equipment maintenance costs, and other manufacturing expenses. Quality control activities cost is the 37.9 % of laboratory cost.

Finance department announces the value of production activities cost as 950 €. As mentioned in laboratory cost, the 37.9 % percentage of laboratory staff's work is directly related with manufacturing as quality control activities cost. This 37.9 % percentage will be added to MNFC as 682.20 €. Therefore, total MNFC equals to the sum of 950 € and 682.20 € as 1632.20 €.

Unit production costs according to production line and production quantity are listed in Table 6.42.

Table 6.42 Unit production costs according to production line and production quantity

Production Line 1		Production Line 2	
Quantity (kg)	Production Cost (€/kg)	Quantity (kg)	Production Cost (€/kg)
0<Quantity≤50	0.46	0<Quantity≤50	0.48
50<Quantity≤100	0.34	50<Quantity≤100	0.29
100<Quantity≤200	0.26	100<Quantity≤200	0.28
200<Quantity≤300	0.16	200<Quantity≤300	0.23
300<Quantity≤400	0.13	300<Quantity≤400	0.15
400<Quantity≤500	0.10	400<Quantity≤500	0.13
500<Quantity≤1000	0.07	500<Quantity≤1000	0.11

From the actual operation, unit production costs according to production quantities, product codes, and production lines are listed in Table 6.43, by the help of the information from Table 6.42.

Table 6.43 Unit production cost according to product codes, production lines, and production quantities from the actual operation

Product Code	Production Line	Batch No	Quantity (kg)	Unit Production Cost (€/kg)
X	1	B01	360	0.13
X	2	B02	410	0.13
X	2	B03	80	0.29
Y	1	B04	340	0.13
Y	1	B05	160	0.26
Y	2	B06	210	0.23
Z	2	B07	950	0.11
Z	2	B08	500	0.13
Z	2	B09	200	0.28
T	1	B10	580	0.07
T	1	B11	690	0.07
H	2	B12	1000	0.11
H	1	B13	850	0.07
M	1	B14	300	0.16
M	1	B15	1000	0.07

Production cost related to sales according to production batches are calculated for each customer in Table 6.44, Table 6.45, Table 6.46, Table 6.47, Table 6.48, and Table 6.49.

Table 6.44 Production cost for customer C1001

Item Code	Sold Item Quantity (kg)	Batch	Production Cost (€)
X	150	B01	$0.13 \cdot 150 = 19.50$
T	145	B10	$0.07 \cdot 145 = 10.15$
M	180	B14	$0.16 \cdot 180 = 28.80$
Total Product Sold: 475 kg			Total Production Cost: 58.45 €

Table 6.45 Production cost for customer C1002

Item Code	Sold Item Quantity (kg)	Batch	Production Cost (€)
X	185	B01	$0.13 \cdot 185 = 24.05$
M	120	B14	$0.16 \cdot 120 = 19.20$
M	730	B15	$0.07 \cdot 730 = 51.10$
T	435	B10	$0.07 \cdot 435 = 30.45$
T	515	B11	$0.07 \cdot 515 = 36.05$
Total Product Sold: 1985 kg			Total Production Cost: 160.85 €

Table 6.46 Production cost for customer C1003

Item Code	Sold Item Quantity (kg)	Batch	Production Cost (€)
Y	175	B06	$0.23 \cdot 175 = 40.25$
M	210	B15	$0.07 \cdot 210 = 14.70$
Total Product Sold: 385 kg			Total Production Cost: 54.95 €

Table 6.47 Production cost for customer C1004

Item Code	Sold Item Quantity (kg)	Batch	Production Cost (€)
H	1000	B12	$0.11 \cdot 1000 = 110.00$
H	50	B13	$0.07 \cdot 50 = 3.50$
Total Product Sold: 1050 kg			Total Production Cost: 113.50 €

Table 6.48 Production cost for customer C1005

Item Code	Sold Item Quantity (kg)	Batch	Production Cost (€)
Y	340	B04	$0.13 \times 340 = 44.20$
Y	150	B05	$0.26 \times 150 = 39.00$
Total Product Sold: 490 kg			Total Production Cost: 83.20 €

Table 6.49 Production cost for customer C1006

Item Code	Sold Item Quantity (kg)	Batch	Production Cost (€)
Z	115	B07	$0.11 \times 115 = 12.65$
H	400	B13	$0.07 \times 400 = 28.00$
Total Product Sold: 515 kg			Total Production Cost: 40.65 €

Total production cost for finished goods sold is $58.45 + 160.85 + 54.95 + 113.50 + 83.20 + 40.65 = 511.60$ €

Total MNFC is 1632.20 €. The difference between total MNFC and total production cost for finished goods sold is $1632.20 - 511.60 = 1120.60$ €.

Mainly this cost comes from the raw material cost, and it should be distributed to all customers according to the sold amount of product. Total amount sold for ABC period is 4900 kg therefore this cost is going to be distributed according to the ratio of sold product of each customer to total amount sold for ABC period. The distribution of this cost is calculated below in Table 6.50.

Table 6.50 Distribution of manufacturing cost according to sold products

Customer Code	MNFC based on Kg (%)	Distributed MNFC According to Sold Quantity (€)
C1001	$(475/4900) \times 100 = 9.8$	$(1120.60 / 100) \times 9.8 = 109.82$
C1002	$(1985/4900) \times 100 = 40.5$	$(1120.60 / 100) \times 40.5 = 453.84$
C1003	$(385/4900) \times 100 = 7.8$	$(1120.60 / 100) \times 7.8 = 87.41$
C1004	$(1050/4900) \times 100 = 21.4$	$(1120.60 / 100) \times 21.4 = 239.81$
C1005	$(490/4900) \times 100 = 10.0$	$(1120.60 / 100) \times 10.0 = 112.06$
C1006	$(515/4900) \times 100 = 10.5$	$(1120.60 / 100) \times 10.5 = 117.66$

Total MNFC by customer is the sum of production cost and distributed MNFC according to sold quantity. Total MNFC by customer is calculated below in Table 6.51.

Table 6.51 Total manufacturing cost by customer

Customer Code	Production Cost (€)	Distributed MNFC According to Sold Quantity (€)	Total MNFC (€)
C1001	58.45	109.82	58.45+109.82=168.27
C1002	160.85	453.84	160.85+453.84=614.69
C1003	54.95	87.41	54.95+87.41=142.36
C1004	113.50	239.81	113.50+239.81=353.31
C1005	83.20	112.06	83.20+112.06=195.26
C1006	40.65	117.66	40.65+117.66=158.31
Total MNFC For All Customers: 1632.20 €			

6.2.2.9 Finance Cost

Finance cost for each customer is calculated by the formula given below. In this formulation, for customers paying in Turkish Liras TRL+EURO interest rate will be used to minimize the differences in exchange rates at the end of the payment term.

Finance Cost Formula:

(Value of the invoice without VAT)*(theoretical payment term/360)*(TRL+EURO interest rate or EURO interest rate based on currency from customer master)/100.

For calculating the stock cost, assumptions were made as TRL interest rate is 29 % and EURO interest rate is 3.5 %. Same assumptions are valid for calculating the finance cost for TRL based and EURO based customers. The base currency and payment terms of the model study customers were summarized in Table 6.30. The finance cost calculation for each customer is given below in Table 6.52.

Table 6.52 Finance cost for each customer

Customer Code	Total Net Value (€)	Finance Cost (€)
C1001	1540	$(1540) \cdot (60/360) \cdot (29+3.5)/100=83.42$
C1002	6742	$(6742) \cdot (45/360) \cdot (29+3.5)/100=273.89$
C1003	1690	$(1690) \cdot (90/360) \cdot (3.5)/100=14.79$
C1004	3546	$(3546) \cdot (40/360) \cdot (3.5)/100=13.79$
C1005	1455	$(1455) \cdot (30/360) \cdot (3.5)/100=4.24$
C1006	1762	$(1762) \cdot (120/360) \cdot (29+3.5)/100=190.88$

6.2.3 Activity Based Costing Model Study Results

All costs are summarized and net profit of each customer for the model study is shown in Table 6.53.

Table 6.53 Net profit table of activity based costing model study

	Customer Code					
	C1001	C1002	C1003	C1004	C1005	C1006
Net Value (€)	1540.00	6742.00	1690.00	3546.00	1455.00	1762.00
<i>Sales Cost (€)</i>	665.53	696.15	380.79	698.77	343.18	715.58
<i>Laboratory Cost (€)</i>	221.33	292.86	386.76	74.89	25.71	116.25
<i>Administration Cost (€)</i>	368.00	1612.00	404.00	848.00	348.00	420.00
<i>Royalty Cost (€)</i>	7.36	32.24	8.08	16.96	6.96	8.40
<i>Warehouse Cost (€)</i>	141.03	475.02	216.62	557.40	351.22	358.71
<i>Stock Cost (€)</i>	11.09	17.31	0.41	0.90	0.17	228.27
<i>Transportation Cost (€)</i>	73.53	307.27	71.52	195.06	91.02	111.60
<i>Manufacturing Cost (€)</i>	168.27	614.69	142.36	353.31	195.26	158.31
<i>Finance Cost (€)</i>	83.42	273.89	14.79	13.79	4.24	190.88
Net Profit (€)	-199.56	2420.57	64.67	786.92	89.24	-546.00

From Table 6.53, C1001 and C1006 seem to be not profitable customers. C1003 and C1005 are profitable with a very small amount. It seems that the most profitable customer is C1002 and the second profitable customer is C1004.

It is seen that highest net value earned from customers is C1002. In this model study, the highest profitability is also from C1002. But it does not happen always like that. We can come face to face that sometimes the highest net value earned customer is the worst one according to the profit level. This is the difficult situation for the analyst to make decision on.

After analyzing the results, it is time to make actions. Action methods will be explained in the real ABC study.

6.3 The Activity Based Costing Study of the Company for Whole Year Activity

Because of the secrecy rules of the company, all calculation details of ABC for each customer cannot be shown. To show the calculation mentality details were given in the model study above. Some information about the real ABC study is given below.

Total number of customers of the company is 182. Total quantity sold for the ABC study period is 7872419.66 kg. Total net value earned from these customers for the ABC period is 20721176.43 €.

The sales team consists of eight salesmen and a sales manager. Laboratory team consists of four laboratory staff. Total working hours of a salesman in sales team and laboratory staff in laboratory team for ABC period is 2016 hours per worker. This represents working 8 hours a day, 21 days a month and 12 months a year.

Total costs for the ABC period are summarized below in Table 6.54.

Table 6.54 Summary of total costs for activity based costing study

Total Quantity Sold (kg)	7872419.66
Total Net Value (€)	20721176.43
Total Sales Cost (€)	850705.48
Total Laboratory Cost (€)	124843.75
Total Administration Cost (€)	1006013.15
Total Royalty Cost (€)	696024.32
Total Warehouse Cost (€)	157681.12
Total Stock Cost (€)	15722.84
Total Transportation Cost (€)	340893.50
Total Manufacturing Cost (€)	15088382.62
Total Finance Cost (€)	519876.47
Total Net Profit (€)	1921033.18

The calculation mentality was given in the model study. With the same method, calculations were done for 182 customers. The results are shown below from Table 6.55 to Table 6.66.

In Table 6.55, quantity of sold items in ABC study period for each customer is shown. Minimum sales amount is 6 kg for Customer140. Maximum sales amount is 843343.10 kg for Customer001. Total quantity sold for the ABC study period is 7872419.66 kg.

In Table 6.56, net values earned from each customer for ABC study period is shown. Lowest net value earned is 39.85 € from Customer140. Highest net value earned is 2069485.28 € from Customer001. Total net value earned from these customers for the ABC period is 20721176.43 €.

In Table 6.57, sales cost for each customer in ABC study period is shown. Lowest sales cost is 1.16 € for Customer130. Highest sales cost is 52785.56 € for Customer178. Total sales cost for ABC study period is 850705.48 €.

In Table 6.58, laboratory cost for each customer in ABC study period is shown. Some customers have zero laboratory cost, which means no laboratory work was done for them. No technical visits were done and no sample study was done for ABC study period for these customers. Highest laboratory cost is 5937.50 € for Customer001. Total laboratory cost for ABC study period is 124843.75 €.

In Table 6.59, ADMC for each customer in ABC study period is shown. Lowest ADMC is 1.93 € for Customer140. Highest ADMC is 100473.51 € for Customer001. Total ADMC for ABC study period is 1006013.15 €.

In Table 6.60, royalty cost for each customer in ABC study period is shown. Lowest royalty cost is 1.34 € for Customer140. Highest royalty cost is 69514.01 € for Customer001. Total royalty cost for ABC study period is 696024.32 €.

In Table 6.61, warehouse cost for each customer in ABC study period is shown. Lowest warehouse cost is 14.14 € for Customer140. Highest warehouse cost is 13489.84 € for Customer004. Total warehouse cost for ABC study period is 157681.12 €.

In Table 6.62, stock cost for each customer in ABC study period is shown. Some customers have zero stock cost, which means their product was sent just after the production. Highest stock cost is 2097.21 € for Customer004. Total stock cost for ABC study period is 15722.84 €.

In Table 6.63, TRNC for each customer in ABC study period is shown. Some customers have zero TRNC, which means the working condition is ex-works. In ex-works system, customer takes products from our factory, therefore no TRNC occurs. Highest TRNC is 38501.01 € for Customer178. Total TRNC for ABC study period is 340893.50 €.

In Table 6.64, MNFC for each customer in ABC study period is shown. Lowest MNFC is 12.46 € for Customer140. Highest MNFC is 1587753.53 € for Customer001. Total MNFC for ABC study period is 15088382.62 €.

In Table 6.65, finance cost for each customer in ABC study period is shown. Some customers have zero finance cost, which means they pay cash. When payment term is zero, no finance cost occurs. Highest finance cost is 51412.34 € for Customer001. Total finance cost for ABC study period is 519876.47 €.

In Table 6.66, net value earned from each customer, total costs for each customer and net profit for each customer for ABC study period is shown. Total net value earned from these customers for the ABC period is 20721176.43 €. Lowest net value earned is 39.85 € from Customer140. Highest net value earned is 2069485.28 € from Customer001. Total costs for the ABC period is 18800143.25 €. Lowest total cost is 54.40 € for Customer119. Highest total cost is 1897342.54 € for Customer001. Total net profit for ABC study period for all customers is the subtraction of total costs from net value earned and equals to 1921033.18 €. Lowest profitability is -24698.48 € for Customer182. Customer182 seems to be loss in financial perspective. Highest profitability is 172142.74 € for Customer001. Customer001 seems to be the most profitable customer in financial perspective.

Table 6.55 Sold quantities of all customers for activity based costing study period

Customer Code	Quantity Sold (kg)	Customer Code	Quantity Sold (kg)	Customer Code	Quantity Sold (kg)
Customer001	843343.10	Customer034	46272.00	Customer067	2820.00
Customer002	500379.90	Customer035	26705.80	Customer068	2119.00
Customer003	220377.00	Customer036	27327.00	Customer069	13479.20
Customer004	330516.40	Customer037	7126.50	Customer070	1688.50
Customer005	286973.10	Customer038	17013.50	Customer071	1443.00
Customer006	41869.00	Customer039	59429.00	Customer072	11050.00
Customer007	293347.20	Customer040	7856.00	Customer073	10500.00
Customer008	171425.80	Customer041	14329.00	Customer074	18818.50
Customer009	251285.60	Customer042	4942.00	Customer075	2994.00
Customer010	453124.10	Customer043	14020.00	Customer076	19000.00
Customer011	156735.00	Customer044	21753.00	Customer077	3360.00
Customer012	256500.70	Customer045	34257.00	Customer078	1350.00
Customer013	112814.00	Customer046	14087.00	Customer079	1248.00
Customer014	13237.50	Customer047	18174.50	Customer080	600.00
Customer015	122845.00	Customer048	21591.50	Customer081	71409.00
Customer016	31597.00	Customer049	28210.00	Customer082	1195.00
Customer017	135990.30	Customer050	20260.00	Customer083	1150.00
Customer018	19780.50	Customer051	56845.00	Customer084	500.00
Customer019	80139.00	Customer052	4197.50	Customer085	554.50
Customer020	90191.00	Customer053	10381.50	Customer086	1960.00
Customer021	18559.80	Customer054	51071.00	Customer087	520.00
Customer022	19774.50	Customer055	15057.50	Customer088	1151.00
Customer023	162978.00	Customer056	11791.00	Customer089	2020.00
Customer024	44001.00	Customer057	24750.00	Customer090	1000.00
Customer025	75036.00	Customer058	18000.00	Customer091	1480.00
Customer026	30145.00	Customer059	1400.00	Customer092	3151.00
Customer027	8910.00	Customer060	3130.00	Customer093	1170.00
Customer028	33680.00	Customer061	4420.00	Customer094	753.80
Customer029	68820.50	Customer062	1485.00	Customer095	1000.00
Customer030	94955.50	Customer063	2517.50	Customer096	1000.00
Customer031	25181.00	Customer064	3684.00	Customer097	600.00
Customer032	13240.00	Customer065	10800.50	Customer098	1200.00
Customer033	38430.00	Customer066	4179.00	Customer099	3089.00

Table 6.55 Sold quantities of all customers for activity based costing study period (Continue)

Customer Code	Quantity Sold (kg)	Customer Code	Quantity Sold (kg)	Customer Code	Quantity Sold (kg)
Customer100	273.00	Customer133	1540.00	Customer166	11662.00
Customer101	4037.00	Customer134	2730.00	Customer167	1000.00
Customer102	390.00	Customer135	34000.00	Customer168	1260.00
Customer103	195.00	Customer136	515.00	Customer169	75771.00
Customer104	540.00	Customer137	958.00	Customer170	14350.50
Customer105	214.00	Customer138	300.00	Customer171	121956.00
Customer106	255.00	Customer139	40.00	Customer172	860.00
Customer107	194.00	Customer140	6.00	Customer173	21861.00
Customer108	195.00	Customer141	90.00	Customer174	235101.00
Customer109	280.00	Customer142	80.00	Customer175	15499.00
Customer110	75.00	Customer143	694.00	Customer176	7713.00
Customer111	40.00	Customer144	4741.70	Customer177	400.00
Customer112	1915.00	Customer145	900.00	Customer178	796818.90
Customer113	503.00	Customer146	2514.00	Customer179	43320.00
Customer114	16941.00	Customer147	290.00	Customer180	44864.16
Customer115	443.20	Customer148	280.00	Customer181	217239.00
Customer116	1650.00	Customer149	63.00	Customer182	272000.00
Customer117	690.00	Customer150	300.00		
Customer118	20.00	Customer151	475.00	Total Quantity Sold (kg)	7872419.66
Customer119	20.00	Customer152	20.00		
Customer120	530.00	Customer153	23997.50		
Customer121	920.00	Customer154	3381.90		
Customer122	375.00	Customer155	75.00		
Customer123	190.00	Customer156	450.00		
Customer124	160.00	Customer157	840.00		
Customer125	199.00	Customer158	45.00		
Customer126	40.00	Customer159	923.00		
Customer127	20.00	Customer160	6322.00		
Customer128	200.00	Customer161	531.00		
Customer129	495.00	Customer162	500.00		
Customer130	20.00	Customer163	264.50		
Customer131	105.00	Customer164	6709.00		
Customer132	75.00	Customer165	25350.00		

Table 6.56 Net value of all customers for activity based costing study period

Customer Code	Net Value Earned (€)	Customer Code	Net Value Earned (€)	Customer Code	Net Value Earned (€)
Customer001	2069485.28	Customer034	135882.11	Customer067	10059.91
Customer002	1231172.94	Customer035	118619.32	Customer068	11593.24
Customer003	699037.57	Customer036	82139.76	Customer069	40807.15
Customer004	966628.54	Customer037	36103.51	Customer070	7548.04
Customer005	782613.59	Customer038	62774.45	Customer071	7464.07
Customer006	108859.40	Customer039	135429.07	Customer072	28850.00
Customer007	775886.31	Customer040	44834.26	Customer073	25830.00
Customer008	494308.66	Customer041	43451.75	Customer074	50628.35
Customer009	630673.70	Customer042	21177.02	Customer075	17103.70
Customer010	1151712.38	Customer043	42104.18	Customer076	38830.00
Customer011	425298.57	Customer044	61010.49	Customer077	9576.00
Customer012	709140.59	Customer045	90180.00	Customer078	7567.80
Customer013	441210.69	Customer046	40212.20	Customer079	6822.29
Customer014	115769.13	Customer047	57728.01	Customer080	3972.00
Customer015	350865.91	Customer048	62978.89	Customer081	141910.91
Customer016	158838.46	Customer049	74969.00	Customer082	5325.55
Customer017	291193.05	Customer050	63308.60	Customer083	6474.00
Customer018	108706.91	Customer051	160517.44	Customer084	3190.00
Customer019	219355.60	Customer052	21501.10	Customer085	4490.10
Customer020	247106.51	Customer053	42219.28	Customer086	6593.00
Customer021	91108.67	Customer054	131767.62	Customer087	3459.75
Customer022	89784.68	Customer055	46849.65	Customer088	3568.10
Customer023	406477.20	Customer056	41646.31	Customer089	5353.00
Customer024	105602.40	Customer057	72938.92	Customer090	3920.80
Customer025	201419.61	Customer058	40500.00	Customer091	4349.51
Customer026	76869.75	Customer059	8820.00	Customer092	11595.68
Customer027	51678.00	Customer060	11398.50	Customer093	5976.60
Customer028	99704.00	Customer061	15366.00	Customer094	4178.54
Customer029	188078.50	Customer062	10073.25	Customer095	3350.00
Customer030	223759.00	Customer063	12609.39	Customer096	3100.00
Customer031	75229.08	Customer064	14072.84	Customer097	1656.00
Customer032	47537.60	Customer065	30210.70	Customer098	4228.95
Customer033	112995.50	Customer066	20806.67	Customer099	10542.05

Table 6.56 Net values of all customers for activity based costing study period (Continue)

Customer Code	Net Value Earned (€)	Customer Code	Net Value Earned (€)	Customer Code	Net Value Earned (€)
Customer100	1523.39	Customer133	3657.14	Customer166	21479.50
Customer101	9957.75	Customer134	9762.47	Customer167	2200.00
Customer102	1395.00	Customer135	71738.64	Customer168	2583.00
Customer103	1016.10	Customer136	1530.40	Customer169	169489.36
Customer104	1537.80	Customer137	3452.21	Customer170	30310.13
Customer105	1926.00	Customer138	690.00	Customer171	272087.79
Customer106	1734.00	Customer139	178.60	Customer172	2121.89
Customer107	947.50	Customer140	39.85	Customer173	49334.31
Customer108	988.50	Customer141	360.00	Customer174	549259.60
Customer109	845.60	Customer142	202.00	Customer175	32547.90
Customer110	478.95	Customer143	1110.40	Customer176	10779.14
Customer111	278.00	Customer144	11533.39	Customer177	920.00
Customer112	7035.70	Customer145	4482.00	Customer178	1673039.98
Customer113	1715.59	Customer146	8235.27	Customer179	86838.08
Customer114	57037.21	Customer147	1018.80	Customer180	100608.88
Customer115	1874.80	Customer148	947.20	Customer181	556958.06
Customer116	8580.00	Customer149	315.00	Customer182	645038.76
Customer117	3830.00	Customer150	645.00		
Customer118	140.00	Customer151	691.53	Total Net Value Earned (€)	20721176.43
Customer119	125.60	Customer152	118.66		
Customer120	2835.70	Customer153	52853.95		
Customer121	2824.40	Customer154	7910.11		
Customer122	2370.00	Customer155	435.60		
Customer123	760.90	Customer156	2191.65		
Customer124	720.00	Customer157	3998.85		
Customer125	1653.69	Customer158	206.10		
Customer126	196.40	Customer159	5103.05		
Customer127	100.00	Customer160	15932.20		
Customer128	690.00	Customer161	2924.36		
Customer129	2294.90	Customer162	1350.00		
Customer130	75.80	Customer163	1415.92		
Customer131	420.00	Customer164	18116.52		
Customer132	249.00	Customer165	62051.74		

Table 6.57 Sales cost of all customers for activity based costing study period

Customer Code	Sales Cost (€)	Customer Code	Sales Cost (€)	Customer Code	Sales Cost (€)
Customer001	46251.26	Customer034	6878.66	Customer067	789.07
Customer002	32520.88	Customer035	7092.65	Customer068	2076.18
Customer003	44342.29	Customer036	4029.11	Customer069	2538.06
Customer004	31239.44	Customer037	1815.76	Customer070	537.70
Customer005	23826.58	Customer038	4241.98	Customer071	746.85
Customer006	1719.61	Customer039	7758.69	Customer072	1690.61
Customer007	31245.35	Customer040	4373.73	Customer073	5293.64
Customer008	11813.79	Customer041	2368.13	Customer074	2275.85
Customer009	22766.00	Customer042	482.69	Customer075	1314.59
Customer010	32057.10	Customer043	1714.01	Customer076	2841.19
Customer011	10814.25	Customer044	5181.66	Customer077	678.16
Customer012	17062.94	Customer045	4801.87	Customer078	1064.83
Customer013	14707.03	Customer046	1369.91	Customer079	1370.39
Customer014	2784.82	Customer047	2799.57	Customer080	693.29
Customer015	8090.71	Customer048	2939.76	Customer081	6254.79
Customer016	4949.06	Customer049	6461.46	Customer082	714.91
Customer017	11856.11	Customer050	3709.88	Customer083	1365.00
Customer018	3653.04	Customer051	5687.56	Customer084	186.93
Customer019	5985.61	Customer052	960.16	Customer085	1017.45
Customer020	7583.43	Customer053	2443.17	Customer086	894.19
Customer021	3920.66	Customer054	13327.42	Customer087	685.57
Customer022	5541.80	Customer055	3264.63	Customer088	266.83
Customer023	17264.51	Customer056	4339.83	Customer089	612.35
Customer024	1678.96	Customer057	5787.35	Customer090	693.82
Customer025	6341.51	Customer058	3633.30	Customer091	701.60
Customer026	6495.33	Customer059	756.85	Customer092	2290.68
Customer027	3028.33	Customer060	703.98	Customer093	1568.98
Customer028	2879.91	Customer061	871.49	Customer094	696.78
Customer029	9189.24	Customer062	1059.30	Customer095	315.96
Customer030	10848.30	Customer063	1142.00	Customer096	312.32
Customer031	4238.33	Customer064	850.29	Customer097	26.04
Customer032	1790.69	Customer065	3430.97	Customer098	65.45
Customer033	13641.54	Customer066	3378.42	Customer099	1430.45

Table 6.57 Sales costs of all customers for activity based costing study period (Continue)

Customer Code	Sales Cost (€)	Customer Code	Sales Cost (€)	Customer Code	Sales Cost (€)
Customer100	181.44	Customer133	691.70	Customer166	1300.40
Customer101	1741.72	Customer134	2790.55	Customer167	2569.26
Customer102	338.32	Customer135	4203.88	Customer168	41.65
Customer103	15.42	Customer136	446.27	Customer169	6089.80
Customer104	90.12	Customer137	686.86	Customer170	1543.23
Customer105	451.08	Customer138	169.39	Customer171	8365.47
Customer106	342.83	Customer139	161.11	Customer172	2409.29
Customer107	14.43	Customer140	106.18	Customer173	4747.92
Customer108	173.40	Customer141	111.12	Customer174	19838.83
Customer109	13.21	Customer142	161.58	Customer175	4018.98
Customer110	7.22	Customer143	229.56	Customer176	181.65
Customer111	4.18	Customer144	816.66	Customer177	4818.75
Customer112	1058.88	Customer145	2074.27	Customer178	52785.56
Customer113	79.39	Customer146	2134.10	Customer179	4042.99
Customer114	5425.17	Customer147	754.85	Customer180	6413.03
Customer115	662.23	Customer148	648.19	Customer181	35277.34
Customer116	1397.28	Customer149	638.29	Customer182	15544.91
Customer117	1325.01	Customer150	538.28		
Customer118	2.10	Customer151	11.59		
Customer119	1.89	Customer152	318.54	Total Sales	
Customer120	1098.85	Customer153	3855.76	Cost (€)	850705.48
Customer121	677.58	Customer154	1181.88		
Customer122	985.99	Customer155	1273.59		
Customer123	170.07	Customer156	1933.88		
Customer124	222.17	Customer157	2647.75		
Customer125	711.02	Customer158	1322.94		
Customer126	55.78	Customer159	2347.35		
Customer127	1.52	Customer160	933.63		
Customer128	116.28	Customer161	2472.73		
Customer129	193.39	Customer162	2080.15		
Customer130	1.16	Customer163	2555.48		
Customer131	112.03	Customer164	2397.04		
Customer132	14.59	Customer165	4540.32		

Table 6.58 Laboratory costs of all customers for activity based costing study period

Customer Code	Laboratory Cost (€)	Customer Code	Laboratory Cost (€)	Customer Code	Laboratory Cost (€)
Customer001	5937.50	Customer034	1093.75	Customer067	0.00
Customer002	5312.50	Customer035	4375.00	Customer068	156.25
Customer003	3281.25	Customer036	468.75	Customer069	1562.50
Customer004	3125.00	Customer037	468.75	Customer070	0.00
Customer005	1406.25	Customer038	781.25	Customer071	0.00
Customer006	0.00	Customer039	1562.50	Customer072	0.00
Customer007	3125.00	Customer040	625.00	Customer073	0.00
Customer008	2500.00	Customer041	312.50	Customer074	1875.00
Customer009	4375.00	Customer042	156.25	Customer075	156.25
Customer010	5625.00	Customer043	156.25	Customer076	0.00
Customer011	2343.75	Customer044	2031.25	Customer077	0.00
Customer012	4375.00	Customer045	468.75	Customer078	312.50
Customer013	3593.75	Customer046	156.25	Customer079	0.00
Customer014	937.50	Customer047	312.50	Customer080	0.00
Customer015	2812.50	Customer048	625.00	Customer081	937.50
Customer016	1250.00	Customer049	625.00	Customer082	0.00
Customer017	1875.00	Customer050	0.00	Customer083	0.00
Customer018	625.00	Customer051	1718.75	Customer084	0.00
Customer019	0.00	Customer052	625.00	Customer085	156.25
Customer020	1875.00	Customer053	937.50	Customer086	0.00
Customer021	312.50	Customer054	2031.25	Customer087	0.00
Customer022	2031.25	Customer055	312.50	Customer088	0.00
Customer023	468.75	Customer056	156.25	Customer089	0.00
Customer024	0.00	Customer057	1250.00	Customer090	0.00
Customer025	468.75	Customer058	0.00	Customer091	0.00
Customer026	468.75	Customer059	0.00	Customer092	625.00
Customer027	0.00	Customer060	312.50	Customer093	0.00
Customer028	0.00	Customer061	0.00	Customer094	625.00
Customer029	1718.75	Customer062	0.00	Customer095	0.00
Customer030	1406.25	Customer063	156.25	Customer096	0.00
Customer031	312.50	Customer064	0.00	Customer097	0.00
Customer032	625.00	Customer065	625.00	Customer098	0.00
Customer033	0.00	Customer066	312.50	Customer099	468.75

Table 6.58 Laboratory costs of all customers for activity based costing study period (Continue)

Customer Code	Laboratory Cost (€)	Customer Code	Laboratory Cost (€)	Customer Code	Laboratory Cost (€)
Customer100	0.00	Customer133	0.00	Customer166	156.25
Customer101	0.00	Customer134	0.00	Customer167	312.50
Customer102	0.00	Customer135	0.00	Customer168	2812.50
Customer103	0.00	Customer136	0.00	Customer169	0.00
Customer104	0.00	Customer137	0.00	Customer170	156.25
Customer105	312.50	Customer138	0.00	Customer171	1562.50
Customer106	0.00	Customer139	0.00	Customer172	1093.75
Customer107	0.00	Customer140	0.00	Customer173	2343.75
Customer108	0.00	Customer141	0.00	Customer174	5312.50
Customer109	0.00	Customer142	0.00	Customer175	1875.00
Customer110	0.00	Customer143	0.00	Customer176	0.00
Customer111	0.00	Customer144	0.00	Customer177	468.75
Customer112	0.00	Customer145	0.00	Customer178	5312.50
Customer113	0.00	Customer146	0.00	Customer179	2656.25
Customer114	625.00	Customer147	0.00	Customer180	1250.00
Customer115	0.00	Customer148	0.00	Customer181	2812.50
Customer116	156.25	Customer149	0.00	Customer182	312.50
Customer117	0.00	Customer150	0.00		
Customer118	0.00	Customer151	0.00	Total Laboratory Cost (€)	124843.75
Customer119	0.00	Customer152	0.00		
Customer120	0.00	Customer153	1093.75		
Customer121	0.00	Customer154	1250.00		
Customer122	0.00	Customer155	0.00		
Customer123	0.00	Customer156	0.00		
Customer124	0.00	Customer157	0.00		
Customer125	0.00	Customer158	0.00		
Customer126	0.00	Customer159	156.25		
Customer127	0.00	Customer160	0.00		
Customer128	0.00	Customer161	0.00		
Customer129	0.00	Customer162	0.00		
Customer130	0.00	Customer163	0.00		
Customer131	0.00	Customer164	625.00		
Customer132	0.00	Customer165	468.75		

Table 6.59 Administration costs of all customers for activity based costing study period

Customer Code	ADMC (€)	Customer Code	ADMC (€)	Customer Code	ADMC (€)
Customer001	100473.51	Customer034	6597.08	Customer067	488.41
Customer002	59773.45	Customer035	5758.97	Customer068	562.85
Customer003	33938.27	Customer036	3987.89	Customer069	1981.19
Customer004	46929.82	Customer037	1752.83	Customer070	366.46
Customer005	37995.89	Customer038	3047.70	Customer071	362.38
Customer006	5285.12	Customer039	6575.08	Customer072	1400.67
Customer007	37669.28	Customer040	2176.70	Customer073	1254.05
Customer008	23998.69	Customer041	2109.58	Customer074	2458.01
Customer009	30619.21	Customer042	1028.14	Customer075	830.38
Customer010	55915.64	Customer043	2044.16	Customer076	1885.20
Customer011	20648.25	Customer044	2962.06	Customer077	464.91
Customer012	34428.78	Customer045	4378.24	Customer078	367.42
Customer013	21420.78	Customer046	1952.30	Customer079	331.22
Customer014	5620.59	Customer047	2802.69	Customer080	192.84
Customer015	17034.54	Customer048	3057.63	Customer081	6889.77
Customer016	7711.61	Customer049	3639.74	Customer082	258.56
Customer017	14137.42	Customer050	3073.63	Customer083	314.31
Customer018	5277.72	Customer051	7793.12	Customer084	154.87
Customer019	10649.71	Customer052	1043.88	Customer085	217.99
Customer020	11997.02	Customer053	2049.75	Customer086	320.09
Customer021	4423.33	Customer054	6397.32	Customer087	167.97
Customer022	4359.05	Customer055	2274.55	Customer088	173.23
Customer023	19734.47	Customer056	2021.93	Customer089	259.89
Customer024	5127.00	Customer057	3541.18	Customer090	190.35
Customer025	9778.92	Customer058	1966.28	Customer091	211.17
Customer026	3732.03	Customer059	428.21	Customer092	562.97
Customer027	2508.97	Customer060	553.40	Customer093	290.16
Customer028	4840.63	Customer061	746.02	Customer094	202.87
Customer029	9131.21	Customer062	489.06	Customer095	162.64
Customer030	10863.50	Customer063	612.19	Customer096	150.51
Customer031	3652.37	Customer064	683.24	Customer097	80.40
Customer032	2307.95	Customer065	1466.73	Customer098	205.32
Customer033	5485.93	Customer066	1010.16	Customer099	511.82

Table 6.59 Administration costs of all customers for activity based costing study period (Continue)

Customer Code	ADMC (€)	Customer Code	ADMC (€)	Customer Code	ADMC (€)
Customer100	73.96	Customer133	177.55	Customer166	1042.83
Customer101	483.45	Customer134	473.97	Customer167	106.81
Customer102	67.73	Customer135	3482.91	Customer168	125.40
Customer103	49.33	Customer136	74.30	Customer169	8228.71
Customer104	74.66	Customer137	167.60	Customer170	1471.56
Customer105	93.51	Customer138	33.50	Customer171	13209.86
Customer106	84.19	Customer139	8.67	Customer172	103.02
Customer107	46.00	Customer140	1.93	Customer173	2395.18
Customer108	47.99	Customer141	17.48	Customer174	26666.55
Customer109	41.05	Customer142	9.81	Customer175	1580.20
Customer110	23.25	Customer143	53.91	Customer176	523.33
Customer111	13.50	Customer144	559.95	Customer177	44.67
Customer112	341.58	Customer145	217.60	Customer178	81226.09
Customer113	83.29	Customer146	399.82	Customer179	4215.99
Customer114	2769.16	Customer147	49.46	Customer180	4884.56
Customer115	91.02	Customer148	45.99	Customer181	27040.31
Customer116	416.56	Customer149	15.29	Customer182	31316.63
Customer117	185.95	Customer150	31.31		
Customer118	6.80	Customer151	33.57		
Customer119	6.10	Customer152	5.76	Total	
Customer120	137.67	Customer153	2566.06	ADMC (€)	1006013.15
Customer121	137.12	Customer154	384.04		
Customer122	115.06	Customer155	21.15		
Customer123	36.94	Customer156	106.40		
Customer124	34.96	Customer157	194.14		
Customer125	80.29	Customer158	10.01		
Customer126	9.54	Customer159	247.75		
Customer127	4.86	Customer160	773.51		
Customer128	33.50	Customer161	141.98		
Customer129	111.42	Customer162	65.54		
Customer130	3.68	Customer163	68.74		
Customer131	20.39	Customer164	879.56		
Customer132	12.09	Customer165	3012.61		

Table 6.60 Royalty costs of all customers for activity based costing study period

Customer Code	Royalty Cost (€)	Customer Code	Royalty Cost (€)	Customer Code	Royalty Cost (€)
Customer001	69514.01	Customer034	4564.28	Customer067	337.91
Customer002	41355.10	Customer035	3984.42	Customer068	389.42
Customer003	23480.67	Customer036	2759.07	Customer069	1370.71
Customer004	32469.05	Customer037	1212.72	Customer070	253.54
Customer005	26287.99	Customer038	2108.59	Customer071	250.72
Customer006	3656.59	Customer039	4549.06	Customer072	969.07
Customer007	26062.02	Customer040	1505.98	Customer073	867.63
Customer008	16603.83	Customer041	1459.54	Customer074	1700.61
Customer009	21184.33	Customer042	711.34	Customer075	574.51
Customer010	38686.02	Customer043	1414.28	Customer076	1304.30
Customer011	14285.78	Customer044	2049.34	Customer077	321.66
Customer012	23820.03	Customer045	3029.15	Customer078	254.20
Customer013	14820.27	Customer046	1350.73	Customer079	229.16
Customer014	3888.69	Customer047	1939.08	Customer080	133.42
Customer015	11785.59	Customer048	2115.46	Customer081	4766.79
Customer016	5335.38	Customer049	2518.21	Customer082	178.89
Customer017	9781.17	Customer050	2126.54	Customer083	217.46
Customer018	3651.47	Customer051	5391.78	Customer084	107.15
Customer019	7368.15	Customer052	722.22	Customer085	150.82
Customer020	8300.31	Customer053	1418.15	Customer086	221.46
Customer021	3060.34	Customer054	4426.07	Customer087	116.21
Customer022	3015.87	Customer055	1573.68	Customer088	119.85
Customer023	13653.57	Customer056	1398.90	Customer089	179.81
Customer024	3547.18	Customer057	2450.02	Customer090	131.70
Customer025	6765.68	Customer058	1360.40	Customer091	146.10
Customer026	2582.05	Customer059	296.26	Customer092	389.50
Customer027	1735.86	Customer060	382.88	Customer093	200.75
Customer028	3349.06	Customer061	516.14	Customer094	140.36
Customer029	6317.56	Customer062	338.36	Customer095	112.53
Customer030	7516.06	Customer063	423.55	Customer096	104.13
Customer031	2526.94	Customer064	472.71	Customer097	55.63
Customer032	1596.79	Customer065	1014.78	Customer098	142.05
Customer033	3795.52	Customer066	698.90	Customer099	354.11

Table 6.60 Royalty costs of all customers for activity based costing study period (Continue)

Customer Code	Royalty Cost (€)	Customer Code	Royalty Cost (€)	Customer Code	Royalty Cost (€)
Customer100	51.17	Customer133	122.84	Customer166	721.50
Customer101	334.48	Customer134	327.92	Customer167	73.90
Customer102	46.86	Customer135	2409.70	Customer168	86.76
Customer103	34.13	Customer136	51.41	Customer169	5693.15
Customer104	51.65	Customer137	115.96	Customer170	1018.12
Customer105	64.69	Customer138	23.18	Customer171	9139.43
Customer106	58.25	Customer139	6.00	Customer172	71.27
Customer107	31.83	Customer140	1.34	Customer173	1657.14
Customer108	33.20	Customer141	12.09	Customer174	18449.63
Customer109	28.40	Customer142	6.79	Customer175	1093.28
Customer110	16.09	Customer143	37.30	Customer176	362.07
Customer111	9.34	Customer144	387.41	Customer177	30.90
Customer112	236.33	Customer145	150.55	Customer178	56197.41
Customer113	57.63	Customer146	276.62	Customer179	2916.89
Customer114	1915.88	Customer147	34.22	Customer180	3379.45
Customer115	62.97	Customer148	31.82	Customer181	18708.22
Customer116	288.20	Customer149	10.58	Customer182	21666.85
Customer117	128.65	Customer150	21.67		
Customer118	4.70	Customer151	23.23	Total Royalty Cost (€)	696024.32
Customer119	4.22	Customer152	3.99		
Customer120	95.25	Customer153	1775.36		
Customer121	94.87	Customer154	265.70		
Customer122	79.61	Customer155	14.63		
Customer123	25.56	Customer156	73.62		
Customer124	24.18	Customer157	134.32		
Customer125	55.55	Customer158	6.92		
Customer126	6.60	Customer159	171.41		
Customer127	3.36	Customer160	535.16		
Customer128	23.18	Customer161	98.23		
Customer129	77.09	Customer162	45.35		
Customer130	2.55	Customer163	47.56		
Customer131	14.11	Customer164	608.53		
Customer132	8.36	Customer165	2084.32		

Table 6.61 Warehouse costs of all customers for activity based costing study period

Customer Code	Warehouse Cost (€)	Customer Code	Warehouse Cost (€)	Customer Code	Warehouse Cost (€)
Customer001	9451.12	Customer034	1491.37	Customer067	366.23
Customer002	6601.48	Customer035	1646.37	Customer068	418.94
Customer003	3770.08	Customer036	411.01	Customer069	577.12
Customer004	13489.84	Customer037	1284.93	Customer070	369.85
Customer005	2756.71	Customer038	458.14	Customer071	225.98
Customer006	395.10	Customer039	1092.38	Customer072	122.98
Customer007	4161.06	Customer040	1000.09	Customer073	88.43
Customer008	5003.44	Customer041	676.28	Customer074	598.95
Customer009	7880.26	Customer042	290.58	Customer075	330.70
Customer010	5259.49	Customer043	307.63	Customer076	173.75
Customer011	2299.87	Customer044	995.47	Customer077	263.40
Customer012	11933.33	Customer045	916.04	Customer078	208.76
Customer013	2125.05	Customer046	249.26	Customer079	87.88
Customer014	724.82	Customer047	1295.61	Customer080	63.09
Customer015	2100.93	Customer048	762.70	Customer081	1204.68
Customer016	1059.65	Customer049	437.46	Customer082	243.84
Customer017	1896.24	Customer050	327.96	Customer083	106.81
Customer018	652.98	Customer051	763.41	Customer084	17.63
Customer019	1810.20	Customer052	294.47	Customer085	60.31
Customer020	1495.28	Customer053	556.48	Customer086	73.31
Customer021	1631.09	Customer054	3524.79	Customer087	202.89
Customer022	1368.25	Customer055	449.82	Customer088	22.24
Customer023	1621.48	Customer056	831.21	Customer089	56.59
Customer024	401.62	Customer057	726.81	Customer090	139.45
Customer025	697.34	Customer058	141.53	Customer091	246.45
Customer026	264.29	Customer059	52.20	Customer092	106.88
Customer027	119.46	Customer060	64.44	Customer093	267.51
Customer028	329.13	Customer061	152.63	Customer094	151.22
Customer029	1545.07	Customer062	52.80	Customer095	21.17
Customer030	1138.71	Customer063	566.35	Customer096	91.65
Customer031	911.21	Customer064	388.32	Customer097	18.34
Customer032	539.25	Customer065	1202.52	Customer098	132.30
Customer033	433.35	Customer066	755.94	Customer099	97.86

Table 6.61 Warehouse costs of all customers for activity based costing study period (Continue)

Customer Code	Warehouse Cost (€)	Customer Code	Warehouse Cost (€)	Customer Code	Warehouse Cost (€)
Customer100	66.89	Customer133	67.28	Customer166	313.60
Customer101	183.63	Customer134	475.30	Customer167	35.27
Customer102	50.57	Customer135	268.91	Customer168	37.11
Customer103	85.95	Customer136	42.88	Customer169	812.84
Customer104	32.01	Customer137	49.07	Customer170	343.68
Customer105	15.61	Customer138	58.50	Customer171	1228.15
Customer106	46.56	Customer139	28.47	Customer172	48.37
Customer107	26.51	Customer140	14.14	Customer173	225.25
Customer108	35.09	Customer141	126.32	Customer174	3303.03
Customer109	33.23	Customer142	20.18	Customer175	199.82
Customer110	62.43	Customer143	19.01	Customer176	174.77
Customer111	28.47	Customer144	188.61	Customer177	73.31
Customer112	264.21	Customer145	133.23	Customer178	8341.94
Customer113	358.40	Customer146	231.69	Customer179	1144.64
Customer114	821.63	Customer147	92.14	Customer180	799.92
Customer115	87.71	Customer148	58.36	Customer181	3530.57
Customer116	209.01	Customer149	28.64	Customer182	2108.99
Customer117	109.07	Customer150	16.22		
Customer118	14.24	Customer151	28.50	Total Warehouse Cost (€)	157681.12
Customer119	14.24	Customer152	36.91		
Customer120	84.68	Customer153	563.97		
Customer121	230.86	Customer154	168.53		
Customer122	139.96	Customer155	53.86		
Customer123	85.91	Customer156	239.16		
Customer124	15.23	Customer157	78.89		
Customer125	15.50	Customer158	14.41		
Customer126	14.38	Customer159	133.39		
Customer127	14.24	Customer160	164.33		
Customer128	29.61	Customer161	282.60		
Customer129	31.69	Customer162	17.63		
Customer130	14.24	Customer163	30.06		
Customer131	14.84	Customer164	337.38		
Customer132	37.30	Customer165	426.02		

Table 6.62 Stock cost of all customers for activity based costing study period

Customer Code	Stock Cost (€)	Customer Code	Stock Cost (€)	Customer Code	Stock Cost (€)
Customer001	1081.15	Customer034	138.77	Customer067	13.41
Customer002	508.28	Customer035	362.09	Customer068	13.72
Customer003	151.97	Customer036	26.12	Customer069	9.33
Customer004	2097.21	Customer037	69.80	Customer070	17.39
Customer005	545.44	Customer038	8.04	Customer071	7.92
Customer006	103.07	Customer039	274.96	Customer072	10.94
Customer007	294.17	Customer040	47.46	Customer073	2.58
Customer008	40.25	Customer041	73.31	Customer074	13.78
Customer009	384.60	Customer042	29.24	Customer075	3.12
Customer010	330.81	Customer043	6.12	Customer076	13.66
Customer011	64.56	Customer044	71.45	Customer077	10.32
Customer012	1506.56	Customer045	108.80	Customer078	21.60
Customer013	385.21	Customer046	15.31	Customer079	2.19
Customer014	19.60	Customer047	85.09	Customer080	6.16
Customer015	152.91	Customer048	306.54	Customer081	2.70
Customer016	125.40	Customer049	28.08	Customer082	15.49
Customer017	493.74	Customer050	33.20	Customer083	2.34
Customer018	15.47	Customer051	0.83	Customer084	0.38
Customer019	65.37	Customer052	2.87	Customer085	0.62
Customer020	211.19	Customer053	2.08	Customer086	0.04
Customer021	161.32	Customer054	39.41	Customer087	3.20
Customer022	24.28	Customer055	7.49	Customer088	0.00
Customer023	272.03	Customer056	4.20	Customer089	0.08
Customer024	19.67	Customer057	208.10	Customer090	16.69
Customer025	394.02	Customer058	5.82	Customer091	5.16
Customer026	13.48	Customer059	0.05	Customer092	2.82
Customer027	15.46	Customer060	29.30	Customer093	6.16
Customer028	0.32	Customer061	0.01	Customer094	3.59
Customer029	39.22	Customer062	39.97	Customer095	0.45
Customer030	409.15	Customer063	18.28	Customer096	0.00
Customer031	79.38	Customer064	7.55	Customer097	3.32
Customer032	3.25	Customer065	93.19	Customer098	6.77
Customer033	23.18	Customer066	11.03	Customer099	0.06

Table 6.62 Stock costs of all customers for activity based costing study period (Continue)

Customer Code	Stock Cost (€)	Customer Code	Stock Cost (€)	Customer Code	Stock Cost (€)
Customer100	1.23	Customer133	1.67	Customer166	175.36
Customer101	47.49	Customer134	29.53	Customer167	0.95
Customer102	0.11	Customer135	15.20	Customer168	1.18
Customer103	0.88	Customer136	7.11	Customer169	0.00
Customer104	0.09	Customer137	0.21	Customer170	94.59
Customer105	0.00	Customer138	0.09	Customer171	131.55
Customer106	2.30	Customer139	0.24	Customer172	0.20
Customer107	0.40	Customer140	0.04	Customer173	96.68
Customer108	1.65	Customer141	0.56	Customer174	332.16
Customer109	0.22	Customer142	0.14	Customer175	9.06
Customer110	0.49	Customer143	1.23	Customer176	15.11
Customer111	1.32	Customer144	112.09	Customer177	0.54
Customer112	8.67	Customer145	4.07	Customer178	262.00
Customer113	3.39	Customer146	9.13	Customer179	320.05
Customer114	193.05	Customer147	1.74	Customer180	48.11
Customer115	19.68	Customer148	1.62	Customer181	249.47
Customer116	28.06	Customer149	2.08	Customer182	94.54
Customer117	2.45	Customer150	0.00		
Customer118	0.63	Customer151	1.29		
Customer119	0.14	Customer152	325.89	Total Stock	
Customer120	4.79	Customer153	568.54	Cost (€)	15722.84
Customer121	5.29	Customer154	0.51		
Customer122	3.54	Customer155	0.64		
Customer123	1.21	Customer156	0.73		
Customer124	0.00	Customer157	7.02		
Customer125	0.00	Customer158	0.20		
Customer126	7.23	Customer159	1.17		
Customer127	0.04	Customer160	8.66		
Customer128	0.22	Customer161	4.15		
Customer129	0.00	Customer162	0.39		
Customer130	0.27	Customer163	6.67		
Customer131	0.66	Customer164	25.45		
Customer132	0.09	Customer165	15.37		

Table 6.63 Transportation costs of all customers for activity based costing study period

Customer Code	TRNC (€)	Customer Code	TRNC (€)	Customer Code	TRNC (€)
Customer001	25468.12	Customer034	2235.80	Customer067	102.20
Customer002	24177.56	Customer035	1290.38	Customer068	76.81
Customer003	13310.33	Customer036	1320.40	Customer069	488.47
Customer004	15970.01	Customer037	258.26	Customer070	61.17
Customer005	10399.56	Customer038	822.07	Customer071	52.28
Customer006	1517.28	Customer039	2512.57	Customer072	0.00
Customer007	14174.06	Customer040	284.71	Customer073	634.18
Customer008	6212.26	Customer041	519.26	Customer074	568.30
Customer009	12141.72	Customer042	238.79	Customer075	108.49
Customer010	19157.47	Customer043	508.08	Customer076	0.00
Customer011	5679.89	Customer044	788.30	Customer077	121.78
Customer012	9295.30	Customer045	1241.44	Customer078	0.00
Customer013	5450.99	Customer046	510.50	Customer079	45.23
Customer014	639.61	Customer047	658.61	Customer080	21.74
Customer015	3709.79	Customer048	782.46	Customer081	2587.76
Customer016	1145.02	Customer049	1363.07	Customer082	43.30
Customer017	6570.83	Customer050	1223.67	Customer083	41.68
Customer018	716.82	Customer051	2060.00	Customer084	0.00
Customer019	2904.14	Customer052	152.12	Customer085	20.09
Customer020	3268.41	Customer053	376.21	Customer086	71.03
Customer021	672.60	Customer054	2159.22	Customer087	18.84
Customer022	716.60	Customer055	545.68	Customer088	55.61
Customer023	7874.83	Customer056	427.29	Customer089	73.20
Customer024	2126.06	Customer057	1494.85	Customer090	36.24
Customer025	2719.22	Customer058	1087.16	Customer091	53.62
Customer026	1092.42	Customer059	84.56	Customer092	114.20
Customer027	538.15	Customer060	151.24	Customer093	42.40
Customer028	2034.20	Customer061	160.18	Customer094	27.31
Customer029	2909.64	Customer062	0.00	Customer095	0.00
Customer030	4588.11	Customer063	91.23	Customer096	48.30
Customer031	1064.62	Customer064	133.51	Customer097	28.99
Customer032	639.75	Customer065	456.61	Customer098	57.98
Customer033	2321.10	Customer066	201.93	Customer099	111.95

Table 6.63 Transportation costs of all customers for activity based costing study period (Continue)

Customer Code	TRNC (€)	Customer Code	TRNC (€)	Customer Code	TRNC (€)
Customer100	9.89	Customer133	55.80	Customer166	422.61
Customer101	170.67	Customer134	131.91	Customer167	48.32
Customer102	0.00	Customer135	0.00	Customer168	45.66
Customer103	7.07	Customer136	18.66	Customer169	2745.85
Customer104	19.57	Customer137	34.71	Customer170	693.38
Customer105	7.76	Customer138	0.00	Customer171	5892.71
Customer106	0.00	Customer139	1.44	Customer172	41.55
Customer107	0.00	Customer140	0.00	Customer173	792.21
Customer108	7.07	Customer141	3.26	Customer174	9939.74
Customer109	0.00	Customer142	0.00	Customer175	0.00
Customer110	3.61	Customer143	25.15	Customer176	0.00
Customer111	1.94	Customer144	171.83	Customer177	16.91
Customer112	0.00	Customer145	32.65	Customer178	38501.01
Customer113	15.18	Customer146	91.11	Customer179	2093.17
Customer114	818.58	Customer147	14.01	Customer180	2167.76
Customer115	16.06	Customer148	10.14	Customer181	13120.81
Customer116	59.79	Customer149	0.00	Customer182	16428.25
Customer117	25.01	Customer150	14.50		
Customer118	0.00	Customer151	0.00		
Customer119	0.72	Customer152	0.72	Total	
Customer120	19.21	Customer153	869.65	TRNC (€)	340893.50
Customer121	33.34	Customer154	122.55		
Customer122	13.58	Customer155	2.71		
Customer123	9.18	Customer156	16.31		
Customer124	0.00	Customer157	30.43		
Customer125	7.21	Customer158	1.63		
Customer126	1.45	Customer159	33.44		
Customer127	0.00	Customer160	381.83		
Customer128	0.00	Customer161	25.65		
Customer129	0.00	Customer162	0.00		
Customer130	0.00	Customer163	11.18		
Customer131	0.00	Customer164	0.00		
Customer132	4.53	Customer165	1531.09		

Table 6.64 Manufacturing costs of all customers for activity based costing study period

Customer Code	MNFC (€)	Customer Code	MNFC (€)	Customer Code	MNFC (€)
Customer001	1587753.53	Customer034	89589.34	Customer067	4821.84
Customer002	892361.28	Customer035	70753.17	Customer068	5206.00
Customer003	429282.57	Customer036	52896.55	Customer069	29623.93
Customer004	676663.15	Customer037	16232.78	Customer070	3414.63
Customer005	552170.86	Customer038	37141.74	Customer071	3172.26
Customer006	76517.12	Customer039	96950.66	Customer072	22036.83
Customer007	555183.65	Customer040	24196.38	Customer073	15269.78
Customer008	337324.54	Customer041	25207.08	Customer074	37823.66
Customer009	445259.46	Customer042	9188.50	Customer075	10916.40
Customer010	907525.59	Customer043	25367.87	Customer076	30640.25
Customer011	288691.50	Customer044	38326.28	Customer077	5266.68
Customer012	513627.56	Customer045	65965.97	Customer078	3494.04
Customer013	300045.73	Customer046	26094.89	Customer079	3148.29
Customer014	48472.00	Customer047	39655.19	Customer080	1432.14
Customer015	245096.00	Customer048	41888.96	Customer081	110993.48
Customer016	86125.27	Customer049	52545.95	Customer082	2306.41
Customer017	200234.09	Customer050	45604.94	Customer083	2808.58
Customer018	57708.46	Customer051	118647.32	Customer084	1452.56
Customer019	153911.27	Customer052	10073.32	Customer085	1681.96
Customer020	167396.26	Customer053	26544.54	Customer086	3770.18
Customer021	46018.56	Customer054	92570.25	Customer087	1131.05
Customer022	47645.06	Customer055	30559.43	Customer088	1995.33
Customer023	311039.25	Customer056	26803.38	Customer089	3024.93
Customer024	79383.02	Customer057	48915.81	Customer090	1677.76
Customer025	147799.54	Customer058	27725.71	Customer091	1950.15
Customer026	54834.07	Customer059	3005.60	Customer092	6402.75
Customer027	21570.98	Customer060	5194.23	Customer093	2575.79
Customer028	64656.41	Customer061	8786.37	Customer094	1483.68
Customer029	133582.06	Customer062	4385.20	Customer095	2085.99
Customer030	154667.91	Customer063	5418.74	Customer096	1741.77
Customer031	38427.95	Customer064	7686.50	Customer097	818.61
Customer032	19586.09	Customer065	17329.21	Customer098	2895.58
Customer033	68771.46	Customer066	11416.46	Customer099	6796.78

Table 6.64 Manufacturing costs of all customers for activity based costing study period (Continue)

Customer Code	MNFC (€)	Customer Code	MNFC (€)	Customer Code	MNFC (€)
Customer100	631.88	Customer133	2384.71	Customer166	19176.90
Customer101	6155.78	Customer134	5336.87	Customer167	1615.96
Customer102	499.43	Customer135	61415.81	Customer168	2098.33
Customer103	465.05	Customer136	881.95	Customer169	140628.08
Customer104	903.89	Customer137	2467.04	Customer170	26590.86
Customer105	586.44	Customer138	492.85	Customer171	222552.75
Customer106	778.87	Customer139	68.77	Customer172	1882.36
Customer107	557.97	Customer140	12.46	Customer173	40380.21
Customer108	415.62	Customer141	197.20	Customer174	442419.60
Customer109	459.66	Customer142	132.67	Customer175	27769.28
Customer110	170.53	Customer143	880.86	Customer176	14214.62
Customer111	66.56	Customer144	9050.80	Customer177	550.71
Customer112	4624.89	Customer145	2014.55	Customer178	1400276.84
Customer113	954.38	Customer146	5122.92	Customer179	73355.49
Customer114	42859.90	Customer147	483.23	Customer180	88087.89
Customer115	775.36	Customer148	591.23	Customer181	461407.18
Customer116	5494.22	Customer149	218.61	Customer182	575120.01
Customer117	1776.50	Customer150	658.58		
Customer118	38.51	Customer151	1379.08		
Customer119	27.09	Customer152	266.55	Total	
Customer120	1220.18	Customer153	39119.76	MNFC (€)	15088382.62
Customer121	1534.59	Customer154	5300.58		
Customer122	869.57	Customer155	178.03		
Customer123	350.98	Customer156	1000.77		
Customer124	383.42	Customer157	1923.89		
Customer125	716.50	Customer158	103.48		
Customer126	60.83	Customer159	3281.01		
Customer127	36.97	Customer160	14480.41		
Customer128	439.67	Customer161	1164.79		
Customer129	1845.80	Customer162	1054.65		
Customer130	36.15	Customer163	686.66		
Customer131	233.36	Customer164	14109.94		
Customer132	171.28	Customer165	51792.37		

Table 6.65 Finance cost of all customers for activity based costing study period

Customer Code	Finance Cost (€)	Customer Code	Finance Cost (€)	Customer Code	Finance Cost (€)
Customer001	51412.34	Customer034	6969.24	Customer067	507.90
Customer002	10931.45	Customer035	7319.64	Customer068	74.33
Customer003	6206.68	Customer036	4015.38	Customer069	279.17
Customer004	21690.07	Customer037	1938.51	Customer070	193.57
Customer005	30104.54	Customer038	3119.02	Customer071	370.86
Customer006	3925.74	Customer039	5100.97	Customer072	382.13
Customer007	12535.74	Customer040	1724.62	Customer073	345.89
Customer008	1151.19	Customer041	2158.95	Customer074	1257.76
Customer009	7068.45	Customer042	543.07	Customer075	863.52
Customer010	10393.56	Customer043	2091.99	Customer076	0.00
Customer011	5757.12	Customer044	391.15	Customer077	483.47
Customer012	35802.74	Customer045	1156.31	Customer078	376.01
Customer013	21922.04	Customer046	998.99	Customer079	174.95
Customer014	1044.75	Customer047	786.46	Customer080	28.65
Customer015	13215.46	Customer048	3230.12	Customer081	6937.28
Customer016	8019.36	Customer049	665.64	Customer082	264.61
Customer017	7467.48	Customer050	552.90	Customer083	321.67
Customer018	996.84	Customer051	11834.59	Customer084	0.00
Customer019	2988.42	Customer052	1068.31	Customer085	0.00
Customer020	15248.19	Customer053	2097.71	Customer086	163.79
Customer021	4453.82	Customer054	1515.18	Customer087	130.31
Customer022	300.58	Customer055	2327.78	Customer088	22.88
Customer023	10423.88	Customer056	381.90	Customer089	261.68
Customer024	461.13	Customer057	3624.05	Customer090	197.95
Customer025	3389.72	Customer058	123.80	Customer091	212.62
Customer026	234.97	Customer059	26.96	Customer092	288.07
Customer027	0.00	Customer060	91.35	Customer093	296.95
Customer028	232.20	Customer061	394.05	Customer094	164.08
Customer029	2545.96	Customer062	52.78	Customer095	10.24
Customer030	12014.30	Customer063	636.62	Customer096	19.87
Customer031	3737.84	Customer064	699.22	Customer097	59.72
Customer032	429.00	Customer065	1476.84	Customer098	210.12
Customer033	1513.14	Customer066	187.77	Customer099	270.35

Table 6.65 Finance costs of all customers for activity based costing study period (Continue)

Customer Code	Finance Cost (€)	Customer Code	Finance Cost (€)	Customer Code	Finance Cost (€)
Customer100	39.07	Customer133	181.71	Customer166	809.03
Customer101	375.06	Customer134	250.35	Customer167	82.86
Customer102	2.64	Customer135	0.00	Customer168	16.17
Customer103	0.00	Customer136	76.04	Customer169	8285.44
Customer104	20.82	Customer137	19.09	Customer170	1505.99
Customer105	49.39	Customer138	5.53	Customer171	13300.94
Customer106	86.16	Customer139	0.00	Customer172	103.73
Customer107	8.69	Customer140	0.00	Customer173	434.90
Customer108	38.82	Customer141	18.18	Customer174	26850.40
Customer109	42.69	Customer142	10.20	Customer175	293.73
Customer110	24.18	Customer143	12.46	Customer176	155.49
Customer111	0.00	Customer144	573.05	Customer177	46.45
Customer112	349.58	Customer145	222.69	Customer178	37015.08
Customer113	13.75	Customer146	422.38	Customer179	4314.65
Customer114	1462.69	Customer147	50.62	Customer180	4918.24
Customer115	25.54	Customer148	47.82	Customer181	11268.50
Customer116	433.18	Customer149	2.89	Customer182	7135.56
Customer117	193.37	Customer150	5.82		
Customer118	1.12	Customer151	0.00	Total Finance Cost (€)	519876.47
Customer119	0.00	Customer152	4.56		
Customer120	109.08	Customer153	3303.81		
Customer121	49.80	Customer154	105.93		
Customer122	119.66	Customer155	5.59		
Customer123	38.42	Customer156	19.46		
Customer124	0.00	Customer157	201.89		
Customer125	27.83	Customer158	10.57		
Customer126	1.57	Customer159	69.52		
Customer127	0.00	Customer160	0.00		
Customer128	25.99	Customer161	145.30		
Customer129	16.37	Customer162	67.08		
Customer130	0.00	Customer163	0.00		
Customer131	21.20	Customer164	1132.43		
Customer132	2.21	Customer165	704.49		

Table 6.66 Net value earned, total costs, and net profit of all customers for activity based costing study period

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer001	2069485.28	1897342.54	172142.74
Customer002	1231172.94	1073541.98	157630.96
Customer003	699037.57	557764.11	141273.46
Customer004	966628.54	843673.59	122954.95
Customer005	782613.59	685493.82	97119.77
Customer006	108859.40	93119.63	15739.77
Customer007	775886.31	684450.33	91435.98
Customer008	494308.66	404647.99	89660.67
Customer009	630673.70	551679.03	78994.67
Customer010	1151712.38	1074950.68	76761.70
Customer011	425298.57	350584.97	74713.60
Customer012	709140.59	651852.24	57288.35
Customer013	441210.69	384470.85	56739.84
Customer014	115769.13	64132.38	51636.75
Customer015	350865.91	303998.43	46867.48
Customer016	158838.46	115720.75	43117.71
Customer017	291193.05	254312.08	36880.97
Customer018	108706.91	73297.80	35409.11
Customer019	219355.60	185682.87	33672.73
Customer020	247106.51	217375.09	29731.42
Customer021	91108.67	64654.22	26454.45
Customer022	89784.68	65002.74	24781.94
Customer023	406477.20	382352.77	24124.43
Customer024	105602.40	92744.64	12857.76
Customer025	201419.61	178354.70	23064.91
Customer026	76869.75	69717.39	7152.36
Customer027	51678.00	29517.21	22160.79
Customer028	99704.00	78321.86	21382.14
Customer029	188078.50	166978.71	21099.79
Customer030	223759.00	203452.29	20306.71
Customer031	75229.08	54951.14	20277.94
Customer032	47537.60	27517.77	20019.83
Customer033	112995.50	95985.22	17010.28
Customer034	135882.11	119558.29	16323.82
Customer035	118619.32	102582.69	16036.63
Customer036	82139.76	69914.28	12225.48
Customer037	36103.51	25034.34	11069.17

Table 6.66 Net value earned, total costs, and net profit of all customers for activity based costing study period (Continue)

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer038	62774.45	51728.53	11045.92
Customer039	135429.07	126376.87	9052.20
Customer040	44834.26	35934.67	8899.59
Customer041	43451.75	34884.63	8567.12
Customer042	21177.02	12668.60	8508.42
Customer043	42104.18	33610.39	8493.79
Customer044	61010.49	52796.96	8213.53
Customer045	90180.00	82066.57	8113.43
Customer046	40212.20	32698.14	7514.06
Customer047	57728.01	50334.80	7393.21
Customer048	62978.89	55708.63	7270.26
Customer049	74969.00	68284.61	6684.39
Customer050	63308.60	56652.72	6655.88
Customer051	160517.44	153897.36	6620.08
Customer052	21501.10	14942.35	6558.75
Customer053	42219.28	36425.59	5793.69
Customer054	131767.62	125990.91	5776.71
Customer055	46849.65	41315.56	5534.09
Customer056	41646.31	36364.89	5281.42
Customer057	72938.92	67998.17	4940.75
Customer058	40500.00	36044.00	4456.00
Customer059	8820.00	4650.69	4169.31
Customer060	11398.50	7483.32	3915.18
Customer061	15366.00	11626.89	3739.11
Customer062	10073.25	6417.47	3655.78
Customer063	12609.39	9065.21	3544.18
Customer064	14072.84	10921.34	3151.50
Customer065	30210.70	27095.85	3114.85
Customer066	20806.67	17973.11	2833.56
Customer067	10059.91	7426.97	2632.94
Customer068	11593.24	8974.50	2618.74
Customer069	40807.15	38430.48	2376.67
Customer070	7548.04	5214.31	2333.73
Customer071	7464.07	5189.25	2274.82
Customer072	28850.00	26613.23	2236.77
Customer073	25830.00	23756.18	2073.82
Customer074	50628.35	48571.92	2056.43

Table 6.66 Net value earned, total costs, and net profit of all customers for activity based costing study period (Continue)

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer075	17103.70	15097.96	2005.74
Customer076	38830.00	36858.35	1971.65
Customer077	9576.00	7610.38	1965.62
Customer078	7567.80	6099.36	1468.44
Customer079	6822.29	5389.31	1432.98
Customer080	3972.00	2571.33	1400.67
Customer081	141910.91	140574.75	1336.16
Customer082	5325.55	4026.01	1299.54
Customer083	6474.00	5177.85	1296.15
Customer084	3190.00	1919.52	1270.48
Customer085	4490.10	3305.49	1184.61
Customer086	6593.00	5514.09	1078.91
Customer087	3459.75	2456.04	1003.71
Customer088	3568.10	2655.97	912.13
Customer089	5353.00	4468.53	884.47
Customer090	3920.80	3083.96	836.84
Customer091	4349.51	3526.87	822.64
Customer092	11595.68	10782.87	812.81
Customer093	5976.60	5248.70	727.90
Customer094	4178.54	3494.89	683.65
Customer095	3350.00	2708.98	641.02
Customer096	3100.00	2468.55	631.45
Customer097	1656.00	1091.05	564.95
Customer098	4228.95	3715.57	513.38
Customer099	10542.05	10042.13	499.92
Customer100	1523.39	1055.53	467.86
Customer101	9957.75	9492.28	465.47
Customer102	1395.00	1005.66	389.34
Customer103	1016.10	657.83	358.27
Customer104	1537.80	1192.81	344.99
Customer105	1926.00	1580.98	345.02
Customer106	1734.00	1399.16	334.84
Customer107	947.50	685.83	261.67
Customer108	988.50	752.84	235.66
Customer109	845.60	618.46	227.14
Customer110	478.95	307.80	171.15
Customer111	278.00	125.31	152.69

Table 6.66 Net value earned, total costs, and net profit of all customers for activity based costing study period (Continue)

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer112	7035.70	6884.14	151.56
Customer113	1715.59	1565.41	150.18
Customer114	57037.21	56891.06	146.15
Customer115	1874.80	1740.57	134.23
Customer116	8580.00	8482.55	97.45
Customer117	3830.00	3746.01	83.99
Customer118	140.00	68.10	71.90
Customer119	125.60	54.40	71.20
Customer120	2835.70	2769.71	65.99
Customer121	2824.40	2763.45	60.95
Customer122	2370.00	2326.97	43.03
Customer123	760.90	718.27	42.63
Customer124	720.00	679.96	40.04
Customer125	1653.69	1613.90	39.79
Customer126	196.40	157.38	39.02
Customer127	100.00	60.99	39.01
Customer128	690.00	668.45	21.55
Customer129	2294.90	2275.76	19.14
Customer130	75.80	58.05	17.75
Customer131	420.00	416.59	3.41
Customer132	249.00	250.45	-1.45
Customer133	3657.14	3683.26	-26.12
Customer134	9762.47	9816.40	-53.93
Customer135	71738.64	71796.41	-57.77
Customer136	1530.40	1598.62	-68.22
Customer137	3452.21	3540.54	-88.33
Customer138	690.00	783.04	-93.04
Customer139	178.60	274.70	-96.10
Customer140	39.85	136.09	-96.24
Customer141	360.00	486.21	-126.21
Customer142	202.00	341.37	-139.37
Customer143	1110.40	1259.48	-149.08
Customer144	11533.39	11860.40	-327.01
Customer145	4482.00	4849.61	-367.61
Customer146	8235.27	8687.77	-452.50
Customer147	1018.80	1480.27	-461.47
Customer148	947.20	1435.17	-487.97

Table 6.66 Net value earned, total costs, and net profit of all customers for activity based costing study period (Continue)

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer149	315.00	916.38	-601.38
Customer150	645.00	1286.38	-641.38
Customer151	691.53	1477.26	-785.73
Customer152	118.66	962.92	-844.26
Customer153	52853.95	53716.66	-862.71
Customer154	7910.11	8779.72	-869.61
Customer155	435.60	1550.20	-1114.60
Customer156	2191.65	3390.33	-1198.68
Customer157	3998.85	5218.33	-1219.48
Customer158	206.10	1470.16	-1264.06
Customer159	5103.05	6441.29	-1338.24
Customer160	15932.20	17277.53	-1345.33
Customer161	2924.36	4335.43	-1411.07
Customer162	1350.00	3330.79	-1980.79
Customer163	1415.92	3406.35	-1990.43
Customer164	18116.52	20115.33	-1998.81
Customer165	62051.74	64575.34	-2523.60
Customer166	21479.50	24118.48	-2638.98
Customer167	2200.00	4845.83	-2645.83
Customer168	2583.00	5264.76	-2681.76
Customer169	169489.36	172483.87	-2994.51
Customer170	30310.13	33417.66	-3107.53
Customer171	272087.79	275383.36	-3295.57
Customer172	2121.89	5753.54	-3631.65
Customer173	49334.31	53073.24	-3738.93
Customer174	549259.60	553112.44	-3852.84
Customer175	32547.90	36839.35	-4291.45
Customer176	10779.14	15627.04	-4847.90
Customer177	920.00	6050.99	-5130.99
Customer178	1673039.98	1679918.43	-6878.45
Customer179	86838.08	95060.12	-8222.04
Customer180	100608.88	111948.96	-11340.08
Customer181	556958.06	573414.90	-16456.84
Customer182	645038.76	669728.24	-24689.48
Total Net Value (€)			20721176.43
Total Costs (€)			18800143.25
Total Net Profit (€)			1921033.18

6.4. Conclusion

When the data and the results are evaluated from Table 6.55 to Table 6.66 following comments can be done.

Total quantity sold for ABC study period is 7872419.66 kg. Total net value earned from all customers is 20721176.43 €. Total costs for ABC study period is 18800143.25 €. Total profit from all 182 customers is 1921033.18 €. Profit ratio of the period over net value earned is %9.3 for all customers.

131 customers from Customer001 to Customer131 are on the positive side of profitability. On the other hand, 51 customers from Customer132 to Customer182 are on the negative side of profitability. Profit from 131 customers is 2056560.60 €. Loss from 51 customers is 135527.42 €. These 51 customers make loss from %6.6 of 131 customers' profit.

The amount of sold items to profitable 131 customers is 5870743.50 kg. Net value earned from these profitable 131 customers is 16220132.44 €. When these numbers are compared with total amount of sold items and total net value earned, therefore it is seen that %74.6 of sold items and %78.3 of net value earned is from the profitable side. Total cost of the profitable 131 customers for ABC study period is 14163571.84 €. This is %75.3 of total costs of 182 customers.

The amount of sold items to 51 customers on the loss side is 2001676.16 kg. Net value earned from these 51 customers is 4501043.99 €. When these numbers are compared with total amount of sold items and total net value earned, therefore it is seen that %25.4 of sold items and %21.7 of net value earned is from the loss side. Total cost of 51 customers on the loss side for ABC study period is 4636571.41 €. This is %24.7 of total costs of 182 customers.

If we classify customers according to the amount of sold items as big consumers, medium consumers and small consumers, another perspective of evaluation exists.

Customers using less than 10 tons for the study period are classified as small consumers, customers using between 10 tons and 40 tons are classified as medium consumers, and customers using more than 40 tons are classified as big consumers.

According to this classification, there are 35 big consumers. This means %19.2 of all customers is big consumers. Total quantity sold for these 35 big consumers is 6042400.16 kg, with a ratio of %76.8 over all sold amounts. Total net value earned from these 35 big consumers is 17478713.66 €, with a ratio of %84.4 over all net values earned. Total costs for these 35 big consumers is 16036271.85 €, with a ratio of %85.3 over all total costs. Profit of these 35 big consumers is 1442441.81 €, with a ratio of %75.1 over all profit.

According to this classification, there are 41 medium consumers. This means %22.5 of all customers is medium consumers. Total quantity sold for these 41 medium consumers is 828642.80 kg, with a ratio of %10.5 over all sold amounts. Total net value earned from these 41 medium consumers is 2612684.17 €, with a ratio of %12.6 over all net values earned. Total costs for these 41 medium consumers is 2214466.64 €, with a ratio of %11.8 over all total costs. Profit of these 41 medium consumers is 398258.53 €, with a ratio of %20.7 over all profit.

According to this classification, there are 106 small consumers. This means %58.3 of all customers is small consumers. Total quantity sold for these 106 small consumers is 1001376.70 kg, with a ratio of %12.7 over all sold amounts. Total net value earned from these 106 small consumers is 629778.60 €, with a ratio of %3.0 over all net values earned. Total costs for these 106 small consumers is 549404.76 €, with a ratio of %2.9 over all total costs. Profit of these 106 small consumers is 80332.84 €, with a ratio of %4.2 over all profit.

If we classify customers according to the net value earned as high value customers and low value customers, another perspective of evaluation exists. If the net value earned for the study period from one customer is less than 100000 €, it is

called low value customer. If the net value earned for the study period from one customer is more than 100000 €, it is called high value customer.

According to this classification, there are 39 high value customers. This means %21.4 of all customers is high value customers. Total quantity sold for these 39 high value customers is 6972174.06 kg, with a ratio of %88.6 over all sold amounts. Total net value earned from these 39 high value customers is 18006804.90 €, with a ratio of %86.9 over all net values earned. Total costs for these 39 high value customers is 16392930.57 €, with a ratio of %87.2 over all total costs. Profit of these 39 high value customers is 1613874.33 €, with a ratio of %84 over all profit.

According to this classification, there are 143 low value customers. This means %78.6 of all customers is low value customers. Total quantity sold for these 143 low value customers is 900245.60 kg, with a ratio of %11.4 over all sold amounts. Total net value earned from these 143 low value customers is 2714371.53 €, with a ratio of %13.1 over all net values earned. Total costs for these 143 low value customers is 2407212.68 €, with a ratio of %12.8 over all total costs. Profit of these 143 low value customers is 307158.85 €, with a ratio of %16.0 over all profit.

From all these evaluations done above it is clearly seen that 51 customers are not profitable according to ABC method. From these not profitable customers, the best way is to focus on the big consumers and high value ones. Big consumers in not profitable customers are Customer178, Customer182, Customer174, Customer181, Customer171, Customer169, Customer180, and Customer179. High value costumers in not profitable customers are Customer178, Customer182, Customer181, Customer174, Customer171, Customer169, and Customer180. Big consumers and high value earned customers in not profitable side are the same customers. Therefore decision should be made over these customers.

When the management team comes face to face such a result, there are some actions to be made. The important thing is to decide which way to choose and apply the decided action.

First proposal is stop working with these not profitable customers. But not working with 51 customers is not easy to do, especially, if these 51 customers are forming %25.4 of total sold items and %21.7 of total net value earned. That's why stop working with these customers should be the last action to be taken.

Second proposal is increasing sales prices of products to increase net value and naturally to increase profit. This should be started from especially, the big consumer and high value not profitable customers. But this also should not be the first step.

Third proposal is decreasing costs to increase profit. Decreasing costs can be done by minimizing raw material costs by using common raw materials. This brings the purchasing power. Decreasing costs can also be done by optimizing shipments and optimizing production. Optimizing shipment can decrease TRNC and optimizing production can decrease MNFC. Minimizing stock level can decrease stock costs, but necessary stock level should be analyzed carefully. Decreasing costs can be done as the first step for increasing profit.

Fourth proposal is searching for profitable costumers instead of the not profitable customers. The aim should be replacing not profitable customers with new profitable customers. This can not be done quickly. It takes time to complete replacement and some of the new customers also can not be profitable. This action should be done, while second and third proposals are going on.

As understood from above, taking decision is not an easy issue. From the sales team perspective, increasing prices of products and replacing not profitable customers with profitable ones get importance. From the management perspective, in addition to these, decreasing costs get importance.

To make final decision and to determine precedence of these actions, it will be better to make these calculations again by using an alternative method to see if there is a similarity or difference between results. Therefore in the next chapter, alternative

calculations will be done. After alternative calculations, comparison between two method results will be done to make a better decision.

CHAPTER SEVEN

AN ALTERNATIVE STUDY WITH DIRECT COSTING METHOD

7.1 Introduction

For taking decisions, it is the best way to use also alternative methods. When similar results come out from different methods, it will be easy to take actions. Therefore, an alternative technique is going to be used to compare the results of ABC.

In this alternative method, costs are distributed directly and classified as fix costs, and variable costs. These costs are distributed on cost centers by specific ratios. The fix cost ratio, and variable cost ratio is decided according to the experience of the analyst. In addition, the variability conditions are set by the analyst. For example, in this practice some variable costs are distributed according to the amount of sold items, and some variable costs are distributed according to the net value of the customer. Fix cost ratio, and variable cost ratio can be different from one people to another. This difference naturally affects the result, but it should not be forgotten that these methods give an idea about the profitability of the customers.

7.2 Model Study of Direct Costing

7.2.1 Direct Costing Model Study Overview

The same customers in ABC model study are going to be used. These are C1001, C1002, C1003, C1004, C1005, and C1006. Total costs like, sales cost, laboratory cost, administration cost, royalty, warehouse cost, stock cost, transportation cost, manufacturing cost, and finance cost are going to be same. The distribution of these costs is going to be different.

Total costs for Direct Costing (DC), which comes from the ABC model study, are listed below in Table 7.1.

Table 7.1 Total Costs from the activity based costing model study

Cost Center	Total Costs (€)
Sales Cost	3500.00
Laboratory Cost	1117.80
Administration Cost	4000.00
Royalty Cost	80.00
Warehouse Cost	2100.00
Stock Cost	258.15
Transportation Cost	850.00
Manufacturing Cost	1632.20
Finance Cost	688.01

Net values and total amount of sold items of each customer are listed below in Table 7.2.

Table 7.2 Net values and total amount of sold items

Customer Code	Net Value (€)	Total Amount of Sold Items (kg)
C1001	1540	475
C1002	6742	1985
C1003	1690	385
C1004	3546	1050
C1005	1455	490
C1006	1762	515
	Total Net Value = 16735 €	Total Amount Sold = 4900 kg

7.2.2 Cost Distribution in Direct Costing Model Study

Costs are distributed as fix costs and variable costs. Fix costs are distributed to all customers equally. Variable costs are distributed according to the amount of sold items, and according to the net value of the customer.

It is decided that ten percent of sales cost is fix and ninety percent is variable. Variable part of sales cost is distributed according to the amount of items sold. Laboratory cost distribution is the same as sales cost distribution. Ten percent of laboratory cost forms fix costs and ninety percent forms variable costs. Variable part of laboratory cost is distributed according to the amount of items sold.

Distribution of ADMC is done as twenty percent fix cost and eighty percent variable cost. Variable part of ADMC is distributed according to the net value of each customer. Royalty is directly distributed as a hundred percent variable according to the net value of each customer.

Warehouse, stock, transportation, and manufacturing costs are distributed as ten percent fix cost and ninety percent variable cost. Variable costs of warehouse, stock, transportation, and manufacturing are distributed according to the amount of items sold.

Twenty percent of finance cost is set as fix cost, and eighty percent is set as variable cost. Variable cost of finance cost is distributed according to the net value of each customer. The cost distribution is summarized below in Table 7.3.

Table 7.3 Cost distribution of direct costing model study

Costs (€)	Cost Distribution		
	Fix Cost	Variable Cost	
	Ratio (%)	Ratio (%)	Variable According to
Sales Cost (€)	10%	90%	Amount of items sold (kg)
Laboratory Cost (€)	10%	90%	Amount of items sold (kg)
Administration Cost (€)	20%	80%	Net Value (€)
Royalty Cost (€)	0%	100%	Net Value (€)
Warehouse Cost (€)	10%	90%	Amount of items sold (kg)
Stock Cost (€)	10%	90%	Amount of items sold (kg)
Transportation Cost (€)	10%	90%	Amount of items sold (kg)
Manufacturing Cost (€)	10%	90%	Amount of items sold (kg)
Finance Cost (€)	20%	80%	Net Value (€)

7.2.3 Direct Costing Model Study Results

By the help of Table 7.1, Table 7.2 and Table 7.3, DC model study calculations were done below in Table 7.4.

From Table 7.4, C1005 seems to be not profitable. C1001 and C1005 are profitable with a very small amount. It seems that the most profitable customer is C1002 and the second profitable customer is C1004. It is seen that highest net value earned from customers is C1002. In this model study, the highest profitability is also from C1002.

In general meaning, the results of DC model study are in the same line with the ABC model study results in the previous chapter. Sometimes the results of two alternative methods can show big differences. This is the difficult situation for the analyst to make decision on.

After analyzing the results, it is time to make actions. Action methods will be explained in the real DC study.

Table 7.4 Direct costing model study calculation summary

		Customer Code					
		C1001	C1002	C1003	C1004	C1005	C1006
Net Value (€)		1540.00	6742.00	1690.00	3546.00	1455.00	1762.00
Items Sold (kg)		475	1985	385	1050	490	515
<i>Sales</i>	Fix %10	58.33	58.33	58.33	58.33	58.33	58,33
<i>Cost (€)</i>	Variable %90	305.36	1276.07	247.50	675.00	315.00	331,07
<i>Laboratory</i>	Fix %10	18.63	18.63	18.63	18.63	18.63	18.63
<i>Cost (€)</i>	Variable %90	97.52	407.54	79.04	215.58	100.60	105.73
<i>Administration</i>	Fix %20	133.33	133.33	133.33	133.33	133.33	133,33
<i>Cost (€)</i>	Variable %80	294.47	1289.18	323.16	678.05	278.22	336,92
<i>Royalty</i>	Fix %0	0.00	0.00	0.00	0.00	0.00	0,00
<i>Cost (€)</i>	Variable %100	7.36	32.23	8.08	16.95	6.96	8,42
<i>Warehouse</i>	Fix %10	35.00	35.00	35.00	35.00	35.00	35,00
<i>Cost (€)</i>	Variable %90	183.21	765.64	148.50	405.00	189.00	198,64
<i>Stock</i>	Fix %10	4.30	4.30	4.30	4.30	4.30	4,30
<i>Cost (€)</i>	Variable %90	22.52	94.12	18.25	49.79	23.23	24,42
<i>Transportation</i>	Fix %10	14.17	14.17	14.17	14.17	14.17	14,17
<i>Cost (€)</i>	Variable %90	74.16	309.90	60.11	163.93	76.50	80,40
<i>Manufacturing</i>	Fix %10	27.20	27.20	27.20	27.20	27.20	27,20
<i>Cost (€)</i>	Variable %90	142.40	595.09	115.42	314.78	146.90	154,39
<i>Finance</i>	Fix %20	22.93	22.93	22.93	22.93	22.93	22,93
<i>Cost (€)</i>	Variable %80	50.65	221.74	55.58	116.63	47.85	57,95
Net Profit (€)		48.44	1436.58	320.45	596.40	-43.17	150.14

7.3 The Direct Costing Study of the Company for Whole Year Activity

The calculation mentality details of DC were given in the model study above. Some information about the real DC study is given below.

Number of customers, quantity sold for these customers, and net value earned from these customers for the DC study is the same with ABC study. Total costs were taken from ABC study and these costs were summarized in previous chapter in Table 6.54. Cost distribution mentality for DC study was mentioned in Table 7.3. The

calculation mentality was given in the model study. With the same method, calculations were done for 182 customers. The results are shown below from Table 7.5 to Table 7.14.

In Table 7.5, sales cost for each customer in DC study period is shown. Total sales cost for all customers is 850705.48 €. Ten percent of sales cost is set as fix sales cost and total fix sales cost equals to 85070.55 €. Fix sales cost per customer is calculated as dividing total fix sales cost by the number of customers and it is equal to 467.42 €. Ninety percent of sales cost is set as variable sales cost and total variable sales cost equals to 765634.93 €. Distribution of variable sales cost is done according to the amount of items sold to each customer. Lowest variable sales cost is 0.58 € for Customer140. Highest variable sales cost is 82019.63 € for Customer001.

In Table 7.6, laboratory cost for each customer in DC study period is shown. Total laboratory cost for all customers is 124843.75 €. Ten percent of laboratory cost is set as fix laboratory cost and total fix laboratory cost equals to 12484.38 €. Fix laboratory cost per customer is calculated as dividing total fix laboratory cost by the number of customers and it is equal to 68.60 €. Ninety percent of laboratory cost is set as variable laboratory cost and total variable laboratory cost equals to 112359.38 €. Distribution of variable laboratory cost is done according to the amount of items sold to each customer. Lowest variable laboratory cost is 0.09 € for Customer140. Highest variable laboratory cost is 12036.64 € for Customer001.

In Table 7.7, ADMC for each customer in DC study period is shown. Total ADMC for all customers is 1006013.15 €. Twenty percent of ADMC is set as fix ADMC and total fix ADMC equals to 201202.63 €. Fix ADMC per customer is calculated as dividing total fix ADMC by the number of customers and it is equal to 1105.51 €. Eighty percent of ADMC is set as variable ADMC and total variable ADMC equals to 804810.52 €. Distribution of variable ADMC is done according to the net value earned from each customer. Lowest variable ADMC is 1.55 € for Customer140. Highest variable ADMC is 80378.81 € for Customer001.

In Table 7.8, royalty cost for each customer in DC study period is shown. Total royalty cost for all customers is 696024.32 €. All royalty cost is set as variable and distributed according to the amount of items sold to each customer. Lowest royalty cost is 1.34 € for Customer140. Highest royalty cost is 69514.01 € for Customer001.

In Table 7.9, warehouse cost for each customer in DC study period is shown. Total warehouse cost for all customers is 157681.12 €. Ten percent of warehouse cost is set as fix warehouse cost and total fix warehouse cost equals to 15768.11 €. Fix warehouse cost per customer is calculated as dividing total fix warehouse cost by the number of customers and it is equal to 86.64 €. Ninety percent of warehouse cost is set as variable warehouse cost and total variable warehouse cost equals to 141913.01 €. Distribution of variable warehouse cost is done according to the amount of items sold to each customer. Lowest variable warehouse cost is 0.11 € for Customer140. Highest variable warehouse cost is 15202.61 € for Customer001.

In Table 7.10, stock cost for each customer in DC study period is shown. Total stock cost for all customers is 15722.84 €. Ten percent of stock cost is set as fix stock cost and total fix stock cost equals to 1572.28 €. Fix stock cost per customer is calculated as dividing total fix stock cost by the number of customers and it is equal to 8.64 €. Ninety percent of stock cost is set as variable stock cost and total variable stock cost equals to 14150.56 €. Distribution of variable stock cost is done according to the amount of items sold to each customer. Lowest variable stock cost is 0.01 € for Customer140. Highest variable stock cost is 1515.90 € for Customer001.

In Table 7.11, TRNC for each customer in DC study period is shown. Total TRNC for all customers is 340893.50 €. Ten percent of TRNC is set as fix TRNC and total fix TRNC equals to 34089.35 €. Fix TRNC per customer is calculated as dividing total fix TRNC by the number of customers and it is equal to 187.30 €. Ninety percent of TRNC is set as variable TRNC and total variable TRNC equals to 306804.15 €. Distribution of variable TRNC is done according to the amount of items sold to each customer. Lowest variable TRNC is 0.23 € for Customer140. Highest variable TRNC is 32866.79 € for Customer001.

In Table 7.12, MNFC for each customer in DC study period is shown. Total MNFC for all customers is 15088382.62 €. Ten percent of MNFC is set as fix MNFC and total fix MNFC equals to 1508838.26 €. Fix MNFC per customer is calculated as dividing total fix MNFC by the number of customers and it is equal to 8290.32 €. Ninety percent of MNFC is set as variable MNFC and total variable MNFC equals to 13579544.36 €. Distribution of variable MNFC is done according to the amount of items sold to each customer. Lowest variable MNFC is 10.35 € for Customer140. Highest variable MNFC is 1454726.19 € for Customer001.

In Table 7.13, finance cost for each customer in DC study period is shown. Total finance cost for all customers is 519876.47 €. Twenty percent of finance cost is set as fix finance cost and total fix finance cost equals to 103975.29 €. Fix finance cost per customer is calculated as dividing total fix finance cost by the number of customers and it is equal to 571.29 €. Eighty percent of finance cost is set as variable finance cost and total variable finance cost equals to 415901.18 €. Distribution of variable finance cost is done according to the net value earned from each customer. Lowest variable finance cost is 0.80 € for Customer140. Highest variable finance cost is 41537.28 € for Customer001.

In Table 7.14, net value earned from each customer, total costs for each customer and net profit for each customer for DC study period is shown. Total net value earned from these customers for the DC period is 20721176.43 €.

Lowest net value earned is 39.85 € from Customer140. Highest net value earned is 2069485.28 € from Customer001. Total costs for the DC period is 18800143.25 €. Lowest total cost is 10800.78 € for Customer140. Highest total cost is 1800583.58 € for Customer001. Total net profit for DC study period for all customers is the subtraction of total costs from net value earned and equals to 1921033.18 €. Lowest profitability is -17341.50 € for Customer081. Customer081 seems to be loss in financial perspective. Highest profitability is 268901.70 € for Customer001. Customer001 seems to be the most profitable customer in financial perspective.

Table 7.5 Sales cost distribution of all customers for direct costing study

Customer Code	Sales Cost (€)		Customer Code	Sales Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer001	467.42	82019.63	Customer034	467.42	4500.20
Customer002	467.42	48664.62	Customer035	467.42	2597.28
Customer003	467.42	21432.84	Customer036	467.42	2657.70
Customer004	467.42	32144.49	Customer037	467.42	693.09
Customer005	467.42	27909.67	Customer038	467.42	1654.65
Customer006	467.42	4071.98	Customer039	467.42	5779.79
Customer007	467.42	28529.58	Customer040	467.42	764.04
Customer008	467.42	16672.08	Customer041	467.42	1393.57
Customer009	467.42	24438.87	Customer042	467.42	480.64
Customer010	467.42	44068.74	Customer043	467.42	1363.52
Customer011	467.42	15243.32	Customer044	467.42	2115.60
Customer012	467.42	24946.07	Customer045	467.42	3331.68
Customer013	467.42	10971.77	Customer046	467.42	1370.04
Customer014	467.42	1287.42	Customer047	467.42	1767.57
Customer015	467.42	11947.33	Customer048	467.42	2099.89
Customer016	467.42	3072.98	Customer049	467.42	2743.57
Customer017	467.42	13225.78	Customer050	467.42	1970.39
Customer018	467.42	1923.76	Customer051	467.42	5528.48
Customer019	467.42	7793.95	Customer052	467.42	408.23
Customer020	467.42	8771.56	Customer053	467.42	1009.66
Customer021	467.42	1805.04	Customer054	467.42	4966.93
Customer022	467.42	1923.18	Customer055	467.42	1464.42
Customer023	467.42	15850.48	Customer056	467.42	1146.74
Customer024	467.42	4279.33	Customer057	467.42	2407.07
Customer025	467.42	7297.65	Customer058	467.42	1750.60
Customer026	467.42	2931.76	Customer059	467.42	136.16
Customer027	467.42	866.55	Customer060	467.42	304.41
Customer028	467.42	3275.56	Customer061	467.42	429.87
Customer029	467.42	6693.16	Customer062	467.42	144.42
Customer030	467.42	9234.93	Customer063	467.42	244.84
Customer031	467.42	2448.99	Customer064	467.42	358.29
Customer032	467.42	1287.66	Customer065	467.42	1050.41
Customer033	467.42	3737.52	Customer066	467.42	406.43

Table 7.5 Sales cost distribution of all customers for direct costing study (Continue)

Customer Code	Sales Cost (€)		Customer Code	Sales Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer067	467.42	274.26	Customer100	467.42	26.55
Customer068	467.42	206.08	Customer101	467.42	392.62
Customer069	467.42	1310.92	Customer102	467.42	37.93
Customer070	467.42	164.22	Customer103	467.42	18.96
Customer071	467.42	140.34	Customer104	467.42	52.52
Customer072	467.42	1074.67	Customer105	467.42	20.81
Customer073	467.42	1021.18	Customer106	467.42	24.80
Customer074	467.42	1830.20	Customer107	467.42	18.87
Customer075	467.42	291.18	Customer108	467.42	18.96
Customer076	467.42	1847.85	Customer109	467.42	27.23
Customer077	467.42	326.78	Customer110	467.42	7.29
Customer078	467.42	131.29	Customer111	467.42	3.89
Customer079	467.42	121.37	Customer112	467.42	186.24
Customer080	467.42	58.35	Customer113	467.42	48.92
Customer081	467.42	6944.91	Customer114	467.42	1647.60
Customer082	467.42	116.22	Customer115	467.42	43.10
Customer083	467.42	111.84	Customer116	467.42	160.47
Customer084	467.42	48.63	Customer117	467.42	67.11
Customer085	467.42	53.93	Customer118	467.42	1.95
Customer086	467.42	190.62	Customer119	467.42	1.95
Customer087	467.42	50.57	Customer120	467.42	51.55
Customer088	467.42	111.94	Customer121	467.42	89.47
Customer089	467.42	196.46	Customer122	467.42	36.47
Customer090	467.42	97.26	Customer123	467.42	18.48
Customer091	467.42	143.94	Customer124	467.42	15.56
Customer092	467.42	306.45	Customer125	467.42	19.35
Customer093	467.42	113.79	Customer126	467.42	3.89
Customer094	467.42	73.31	Customer127	467.42	1.95
Customer095	467.42	97.26	Customer128	467.42	19.45
Customer096	467.42	97.26	Customer129	467.42	48.14
Customer097	467.42	58.35	Customer130	467.42	1.95
Customer098	467.42	116.71	Customer131	467.42	10.21
Customer099	467.42	300.42	Customer132	467.42	7.29

Table 7.5 Sales cost distribution of all customers for direct costing study (Continue)

Customer Code	Sales Cost (€)		Customer Code	Sales Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer133	467.42	149.77	Customer166	467.42	1134.19
Customer134	467.42	265.51	Customer167	467.42	97.26
Customer135	467.42	3306.68	Customer168	467.42	122.54
Customer136	467.42	50.09	Customer169	467.42	7369.14
Customer137	467.42	93.17	Customer170	467.42	1395.66
Customer138	467.42	29.18	Customer171	467.42	11860.87
Customer139	467.42	3.89	Customer172	467.42	83.64
Customer140	467.42	0.58	Customer173	467.42	2126.10
Customer141	467.42	8.75	Customer174	467.42	22864.83
Customer142	467.42	7.78	Customer175	467.42	1507.36
Customer143	467.42	67.50	Customer176	467.42	750.13
Customer144	467.42	461.16	Customer177	467.42	38.90
Customer145	467.42	87.53	Customer178	467.42	77494.90
Customer146	467.42	244.50	Customer179	467.42	4213.10
Customer147	467.42	28.20	Customer180	467.42	4363.28
Customer148	467.42	27.23	Customer181	467.42	21127.66
Customer149	467.42	6.13	Customer182	467.42	26453.46
Customer150	467.42	29.18			
Customer151	467.42	46.20	Total Fix Cost(€)		85070.55
Customer152	467.42	1.95	Total Variable Cost(€)		765634.93
Customer153	467.42	2333.89	Total Sales Cost(€)		850705.48
Customer154	467.42	328.91			
Customer155	467.42	7.29			
Customer156	467.42	43.76			
Customer157	467.42	81.69			
Customer158	467.42	4.38			
Customer159	467.42	89.77			
Customer160	467.42	614.85			
Customer161	467.42	51.64			
Customer162	467.42	48.63			
Customer163	467.42	25.72			
Customer164	467.42	652.49			
Customer165	467.42	2465.42			

Table 7.6 Laboratory cost distribution of all customers for direct costing study

Customer Code	Laboratory Cost (€)		Customer Code	Laboratory Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer001	68.60	12036.64	Customer034	68.60	660.42
Customer002	68.60	7141.69	Customer035	68.60	381.16
Customer003	68.60	3145.34	Customer036	68.60	390.03
Customer004	68.60	4717.31	Customer037	68.60	101.71
Customer005	68.60	4095.83	Customer038	68.60	242.83
Customer006	68.60	597.58	Customer039	68.60	848.20
Customer007	68.60	4186.81	Customer040	68.60	112.13
Customer008	68.60	2446.68	Customer041	68.60	204.51
Customer009	68.60	3586.48	Customer042	68.60	70.53
Customer010	68.60	6467.23	Customer043	68.60	200.10
Customer011	68.60	2237.01	Customer044	68.60	310.47
Customer012	68.60	3660.91	Customer045	68.60	488.93
Customer013	68.60	1610.14	Customer046	68.60	201.06
Customer014	68.60	188.93	Customer047	68.60	259.40
Customer015	68.60	1753.31	Customer048	68.60	308.17
Customer016	68.60	450.97	Customer049	68.60	402.63
Customer017	68.60	1940.93	Customer050	68.60	289.16
Customer018	68.60	282.32	Customer051	68.60	811.32
Customer019	68.60	1143.79	Customer052	68.60	59.91
Customer020	68.60	1287.25	Customer053	68.60	148.17
Customer021	68.60	264.90	Customer054	68.60	728.91
Customer022	68.60	282.23	Customer055	68.60	214.91
Customer023	68.60	2326.11	Customer056	68.60	168.29
Customer024	68.60	628.01	Customer057	68.60	353.25
Customer025	68.60	1070.95	Customer058	68.60	256.91
Customer026	68.60	430.25	Customer059	68.60	19.98
Customer027	68.60	127.17	Customer060	68.60	44.67
Customer028	68.60	480.70	Customer061	68.60	63.08
Customer029	68.60	982.24	Customer062	68.60	21.19
Customer030	68.60	1355.26	Customer063	68.60	35.93
Customer031	68.60	359.40	Customer064	68.60	52.58
Customer032	68.60	188.97	Customer065	68.60	154.15
Customer033	68.60	548.49	Customer066	68.60	59.64

Table 7.6 Laboratory cost distribution of all customers for direct costing study (Continue)

Customer Code	Laboratory Cost (€)		Customer Code	Laboratory Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer067	68.60	40.25	Customer100	68.60	3.90
Customer068	68.60	30.24	Customer101	68.60	57.62
Customer069	68.60	192.38	Customer102	68.60	5.57
Customer070	68.60	24.10	Customer103	68.60	2.78
Customer071	68.60	20.60	Customer104	68.60	7.71
Customer072	68.60	157.71	Customer105	68.60	3.05
Customer073	68.60	149.86	Customer106	68.60	3.64
Customer074	68.60	268.59	Customer107	68.60	2.77
Customer075	68.60	42.73	Customer108	68.60	2.78
Customer076	68.60	271.18	Customer109	68.60	4.00
Customer077	68.60	47.96	Customer110	68.60	1.07
Customer078	68.60	19.27	Customer111	68.60	0.57
Customer079	68.60	17.81	Customer112	68.60	27.33
Customer080	68.60	8.56	Customer113	68.60	7.18
Customer081	68.60	1019.19	Customer114	68.60	241.79
Customer082	68.60	17.06	Customer115	68.60	6.33
Customer083	68.60	16.41	Customer116	68.60	23.55
Customer084	68.60	7.14	Customer117	68.60	9.85
Customer085	68.60	7.91	Customer118	68.60	0.29
Customer086	68.60	27.97	Customer119	68.60	0.29
Customer087	68.60	7.42	Customer120	68.60	7.56
Customer088	68.60	16.43	Customer121	68.60	13.13
Customer089	68.60	28.83	Customer122	68.60	5.35
Customer090	68.60	14.27	Customer123	68.60	2.71
Customer091	68.60	21.12	Customer124	68.60	2.28
Customer092	68.60	44.97	Customer125	68.60	2.84
Customer093	68.60	16.70	Customer126	68.60	0.57
Customer094	68.60	10.76	Customer127	68.60	0.29
Customer095	68.60	14.27	Customer128	68.60	2.85
Customer096	68.60	14.27	Customer129	68.60	7.06
Customer097	68.60	8.56	Customer130	68.60	0.29
Customer098	68.60	17.13	Customer131	68.60	1.50
Customer099	68.60	44.09	Customer132	68.60	1.07

Table 7.6 Laboratory cost distribution of all customers for direct costing study (Continue)

Customer Code	Laboratory Cost (€)		Customer Code	Laboratory Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer133	68.60	21.98	Customer166	68.60	166.45
Customer134	68.60	38.96	Customer167	68.60	14.27
Customer135	68.60	485.27	Customer168	68.60	17.98
Customer136	68.60	7.35	Customer169	68.60	1081.44
Customer137	68.60	13.67	Customer170	68.60	204.82
Customer138	68.60	4.28	Customer171	68.60	1740.62
Customer139	68.60	0.57	Customer172	68.60	12.27
Customer140	68.60	0.09	Customer173	68.60	312.01
Customer141	68.60	1.28	Customer174	68.60	3355.49
Customer142	68.60	1.14	Customer175	68.60	221.21
Customer143	68.60	9.91	Customer176	68.60	110.08
Customer144	68.60	67.68	Customer177	68.60	5.71
Customer145	68.60	12.85	Customer178	68.60	11372.62
Customer146	68.60	35.88	Customer179	68.60	618.29
Customer147	68.60	4.14	Customer180	68.60	640.33
Customer148	68.60	4.00	Customer181	68.60	3100.55
Customer149	68.60	0.90	Customer182	68.60	3882.13
Customer150	68.60	4.28			
Customer151	68.60	6.78	Total Fix Cost(€)		12484.38
Customer152	68.60	0.29	Total Variable Cost(€)		112359.38
Customer153	68.60	342.51	Total		
Customer154	68.60	48.27	Laboratory Cost(€)		124843.75
Customer155	68.60	1.07			
Customer156	68.60	6.42			
Customer157	68.60	11.99			
Customer158	68.60	0.64			
Customer159	68.60	13.17			
Customer160	68.60	90.23			
Customer161	68.60	7.58			
Customer162	68.60	7.14			
Customer163	68.60	3.78			
Customer164	68.60	95.75			
Customer165	68.60	361.81			

Table 7.7 Administration cost distribution of all customers for direct costing study

Customer Code	Administration Cost (€)		Customer Code	Administration Cost (€)	
	Fix %20	Variable %80		Fix %20	Variable %80
Customer001	1105.51	80378.81	Customer034	1105.51	5277.66
Customer002	1105.51	47818.76	Customer035	1105.51	4607.17
Customer003	1105.51	27150.62	Customer036	1105.51	3190.31
Customer004	1105.51	37543.85	Customer037	1105.51	1402.26
Customer005	1105.51	30396.71	Customer038	1105.51	2438.16
Customer006	1105.51	4228.10	Customer039	1105.51	5260.07
Customer007	1105.51	30135.43	Customer040	1105.51	1741.36
Customer008	1105.51	19198.95	Customer041	1105.51	1687.67
Customer009	1105.51	24495.37	Customer042	1105.51	822.52
Customer010	1105.51	44732.51	Customer043	1105.51	1635.33
Customer011	1105.51	16518.60	Customer044	1105.51	2369.65
Customer012	1105.51	27543.02	Customer045	1105.51	3502.59
Customer013	1105.51	17136.62	Customer046	1105.51	1561.84
Customer014	1105.51	4496.47	Customer047	1105.51	2242.16
Customer015	1105.51	13627.63	Customer048	1105.51	2446.10
Customer016	1105.51	6169.29	Customer049	1105.51	2911.80
Customer017	1105.51	11309.94	Customer050	1105.51	2458.91
Customer018	1105.51	4222.18	Customer051	1105.51	6234.50
Customer019	1105.51	8519.77	Customer052	1105.51	835.10
Customer020	1105.51	9597.62	Customer053	1105.51	1639.80
Customer021	1105.51	3538.66	Customer054	1105.51	5117.85
Customer022	1105.51	3487.24	Customer055	1105.51	1819.64
Customer023	1105.51	15787.57	Customer056	1105.51	1617.54
Customer024	1105.51	4101.60	Customer057	1105.51	2832.95
Customer025	1105.51	7823.14	Customer058	1105.51	1573.02
Customer026	1105.51	2985.62	Customer059	1105.51	342.57
Customer027	1105.51	2007.17	Customer060	1105.51	442.72
Customer028	1105.51	3872.50	Customer061	1105.51	596.82
Customer029	1105.51	7304.97	Customer062	1105.51	391.25
Customer030	1105.51	8690.80	Customer063	1105.51	489.75
Customer031	1105.51	2921.90	Customer064	1105.51	546.59
Customer032	1105.51	1846.36	Customer065	1105.51	1173.38
Customer033	1105.51	4388.75	Customer066	1105.51	808.13

Table 7.7 Administration cost distribution of all customers for direct costing study (Continue)

Customer Code	Administration Cost (€)		Customer Code	Administration Cost (€)	
	Fix %20	Variable %80		Fix %20	Variable %80
Customer067	1105.51	390.73	Customer100	1105.51	59.17
Customer068	1105.51	450.28	Customer101	1105.51	386.76
Customer069	1105.51	1584.95	Customer102	1105.51	54.18
Customer070	1105.51	293.17	Customer103	1105.51	39.47
Customer071	1105.51	289.90	Customer104	1105.51	59.73
Customer072	1105.51	1120.53	Customer105	1105.51	74.81
Customer073	1105.51	1003.24	Customer106	1105.51	67.35
Customer074	1105.51	1966.41	Customer107	1105.51	36.80
Customer075	1105.51	664.31	Customer108	1105.51	38.39
Customer076	1105.51	1508.16	Customer109	1105.51	32.84
Customer077	1105.51	371.93	Customer110	1105.51	18.60
Customer078	1105.51	293.93	Customer111	1105.51	10.80
Customer079	1105.51	264.98	Customer112	1105.51	273.27
Customer080	1105.51	154.27	Customer113	1105.51	66.63
Customer081	1105.51	5511.82	Customer114	1105.51	2215.33
Customer082	1105.51	206.84	Customer115	1105.51	72.82
Customer083	1105.51	251.45	Customer116	1105.51	333.25
Customer084	1105.51	123.90	Customer117	1105.51	148.76
Customer085	1105.51	174.40	Customer118	1105.51	5.44
Customer086	1105.51	256.07	Customer119	1105.51	4.88
Customer087	1105.51	134.38	Customer120	1105.51	110.14
Customer088	1105.51	138.59	Customer121	1105.51	109.70
Customer089	1105.51	207.91	Customer122	1105.51	92.05
Customer090	1105.51	152.28	Customer123	1105.51	29.55
Customer091	1105.51	168.93	Customer124	1105.51	27.96
Customer092	1105.51	450.38	Customer125	1105.51	64.23
Customer093	1105.51	232.13	Customer126	1105.51	7.63
Customer094	1105.51	162.29	Customer127	1105.51	3.88
Customer095	1105.51	130.11	Customer128	1105.51	26.80
Customer096	1105.51	120.40	Customer129	1105.51	89.13
Customer097	1105.51	64.32	Customer130	1105.51	2.94
Customer098	1105.51	164.25	Customer131	1105.51	16.31
Customer099	1105.51	409.45	Customer132	1105.51	9.67

Table 7.7 Administration cost distribution of all customers for direct costing study (Continue)

Customer Code	Administration Cost (€)		Customer Code	Administration Cost (€)	
	Fix %20	Variable %80		Fix %20	Variable %80
Customer133	1105.51	142.04	Customer166	1105.51	834.26
Customer134	1105.51	379.17	Customer167	1105.51	85.45
Customer135	1105.51	2786.33	Customer168	1105.51	100.32
Customer136	1105.51	59.44	Customer169	1105.51	6582.97
Customer137	1105.51	134.08	Customer170	1105.51	1177.25
Customer138	1105.51	26.80	Customer171	1105.51	10567.89
Customer139	1105.51	6.94	Customer172	1105.51	82.41
Customer140	1105.51	1.55	Customer173	1105.51	1916.14
Customer141	1105.51	13.98	Customer174	1105.51	21333.24
Customer142	1105.51	7.85	Customer175	1105.51	1264.16
Customer143	1105.51	43.13	Customer176	1105.51	418.66
Customer144	1105.51	447.96	Customer177	1105.51	35.73
Customer145	1105.51	174.08	Customer178	1105.51	64980.88
Customer146	1105.51	319.86	Customer179	1105.51	3372.79
Customer147	1105.51	39.57	Customer180	1105.51	3907.65
Customer148	1105.51	36.79	Customer181	1105.51	21632.25
Customer149	1105.51	12.23	Customer182	1105.51	25053.31
Customer150	1105.51	25.05			
Customer151	1105.51	26.86	Total Fix Cost(€)		201202.63
Customer152	1105.51	4.61	Total Variable Cost(€)		804810.52
Customer153	1105.51	2052.85	Total Administration		1006013.15
Customer154	1105.51	307.23	Cost(€)		
Customer155	1105.51	16.92			
Customer156	1105.51	85.12			
Customer157	1105.51	155.32			
Customer158	1105.51	8.00			
Customer159	1105.51	198.20			
Customer160	1105.51	618.81			
Customer161	1105.51	113.58			
Customer162	1105.51	52.43			
Customer163	1105.51	54.99			
Customer164	1105.51	703.65			
Customer165	1105.51	2410.09			

Table 7.8 Royalty cost distribution of all customers for direct costing study

Customer Code	Royalty Cost (€)		Customer Code	Royalty Cost (€)	
	Fix %0	Variable %100		Fix %0	Variable %100
Customer001	0.00	69514.01	Customer034	0.00	4564.28
Customer002	0.00	41355.10	Customer035	0.00	3984.42
Customer003	0.00	23480.67	Customer036	0.00	2759.07
Customer004	0.00	32469.05	Customer037	0.00	1212.72
Customer005	0.00	26287.99	Customer038	0.00	2108.59
Customer006	0.00	3656.59	Customer039	0.00	4549.06
Customer007	0.00	26062.02	Customer040	0.00	1505.98
Customer008	0.00	16603.83	Customer041	0.00	1459.54
Customer009	0.00	21184.33	Customer042	0.00	711.34
Customer010	0.00	38686.02	Customer043	0.00	1414.28
Customer011	0.00	14285.78	Customer044	0.00	2049.34
Customer012	0.00	23820.03	Customer045	0.00	3029.15
Customer013	0.00	14820.27	Customer046	0.00	1350.73
Customer014	0.00	3888.69	Customer047	0.00	1939.08
Customer015	0.00	11785.59	Customer048	0.00	2115.46
Customer016	0.00	5335.38	Customer049	0.00	2518.21
Customer017	0.00	9781.17	Customer050	0.00	2126.54
Customer018	0.00	3651.47	Customer051	0.00	5391.78
Customer019	0.00	7368.15	Customer052	0.00	722.22
Customer020	0.00	8300.31	Customer053	0.00	1418.15
Customer021	0.00	3060.34	Customer054	0.00	4426.07
Customer022	0.00	3015.87	Customer055	0.00	1573.68
Customer023	0.00	13653.57	Customer056	0.00	1398.90
Customer024	0.00	3547.18	Customer057	0.00	2450.02
Customer025	0.00	6765.68	Customer058	0.00	1360.40
Customer026	0.00	2582.05	Customer059	0.00	296.26
Customer027	0.00	1735.86	Customer060	0.00	382.88
Customer028	0.00	3349.06	Customer061	0.00	516.14
Customer029	0.00	6317.56	Customer062	0.00	338.36
Customer030	0.00	7516.06	Customer063	0.00	423.55
Customer031	0.00	2526.94	Customer064	0.00	472.71
Customer032	0.00	1596.79	Customer065	0.00	1014.78
Customer033	0.00	3795.52	Customer066	0.00	698.90

Table 7.8 Royalty cost distribution of all customers for direct costing study (Continue)

Customer Code	Royalty Cost (€)		Customer Code	Royalty Cost (€)	
	Fix %0	Variable %100		Fix %0	Variable %100
Customer067	0.00	337.91	Customer100	0.00	51.17
Customer068	0.00	389.42	Customer101	0.00	334.48
Customer069	0.00	1370.71	Customer102	0.00	46.86
Customer070	0.00	253.54	Customer103	0.00	34.13
Customer071	0.00	250.72	Customer104	0.00	51.65
Customer072	0.00	969.07	Customer105	0.00	64.69
Customer073	0.00	867.63	Customer106	0.00	58.25
Customer074	0.00	1700.61	Customer107	0.00	31.83
Customer075	0.00	574.51	Customer108	0.00	33.20
Customer076	0.00	1304.30	Customer109	0.00	28.40
Customer077	0.00	321.66	Customer110	0.00	16.09
Customer078	0.00	254.20	Customer111	0.00	9.34
Customer079	0.00	229.16	Customer112	0.00	236.33
Customer080	0.00	133.42	Customer113	0.00	57.63
Customer081	0.00	4766.79	Customer114	0.00	1915.88
Customer082	0.00	178.89	Customer115	0.00	62.97
Customer083	0.00	217.46	Customer116	0.00	288.20
Customer084	0.00	107.15	Customer117	0.00	128.65
Customer085	0.00	150.82	Customer118	0.00	4.70
Customer086	0.00	221.46	Customer119	0.00	4.22
Customer087	0.00	116.21	Customer120	0.00	95.25
Customer088	0.00	119.85	Customer121	0.00	94.87
Customer089	0.00	179.81	Customer122	0.00	79.61
Customer090	0.00	131.70	Customer123	0.00	25.56
Customer091	0.00	146.10	Customer124	0.00	24.18
Customer092	0.00	389.50	Customer125	0.00	55.55
Customer093	0.00	200.75	Customer126	0.00	6.60
Customer094	0.00	140.36	Customer127	0.00	3.36
Customer095	0.00	112.53	Customer128	0.00	23.18
Customer096	0.00	104.13	Customer129	0.00	77.09
Customer097	0.00	55.63	Customer130	0.00	2.55
Customer098	0.00	142.05	Customer131	0.00	14.11
Customer099	0.00	354.11	Customer132	0.00	8.36

Table 7.8 Royalty cost distribution of all customers for direct costing study (Continue)

Customer Code	Royalty Cost (€)		Customer Code	Royalty Cost (€)	
	Fix %0	Variable %100		Fix %0	Variable %100
Customer133	0.00	122.84	Customer166	0.00	721.50
Customer134	0.00	327.92	Customer167	0.00	73.90
Customer135	0.00	2409.70	Customer168	0.00	86.76
Customer136	0.00	51.41	Customer169	0.00	5693.15
Customer137	0.00	115.96	Customer170	0.00	1018.12
Customer138	0.00	23.18	Customer171	0.00	9139.43
Customer139	0.00	6.00	Customer172	0.00	71.27
Customer140	0.00	1.34	Customer173	0.00	1657.14
Customer141	0.00	12.09	Customer174	0.00	18449.63
Customer142	0.00	6.79	Customer175	0.00	1093.28
Customer143	0.00	37.30	Customer176	0.00	362.07
Customer144	0.00	387.41	Customer177	0.00	30.90
Customer145	0.00	150.55	Customer178	0.00	56197.41
Customer146	0.00	276.62	Customer179	0.00	2916.89
Customer147	0.00	34.22	Customer180	0.00	3379.45
Customer148	0.00	31.82	Customer181	0.00	18708.22
Customer149	0.00	10.58	Customer182	0.00	21666.85
Customer150	0.00	21.67			
Customer151	0.00	23.23	Total Fix Cost(€)		0.00
Customer152	0.00	3.99	Total Variable Cost(€)		696024.32
Customer153	0.00	1775.36	Total Royalty Cost(€)		696024.32
Customer154	0.00	265.70			
Customer155	0.00	14.63			
Customer156	0.00	73.62			
Customer157	0.00	134.32			
Customer158	0.00	6.92			
Customer159	0.00	171.41			
Customer160	0.00	535.16			
Customer161	0.00	98.23			
Customer162	0.00	45.35			
Customer163	0.00	47.56			
Customer164	0.00	608.53			
Customer165	0.00	2084.32			

Table 7.9 Warehouse cost distribution of all customers for direct costing study

Customer Code	Warehouse Cost (€)		Customer Code	Warehouse Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer001	86.64	15202.61	Customer034	86.64	834.13
Customer002	86.64	9020.15	Customer035	86.64	481.41
Customer003	86.64	3972.65	Customer036	86.64	492.61
Customer004	86.64	5958.09	Customer037	86.64	128.47
Customer005	86.64	5173.15	Customer038	86.64	306.70
Customer006	86.64	754.76	Customer039	86.64	1071.30
Customer007	86.64	5288.05	Customer040	86.64	141.62
Customer008	86.64	3090.23	Customer041	86.64	258.30
Customer009	86.64	4529.83	Customer042	86.64	89.09
Customer010	86.64	8168.29	Customer043	86.64	252.73
Customer011	86.64	2825.40	Customer044	86.64	392.13
Customer012	86.64	4623.84	Customer045	86.64	617.54
Customer013	86.64	2033.65	Customer046	86.64	253.94
Customer014	86.64	238.63	Customer047	86.64	327.62
Customer015	86.64	2214.48	Customer048	86.64	389.22
Customer016	86.64	569.59	Customer049	86.64	508.53
Customer017	86.64	2451.44	Customer050	86.64	365.22
Customer018	86.64	356.58	Customer051	86.64	1024.72
Customer019	86.64	1444.63	Customer052	86.64	75.67
Customer020	86.64	1625.84	Customer053	86.64	187.14
Customer021	86.64	334.57	Customer054	86.64	920.64
Customer022	86.64	356.47	Customer055	86.64	271.44
Customer023	86.64	2937.94	Customer056	86.64	212.55
Customer024	86.64	793.19	Customer057	86.64	446.16
Customer025	86.64	1352.64	Customer058	86.64	324.48
Customer026	86.64	543.41	Customer059	86.64	25.24
Customer027	86.64	160.62	Customer060	86.64	56.42
Customer028	86.64	607.14	Customer061	86.64	79.68
Customer029	86.64	1240.60	Customer062	86.64	26.77
Customer030	86.64	1711.73	Customer063	86.64	45.38
Customer031	86.64	453.93	Customer064	86.64	66.41
Customer032	86.64	238.67	Customer065	86.64	194.70
Customer033	86.64	692.76	Customer066	86.64	75.33

Table 7.9 Warehouse cost distribution of all customers for direct costing study (Continue)

Customer Code	Warehouse Cost (€)		Customer Code	Warehouse Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer067	86.64	50.84	Customer100	86.64	4.92
Customer068	86.64	38.20	Customer101	86.64	72.77
Customer069	86.64	242.98	Customer102	86.64	7.03
Customer070	86.64	30.44	Customer103	86.64	3.52
Customer071	86.64	26.01	Customer104	86.64	9.73
Customer072	86.64	199.19	Customer105	86.64	3.86
Customer073	86.64	189.28	Customer106	86.64	4.60
Customer074	86.64	339.23	Customer107	86.64	3.50
Customer075	86.64	53.97	Customer108	86.64	3.52
Customer076	86.64	342.51	Customer109	86.64	5.05
Customer077	86.64	60.57	Customer110	86.64	1.35
Customer078	86.64	24.34	Customer111	86.64	0.72
Customer079	86.64	22.50	Customer112	86.64	34.52
Customer080	86.64	10.82	Customer113	86.64	9.07
Customer081	86.64	1287.26	Customer114	86.64	305.39
Customer082	86.64	21.54	Customer115	86.64	7.99
Customer083	86.64	20.73	Customer116	86.64	29.74
Customer084	86.64	9.01	Customer117	86.64	12.44
Customer085	86.64	10.00	Customer118	86.64	0.36
Customer086	86.64	35.33	Customer119	86.64	0.36
Customer087	86.64	9.37	Customer120	86.64	9.55
Customer088	86.64	20.75	Customer121	86.64	16.58
Customer089	86.64	36.41	Customer122	86.64	6.76
Customer090	86.64	18.03	Customer123	86.64	3.43
Customer091	86.64	26.68	Customer124	86.64	2.88
Customer092	86.64	56.80	Customer125	86.64	3.59
Customer093	86.64	21.09	Customer126	86.64	0.72
Customer094	86.64	13.59	Customer127	86.64	0.36
Customer095	86.64	18.03	Customer128	86.64	3.61
Customer096	86.64	18.03	Customer129	86.64	8.92
Customer097	86.64	10.82	Customer130	86.64	0.36
Customer098	86.64	21.63	Customer131	86.64	1.89
Customer099	86.64	55.68	Customer132	86.64	1.35

Table 7.9 Warehouse cost distribution of all customers for direct costing study (Continue)

Customer Code	Warehouse Cost (€)		Customer Code	Warehouse Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer133	86.64	27.76	Customer166	86.64	210.23
Customer134	86.64	49.21	Customer167	86.64	18.03
Customer135	86.64	612.90	Customer168	86.64	22.71
Customer136	86.64	9.28	Customer169	86.64	1365.89
Customer137	86.64	17.27	Customer170	86.64	258.69
Customer138	86.64	5.41	Customer171	86.64	2198.45
Customer139	86.64	0.72	Customer172	86.64	15.50
Customer140	86.64	0.11	Customer173	86.64	394.08
Customer141	86.64	1.62	Customer174	86.64	4238.07
Customer142	86.64	1.44	Customer175	86.64	279.39
Customer143	86.64	12.51	Customer176	86.64	139.04
Customer144	86.64	85.48	Customer177	86.64	7.21
Customer145	86.64	16.22	Customer178	86.64	14363.94
Customer146	86.64	45.32	Customer179	86.64	780.91
Customer147	86.64	5.23	Customer180	86.64	808.75
Customer148	86.64	5.05	Customer181	86.64	3916.08
Customer149	86.64	1.14	Customer182	86.64	4903.24
Customer150	86.64	5.41			
Customer151	86.64	8.56	Total Fix Cost(€)		15768.11
Customer152	86.64	0.36	Total Variable Cost(€)		141913.01
Customer153	86.64	432.59	Total Warehouse Cost(€)		157681.12
Customer154	86.64	60.96			
Customer155	86.64	1.35			
Customer156	86.64	8.11			
Customer157	86.64	15.14			
Customer158	86.64	0.81			
Customer159	86.64	16.64			
Customer160	86.64	113.96			
Customer161	86.64	9.57			
Customer162	86.64	9.01			
Customer163	86.64	4.77			
Customer164	86.64	120.94			
Customer165	86.64	456.97			

Table 7.10 Stock cost distribution of all customers for direct costing study

Customer Code	Stock Cost (€)		Customer Code	Stock Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer001	8.64	1515.90	Customer034	8.64	83.17
Customer002	8.64	899.43	Customer035	8.64	48.00
Customer003	8.64	396.12	Customer036	8.64	49.12
Customer004	8.64	594.10	Customer037	8.64	12.81
Customer005	8.64	515.83	Customer038	8.64	30.58
Customer006	8.64	75.26	Customer039	8.64	106.82
Customer007	8.64	527.29	Customer040	8.64	14.12
Customer008	8.64	308.14	Customer041	8.64	25.76
Customer009	8.64	451.68	Customer042	8.64	8.88
Customer010	8.64	814.48	Customer043	8.64	25.20
Customer011	8.64	281.73	Customer044	8.64	39.10
Customer012	8.64	461.06	Customer045	8.64	61.58
Customer013	8.64	202.78	Customer046	8.64	25.32
Customer014	8.64	23.79	Customer047	8.64	32.67
Customer015	8.64	220.81	Customer048	8.64	38.81
Customer016	8.64	56.80	Customer049	8.64	50.71
Customer017	8.64	244.44	Customer050	8.64	36.42
Customer018	8.64	35.56	Customer051	8.64	102.18
Customer019	8.64	144.05	Customer052	8.64	7.54
Customer020	8.64	162.12	Customer053	8.64	18.66
Customer021	8.64	33.36	Customer054	8.64	91.80
Customer022	8.64	35.54	Customer055	8.64	27.07
Customer023	8.64	292.95	Customer056	8.64	21.19
Customer024	8.64	79.09	Customer057	8.64	44.49
Customer025	8.64	134.88	Customer058	8.64	32.35
Customer026	8.64	54.19	Customer059	8.64	2.52
Customer027	8.64	16.02	Customer060	8.64	5.63
Customer028	8.64	60.54	Customer061	8.64	7.94
Customer029	8.64	123.70	Customer062	8.64	2.67
Customer030	8.64	170.68	Customer063	8.64	4.53
Customer031	8.64	45.26	Customer064	8.64	6.62
Customer032	8.64	23.80	Customer065	8.64	19.41
Customer033	8.64	69.08	Customer066	8.64	7.51

Table 7.10 Stock cost distribution of all customers for direct costing study (Continue)

Customer Code	Stock Cost (€)		Customer Code	Stock Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer067	8.64	5.07	Customer100	8.64	0.49
Customer068	8.64	3.81	Customer101	8.64	7.26
Customer069	8.64	24.23	Customer102	8.64	0.70
Customer070	8.64	3.04	Customer103	8.64	0.35
Customer071	8.64	2.59	Customer104	8.64	0.97
Customer072	8.64	19.86	Customer105	8.64	0.38
Customer073	8.64	18.87	Customer106	8.64	0.46
Customer074	8.64	33.83	Customer107	8.64	0.35
Customer075	8.64	5.38	Customer108	8.64	0.35
Customer076	8.64	34.15	Customer109	8.64	0.50
Customer077	8.64	6.04	Customer110	8.64	0.13
Customer078	8.64	2.43	Customer111	8.64	0.07
Customer079	8.64	2.24	Customer112	8.64	3.44
Customer080	8.64	1.08	Customer113	8.64	0.90
Customer081	8.64	128.36	Customer114	8.64	30.45
Customer082	8.64	2.15	Customer115	8.64	0.80
Customer083	8.64	2.07	Customer116	8.64	2.97
Customer084	8.64	0.90	Customer117	8.64	1.24
Customer085	8.64	1.00	Customer118	8.64	0.04
Customer086	8.64	3.52	Customer119	8.64	0.04
Customer087	8.64	0.93	Customer120	8.64	0.95
Customer088	8.64	2.07	Customer121	8.64	1.65
Customer089	8.64	3.63	Customer122	8.64	0.67
Customer090	8.64	1.80	Customer123	8.64	0.34
Customer091	8.64	2.66	Customer124	8.64	0.29
Customer092	8.64	5.66	Customer125	8.64	0.36
Customer093	8.64	2.10	Customer126	8.64	0.07
Customer094	8.64	1.35	Customer127	8.64	0.04
Customer095	8.64	1.80	Customer128	8.64	0.36
Customer096	8.64	1.80	Customer129	8.64	0.89
Customer097	8.64	1.08	Customer130	8.64	0.04
Customer098	8.64	2.16	Customer131	8.64	0.19
Customer099	8.64	5.55	Customer132	8.64	0.13

Table 7.10 Stock cost distribution of all customers for direct costing study (Continue)

Customer Code	Stock Cost (€)		Customer Code	Stock Cost (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer133	8.64	2.77	Customer166	8.64	20.96
Customer134	8.64	4.91	Customer167	8.64	1.80
Customer135	8.64	61.11	Customer168	8.64	2.26
Customer136	8.64	0.93	Customer169	8.64	136.20
Customer137	8.64	1.72	Customer170	8.64	25.79
Customer138	8.64	0.54	Customer171	8.64	219.21
Customer139	8.64	0.07	Customer172	8.64	1.55
Customer140	8.64	0.01	Customer173	8.64	39.29
Customer141	8.64	0.16	Customer174	8.64	422.59
Customer142	8.64	0.14	Customer175	8.64	27.86
Customer143	8.64	1.25	Customer176	8.64	13.86
Customer144	8.64	8.52	Customer177	8.64	0.72
Customer145	8.64	1.62	Customer178	8.64	1432.27
Customer146	8.64	4.52	Customer179	8.64	77.87
Customer147	8.64	0.52	Customer180	8.64	80.64
Customer148	8.64	0.50	Customer181	8.64	390.48
Customer149	8.64	0.11	Customer182	8.64	488.92
Customer150	8.64	0.54			
Customer151	8.64	0.85	Total Fix Cost(€)		1572.28
Customer152	8.64	0.04	Total Variable Cost(€)		14150.56
Customer153	8.64	43.14	Total Stock Cost(€)		15722.84
Customer154	8.64	6.08			
Customer155	8.64	0.13			
Customer156	8.64	0.81			
Customer157	8.64	1.51			
Customer158	8.64	0.08			
Customer159	8.64	1.66			
Customer160	8.64	11.36			
Customer161	8.64	0.95			
Customer162	8.64	0.90			
Customer163	8.64	0.48			
Customer164	8.64	12.06			
Customer165	8.64	45.57			

Table 7.11 Transportation cost distribution of all customers for direct costing study

Customer Code	TRNC (€)		Customer Code	TRNC (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer001	187.30	32866.79	Customer034	187.30	1803.31
Customer002	187.30	19500.82	Customer035	187.30	1040.78
Customer003	187.30	8588.54	Customer036	187.30	1064.99
Customer004	187.30	12880.89	Customer037	187.30	277.73
Customer005	187.30	11183.92	Customer038	187.30	663.05
Customer006	187.30	1631.72	Customer039	187.30	2316.07
Customer007	187.30	11432.33	Customer040	187.30	306.16
Customer008	187.30	6680.81	Customer041	187.30	558.43
Customer009	187.30	9793.11	Customer042	187.30	192.60
Customer010	187.30	17659.16	Customer043	187.30	546.39
Customer011	187.30	6108.28	Customer044	187.30	847.76
Customer012	187.30	9996.35	Customer045	187.30	1335.06
Customer013	187.30	4396.59	Customer046	187.30	549.00
Customer014	187.30	515.89	Customer047	187.30	708.30
Customer015	187.30	4787.52	Customer048	187.30	841.46
Customer016	187.30	1231.40	Customer049	187.30	1099.40
Customer017	187.30	5299.82	Customer050	187.30	789.57
Customer018	187.30	770.89	Customer051	187.30	2215.36
Customer019	187.30	3123.18	Customer052	187.30	163.59
Customer020	187.30	3514.93	Customer053	187.30	404.59
Customer021	187.30	723.31	Customer054	187.30	1990.34
Customer022	187.30	770.65	Customer055	187.30	586.82
Customer023	187.30	6351.58	Customer056	187.30	459.52
Customer024	187.30	1714.81	Customer057	187.30	964.56
Customer025	187.30	2924.31	Customer058	187.30	701.50
Customer026	187.30	1174.81	Customer059	187.30	54.56
Customer027	187.30	347.24	Customer060	187.30	121.98
Customer028	187.30	1312.58	Customer061	187.30	172.26
Customer029	187.30	2682.07	Customer062	187.30	57.87
Customer030	187.30	3700.61	Customer063	187.30	98.11
Customer031	187.30	981.35	Customer064	187.30	143.57
Customer032	187.30	515.99	Customer065	187.30	420.92
Customer033	187.30	1497.69	Customer066	187.30	162.86

Table 7.11 Transportation cost distribution of all customers for direct costing study (Continue)

Customer Code	TRNC (€)		Customer Code	TRNC (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer067	187.30	109.90	Customer100	187.30	10.64
Customer068	187.30	82.58	Customer101	187.30	157.33
Customer069	187.30	525.31	Customer102	187.30	15.20
Customer070	187.30	65.80	Customer103	187.30	7.60
Customer071	187.30	56.24	Customer104	187.30	21.04
Customer072	187.30	430.64	Customer105	187.30	8.34
Customer073	187.30	409.21	Customer106	187.30	9.94
Customer074	187.30	733.40	Customer107	187.30	7.56
Customer075	187.30	116.68	Customer108	187.30	7.60
Customer076	187.30	740.47	Customer109	187.30	10.91
Customer077	187.30	130.95	Customer110	187.30	2.92
Customer078	187.30	52.61	Customer111	187.30	1.56
Customer079	187.30	48.64	Customer112	187.30	74.63
Customer080	187.30	23.38	Customer113	187.30	19.60
Customer081	187.30	2782.95	Customer114	187.30	660.23
Customer082	187.30	46.57	Customer115	187.30	17.27
Customer083	187.30	44.82	Customer116	187.30	64.30
Customer084	187.30	19.49	Customer117	187.30	26.89
Customer085	187.30	21.61	Customer118	187.30	0.78
Customer086	187.30	76.39	Customer119	187.30	0.78
Customer087	187.30	20.27	Customer120	187.30	20.66
Customer088	187.30	44.86	Customer121	187.30	35.85
Customer089	187.30	78.72	Customer122	187.30	14.61
Customer090	187.30	38.97	Customer123	187.30	7.40
Customer091	187.30	57.68	Customer124	187.30	6.24
Customer092	187.30	122.80	Customer125	187.30	7.76
Customer093	187.30	45.60	Customer126	187.30	1.56
Customer094	187.30	29.38	Customer127	187.30	0.78
Customer095	187.30	38.97	Customer128	187.30	7.79
Customer096	187.30	38.97	Customer129	187.30	19.29
Customer097	187.30	23.38	Customer130	187.30	0.78
Customer098	187.30	46.77	Customer131	187.30	4.09
Customer099	187.30	120.38	Customer132	187.30	2.92

Table 7.11 Transportation cost distribution of all customers for direct costing study (Continue)

Customer Code	TRNC (€)		Customer Code	TRNC (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer133	187.30	60.02	Customer166	187.30	454.49
Customer134	187.30	106.39	Customer167	187.30	38.97
Customer135	187.30	1325.05	Customer168	187.30	49.10
Customer136	187.30	20.07	Customer169	187.30	2952.95
Customer137	187.30	37.34	Customer170	187.30	559.27
Customer138	187.30	11.69	Customer171	187.30	4752.87
Customer139	187.30	1.56	Customer172	187.30	33.52
Customer140	187.30	0.23	Customer173	187.30	851.97
Customer141	187.30	3.51	Customer174	187.30	9162.36
Customer142	187.30	3.12	Customer175	187.30	604.03
Customer143	187.30	27.05	Customer176	187.30	300.59
Customer144	187.30	184.79	Customer177	187.30	15.59
Customer145	187.30	35.07	Customer178	187.30	31053.65
Customer146	187.30	97.98	Customer179	187.30	1688.27
Customer147	187.30	11.30	Customer180	187.30	1748.45
Customer148	187.30	10.91	Customer181	187.30	8466.24
Customer149	187.30	2.46	Customer182	187.30	10600.39
Customer150	187.30	11.69			
Customer151	187.30	18.51	Total Fix Cost(€)		34089.35
Customer152	187.30	0.78	Total Variable Cost(€)		306804.15
Customer153	187.30	935.23	Total TRNC (€)		340893.50
Customer154	187.30	131.80			
Customer155	187.30	2.92			
Customer156	187.30	17.54			
Customer157	187.30	32.74			
Customer158	187.30	1.75			
Customer159	187.30	35.97			
Customer160	187.30	246.38			
Customer161	187.30	20.69			
Customer162	187.30	19.49			
Customer163	187.30	10.31			
Customer164	187.30	261.46			
Customer165	187.30	987.94			

Table 7.12 Manufacturing cost distribution of all customers for direct costing study

Customer Code	MNFC (€)		Customer Code	MNFC (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer001	8290.32	1454726.19	Customer034	8290.32	79816.97
Customer002	8290.32	863131.20	Customer035	8290.32	46066.22
Customer003	8290.32	380139.70	Customer036	8290.32	47137.76
Customer004	8290.32	570124.85	Customer037	8290.32	12292.87
Customer005	8290.32	495014.76	Customer038	8290.32	29347.47
Customer006	8290.32	72222.01	Customer039	8290.32	102512.16
Customer007	8290.32	506009.78	Customer040	8290.32	13551.22
Customer008	8290.32	295701.24	Customer041	8290.32	24716.83
Customer009	8290.32	433455.54	Customer042	8290.32	8524.71
Customer010	8290.32	781617.23	Customer043	8290.32	24183.82
Customer011	8290.32	270360.32	Customer044	8290.32	37522.88
Customer012	8290.32	442451.34	Customer045	8290.32	59091.67
Customer013	8290.32	194598.71	Customer046	8290.32	24299.40
Customer014	8290.32	22834.05	Customer047	8290.32	31350.14
Customer015	8290.32	211901.70	Customer048	8290.32	37244.30
Customer016	8290.32	54503.30	Customer049	8290.32	48660.89
Customer017	8290.32	234576.71	Customer050	8290.32	34947.52
Customer018	8290.32	34120.41	Customer051	8290.32	98054.88
Customer019	8290.32	138235.91	Customer052	8290.32	7240.49
Customer020	8290.32	155575.13	Customer053	8290.32	17907.59
Customer021	8290.32	32014.76	Customer054	8290.32	88095.01
Customer022	8290.32	34110.06	Customer055	8290.32	25973.46
Customer023	8290.32	281129.19	Customer056	8290.32	20338.91
Customer024	8290.32	75899.60	Customer057	8290.32	42692.56
Customer025	8290.32	129433.48	Customer058	8290.32	31049.13
Customer026	8290.32	51998.67	Customer059	8290.32	2414.93
Customer027	8290.32	15369.32	Customer060	8290.32	5399.10
Customer028	8290.32	58096.38	Customer061	8290.32	7624.29
Customer029	8290.32	118712.04	Customer062	8290.32	2561.55
Customer030	8290.32	163793.66	Customer063	8290.32	4342.57
Customer031	8290.32	43436.01	Customer064	8290.32	6354.72
Customer032	8290.32	22838.36	Customer065	8290.32	18630.34
Customer033	8290.32	66289.90	Customer066	8290.32	7208.57

Table 7.12 Manufacturing cost distribution of all customers for direct costing study (Continue)

Customer Code	MNFC (€)		Customer Code	MNFC (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer067	8290.32	4864.36	Customer100	8290.32	470.91
Customer068	8290.32	3655.17	Customer101	8290.32	6963.63
Customer069	8290.32	23250.97	Customer102	8290.32	672.73
Customer070	8290.32	2912.58	Customer103	8290.32	336.37
Customer071	8290.32	2489.11	Customer104	8290.32	931.47
Customer072	8290.32	19060.72	Customer105	8290.32	369.14
Customer073	8290.32	18111.99	Customer106	8290.32	439.86
Customer074	8290.32	32461.01	Customer107	8290.32	334.64
Customer075	8290.32	5164.51	Customer108	8290.32	336.37
Customer076	8290.32	32774.08	Customer109	8290.32	482.99
Customer077	8290.32	5795.84	Customer110	8290.32	129.37
Customer078	8290.32	2328.68	Customer111	8290.32	69.00
Customer079	8290.32	2152.74	Customer112	8290.32	3303.28
Customer080	8290.32	1034.97	Customer113	8290.32	867.65
Customer081	8290.32	123177.08	Customer114	8290.32	29222.41
Customer082	8290.32	2061.32	Customer115	8290.32	764.50
Customer083	8290.32	1983.69	Customer116	8290.32	2846.17
Customer084	8290.32	862.48	Customer117	8290.32	1190.22
Customer085	8290.32	956.49	Customer118	8290.32	34.50
Customer086	8290.32	3380.91	Customer119	8290.32	34.50
Customer087	8290.32	896.97	Customer120	8290.32	914.22
Customer088	8290.32	1985.42	Customer121	8290.32	1586.96
Customer089	8290.32	3484.40	Customer122	8290.32	646.86
Customer090	8290.32	1724.95	Customer123	8290.32	327.74
Customer091	8290.32	2552.93	Customer124	8290.32	275.99
Customer092	8290.32	5435.32	Customer125	8290.32	343.27
Customer093	8290.32	2018.19	Customer126	8290.32	69.00
Customer094	8290.32	1300.27	Customer127	8290.32	34.50
Customer095	8290.32	1724.95	Customer128	8290.32	344.99
Customer096	8290.32	1724.95	Customer129	8290.32	853.85
Customer097	8290.32	1034.97	Customer130	8290.32	34.50
Customer098	8290.32	2069.94	Customer131	8290.32	181.12
Customer099	8290.32	5328.38	Customer132	8290.32	129.37

Table 7.12 Manufacturing cost distribution of all customers for direct costing study (Continue)

Customer Code	MNFC (€)		Customer Code	MNFC (€)	
	Fix %10	Variable %90		Fix %10	Variable %90
Customer133	8290.32	2656.43	Customer166	8290.32	20116.39
Customer134	8290.32	4709.12	Customer167	8290.32	1724.95
Customer135	8290.32	58648.36	Customer168	8290.32	2173.44
Customer136	8290.32	888.35	Customer169	8290.32	130701.32
Customer137	8290.32	1652.50	Customer170	8290.32	24753.92
Customer138	8290.32	517.49	Customer171	8290.32	210368.22
Customer139	8290.32	69.00	Customer172	8290.32	1483.46
Customer140	8290.32	10.35	Customer173	8290.32	37709.17
Customer141	8290.32	155.25	Customer174	8290.32	405537.89
Customer142	8290.32	138.00	Customer175	8290.32	26735.03
Customer143	8290.32	1197.12	Customer176	8290.32	13304.55
Customer144	8290.32	8179.20	Customer177	8290.32	689.98
Customer145	8290.32	1552.46	Customer178	8290.32	1374474.18
Customer146	8290.32	4336.53	Customer179	8290.32	74724.91
Customer147	8290.32	500.24	Customer180	8290.32	77388.52
Customer148	8290.32	482.99	Customer181	8290.32	374726.80
Customer149	8290.32	108.67	Customer182	8290.32	469186.89
Customer150	8290.32	517.49			
Customer151	8290.32	819.35	Total Fix Cost(€)		1508838.26
Customer152	8290.32	34.50	Total Variable Cost(€)		13579544.36
Customer153	8290.32	41394.53	Total MNFC (€)		15088382.62
Customer154	8290.32	5833.61			
Customer155	8290.32	129.37			
Customer156	8290.32	776.23			
Customer157	8290.32	1448.96			
Customer158	8290.32	77.62			
Customer159	8290.32	1592.13			
Customer160	8290.32	10905.15			
Customer161	8290.32	915.95			
Customer162	8290.32	862.48			
Customer163	8290.32	456.25			
Customer164	8290.32	11572.70			
Customer165	8290.32	43727.53			

Table 7.13 Finance cost distribution of all customers for direct costing study

Customer Code	Finance Cost (€)		Customer Code	Finance Cost (€)	
	Fix %20	Variable %80		Fix %20	Variable %80
Customer001	571.29	41537.28	Customer034	571.29	2727.33
Customer002	571.29	24711.25	Customer035	571.29	2380.85
Customer003	571.29	14030.60	Customer036	571.29	1648.65
Customer004	571.29	19401.50	Customer037	571.29	724.64
Customer005	571.29	15708.08	Customer038	571.29	1259.97
Customer006	571.29	2184.95	Customer039	571.29	2718.24
Customer007	571.29	15573.06	Customer040	571.29	899.88
Customer008	571.29	9921.42	Customer041	571.29	872.13
Customer009	571.29	12658.45	Customer042	571.29	425.05
Customer010	571.29	23116.38	Customer043	571.29	845.09
Customer011	571.29	8536.30	Customer044	571.29	1224.56
Customer012	571.29	14233.38	Customer045	571.29	1810.03
Customer013	571.29	8855.68	Customer046	571.29	807.11
Customer014	571.29	2323.64	Customer047	571.29	1158.68
Customer015	571.29	7042.34	Customer048	571.29	1264.07
Customer016	571.29	3188.10	Customer049	571.29	1504.73
Customer017	571.29	5844.63	Customer050	571.29	1270.69
Customer018	571.29	2181.89	Customer051	571.29	3221.80
Customer019	571.29	4402.75	Customer052	571.29	431.56
Customer020	571.29	4959.75	Customer053	571.29	847.40
Customer021	571.29	1828.67	Customer054	571.29	2644.75
Customer022	571.29	1802.10	Customer055	571.29	940.33
Customer023	571.29	8158.53	Customer056	571.29	835.90
Customer024	571.29	2119.58	Customer057	571.29	1463.98
Customer025	571.29	4042.76	Customer058	571.29	812.89
Customer026	571.29	1542.88	Customer059	571.29	177.03
Customer027	571.29	1037.25	Customer060	571.29	228.78
Customer028	571.29	2001.19	Customer061	571.29	308.42
Customer029	571.29	3774.98	Customer062	571.29	202.18
Customer030	571.29	4491.14	Customer063	571.29	253.09
Customer031	571.29	1509.95	Customer064	571.29	282.46
Customer032	571.29	954.14	Customer065	571.29	606.37
Customer033	571.29	2267.97	Customer066	571.29	417.62

Table 7.13 Finance cost distribution of all customers for direct costing study (Continue)

Customer Code	Finance Cost (€)		Customer Code	Finance Cost (€)	
	Fix %20	Variable %80		Fix %20	Variable %80
Customer067	571.29	201.92	Customer100	571.29	30.58
Customer068	571.29	232.69	Customer101	571.29	199.87
Customer069	571.29	819.05	Customer102	571.29	28.00
Customer070	571.29	151.50	Customer103	571.29	20.39
Customer071	571.29	149.81	Customer104	571.29	30.87
Customer072	571.29	579.06	Customer105	571.29	38.66
Customer073	571.29	518.44	Customer106	571.29	34.80
Customer074	571.29	1016.18	Customer107	571.29	19.02
Customer075	571.29	343.29	Customer108	571.29	19.84
Customer076	571.29	779.37	Customer109	571.29	16.97
Customer077	571.29	192.20	Customer110	571.29	9.61
Customer078	571.29	151.90	Customer111	571.29	5.58
Customer079	571.29	136.93	Customer112	571.29	141.22
Customer080	571.29	79.72	Customer113	571.29	34.43
Customer081	571.29	2848.34	Customer114	571.29	1144.81
Customer082	571.29	106.89	Customer115	571.29	37.63
Customer083	571.29	129.94	Customer116	571.29	172.21
Customer084	571.29	64.03	Customer117	571.29	76.87
Customer085	571.29	90.12	Customer118	571.29	2.81
Customer086	571.29	132.33	Customer119	571.29	2.52
Customer087	571.29	69.44	Customer120	571.29	56.92
Customer088	571.29	71.62	Customer121	571.29	56.69
Customer089	571.29	107.44	Customer122	571.29	47.57
Customer090	571.29	78.70	Customer123	571.29	15.27
Customer091	571.29	87.30	Customer124	571.29	14.45
Customer092	571.29	232.74	Customer125	571.29	33.19
Customer093	571.29	119.96	Customer126	571.29	3.94
Customer094	571.29	83.87	Customer127	571.29	2.01
Customer095	571.29	67.24	Customer128	571.29	13.85
Customer096	571.29	62.22	Customer129	571.29	46.06
Customer097	571.29	33.24	Customer130	571.29	1.52
Customer098	571.29	84.88	Customer131	571.29	8.43
Customer099	571.29	211.59	Customer132	571.29	5.00

Table 7.13 Finance cost distribution of all customers for direct costing study (Continue)

Customer Code	Finance Cost (€)		Customer Code	Finance Cost (€)	
	Fix %20	Variable %80		Fix %20	Variable %80
Customer133	571.29	73.40	Customer166	571.29	431.12
Customer134	571.29	195.95	Customer167	571.29	44.16
Customer135	571.29	1439.89	Customer168	571.29	51.84
Customer136	571.29	30.72	Customer169	571.29	3401.87
Customer137	571.29	69.29	Customer170	571.29	608.36
Customer138	571.29	13.85	Customer171	571.29	5461.16
Customer139	571.29	3.58	Customer172	571.29	42.59
Customer140	571.29	0.80	Customer173	571.29	990.20
Customer141	571.29	7.23	Customer174	571.29	11024.36
Customer142	571.29	4.05	Customer175	571.29	653.28
Customer143	571.29	22.29	Customer176	571.29	216.35
Customer144	571.29	231.49	Customer177	571.29	18.47
Customer145	571.29	89.96	Customer178	571.29	33580.11
Customer146	571.29	165.29	Customer179	571.29	1742.95
Customer147	571.29	20.45	Customer180	571.29	2019.35
Customer148	571.29	19.01	Customer181	571.29	11178.88
Customer149	571.29	6.32	Customer182	571.29	12946.77
Customer150	571.29	12.95			
Customer151	571.29	13.88	Total Fix Cost(€)		103975.29
Customer152	571.29	2.38	Total Variable Cost(€)		415901.18
Customer153	571.29	1060.85	Total Finance Cost(€)		519876.47
Customer154	571.29	158.77			
Customer155	571.29	8.74			
Customer156	571.29	43.99			
Customer157	571.29	80.26			
Customer158	571.29	4.14			
Customer159	571.29	102.42			
Customer160	571.29	319.78			
Customer161	571.29	58.70			
Customer162	571.29	27.10			
Customer163	571.29	28.42			
Customer164	571.29	363.62			
Customer165	571.29	1245.46			

Table 7.14 Net value earned, total costs, and net profit of all customers for direct costing study period

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer001	2069485.28	1800583.58	268901.70
Customer002	1231172.94	1073028.74	158144.20
Customer003	699037.57	493122.80	205914.77
Customer004	966628.54	726619.86	240008.68
Customer005	782613.59	627071.67	155541.92
Customer006	108859.40	100208.66	8650.74
Customer007	775886.31	638530.07	137356.24
Customer008	494308.66	381409.09	112899.57
Customer009	630673.70	545379.38	85294.32
Customer010	1151712.38	976115.76	175596.62
Customer011	425298.57	347182.45	78116.12
Customer012	709140.59	562521.72	146618.87
Customer013	441210.69	265411.93	175798.76
Customer014	115769.13	46583.23	69185.90
Customer015	350865.91	276066.43	74799.48
Customer016	158838.46	85363.51	73474.95
Customer017	291193.05	295460.58	-4267.53
Customer018	108706.91	58330.75	50376.16
Customer019	219355.60	182961.91	36393.69
Customer020	247106.51	204580.21	42526.30
Customer021	91108.67	54389.33	36719.34
Customer022	89784.68	56569.05	33215.63
Customer023	406477.20	357273.65	49203.55
Customer024	105602.40	103948.11	1654.29
Customer025	201419.61	171631.21	29788.40
Customer026	76869.75	75029.36	1840.39
Customer027	51678.00	32452.91	19225.09
Customer028	99704.00	83841.36	15862.64
Customer029	188078.50	158617.05	29461.45
Customer030	223759.00	211450.58	12308.42
Customer031	75229.08	65469.45	9759.63
Customer032	47537.60	40276.46	7261.14
Customer033	112995.50	94073.40	18922.10
Customer034	135882.11	111053.19	24828.92
Customer035	118619.32	72373.02	46246.30
Customer036	82139.76	70175.96	11963.80
Customer037	36103.51	27632.02	8471.49
Customer038	62774.45	48837.71	13936.74

Table 7.14 Net value earned, total costs, and net profit of all customers for direct costing study period (Continue)

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer039	135429.07	135947.43	-518.36
Customer040	44834.26	29822.23	15012.03
Customer041	43451.75	41962.47	1489.28
Customer042	21177.02	22111.07	-934.05
Customer043	42104.18	41252.18	852.00
Customer044	61010.49	57657.20	3353.29
Customer045	90180.00	84053.95	6126.05
Customer046	40212.20	41204.15	-991.95
Customer047	57728.01	50571.33	7156.68
Customer048	62978.89	57533.20	5445.69
Customer049	74969.00	71186.18	3782.82
Customer050	63308.60	55040.14	8268.46
Customer051	160517.44	133370.75	27146.69
Customer052	21501.10	20730.02	771.08
Customer053	42219.28	34366.86	7852.42
Customer054	131767.62	119768.03	11999.59
Customer055	46849.65	43657.49	3192.16
Customer056	41646.31	36985.25	4661.06
Customer057	72938.92	64440.74	8498.18
Customer058	40500.00	48646.99	-8146.99
Customer059	8820.00	14254.97	-5434.97
Customer060	11398.50	17772.31	-6373.81
Customer061	15366.00	20584.21	-5218.21
Customer062	10073.25	14531.99	-4458.74
Customer063	12609.39	16723.46	-4114.07
Customer064	14072.84	19069.67	-4996.83
Customer065	30210.70	34050.17	-3839.47
Customer066	20806.67	20630.72	175.95
Customer067	10059.91	17060.95	-7001.04
Customer068	11593.24	15874.20	-4280.96
Customer069	40807.15	40107.24	699.91
Customer070	7548.04	14684.10	-7136.06
Customer071	7464.07	14211.04	-6746.97
Customer072	28850.00	34397.18	-5547.18
Customer073	25830.00	33075.42	-7245.42
Customer074	50628.35	51135.16	-506.81
Customer075	17103.70	18042.29	-938.59
Customer076	38830.00	50387.78	-11557.78

Table 7.14 Net value earned, total costs, and net profit of all customers for direct costing study period (Continue)

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer077	9576.00	18039.64	-8463.64
Customer078	7567.80	14044.37	-6476.57
Customer079	6822.29	13782.09	-6959.80
Customer080	3972.00	12290.30	-8318.30
Customer081	141910.91	159252.41	-17341.50
Customer082	5325.55	13543.19	-8217.64
Customer083	6474.00	13564.14	-7090.14
Customer084	3190.00	12028.44	-8838.44
Customer085	4490.10	12251.99	-7761.89
Customer086	6593.00	15110.32	-8517.32
Customer087	3459.75	12091.29	-8631.54
Customer088	3568.10	13297.24	-9729.14
Customer089	5353.00	15109.34	-9756.34
Customer090	3920.80	13043.67	-9122.87
Customer091	4349.51	13993.06	-9643.55
Customer092	11595.68	17830.35	-6234.67
Customer093	5976.60	13556.03	-7579.43
Customer094	4178.54	12600.90	-8422.36
Customer095	3350.00	12990.87	-9640.87
Customer096	3100.00	12967.75	-9867.75
Customer097	1656.00	12076.07	-10420.07
Customer098	4228.95	13451.23	-9222.28
Customer099	10542.05	17615.38	-7073.33
Customer100	1523.39	11444.04	-9920.65
Customer101	9957.75	19358.05	-9400.30
Customer102	1395.00	11653.92	-10258.92
Customer103	1016.10	11249.29	-10233.19
Customer104	1537.80	11951.42	-10413.62
Customer105	1926.00	11369.47	-9443.47
Customer106	1734.00	11429.41	-9695.41
Customer107	947.50	11241.05	-10293.55
Customer108	988.50	11246.74	-10258.24
Customer109	845.60	11394.62	-10549.02
Customer110	478.95	10972.17	-10493.22
Customer111	278.00	10887.25	-10609.25
Customer112	7035.70	15065.98	-8030.28
Customer113	1715.59	11897.74	-10182.15
Customer114	57037.21	48169.60	8867.61

Table 7.14 Net value earned, total costs, and net profit of all customers for direct costing study period (Continue)

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer115	1874.80	11799.13	-9924.33
Customer116	8580.00	14706.59	-6126.59
Customer117	3830.00	12447.74	-8617.74
Customer118	140.00	10836.57	-10696.57
Customer119	125.60	10835.24	-10709.64
Customer120	2835.70	12052.52	-9216.82
Customer121	2824.40	12790.63	-9966.23
Customer122	2370.00	11715.68	-9345.68
Customer123	760.90	11216.21	-10455.31
Customer124	720.00	11155.56	-10435.56
Customer125	1653.69	11315.85	-9662.16
Customer126	196.40	10879.70	-10683.30
Customer127	100.00	10832.87	-10732.87
Customer128	690.00	11228.60	-10538.60
Customer129	2294.90	11936.16	-9641.26
Customer130	75.80	10830.64	-10754.84
Customer131	420.00	11023.57	-10603.57
Customer132	249.00	10950.90	-10701.90
Customer133	3657.14	14042.73	-10385.59
Customer134	9762.47	16862.86	-7100.39
Customer135	71738.64	81861.01	-10122.37
Customer136	1530.40	11903.35	-10372.95
Customer137	3452.21	12920.73	-9468.52
Customer138	690.00	11418.13	-10728.13
Customer139	178.60	10878.05	-10699.45
Customer140	39.85	10800.78	-10760.93
Customer141	360.00	10989.59	-10629.59
Customer142	202.00	10956.03	-10754.03
Customer143	1110.40	12203.75	-11093.35
Customer144	11533.39	20839.40	-9306.01
Customer145	4482.00	12906.06	-8424.06
Customer146	8235.27	16312.22	-8076.95
Customer147	1018.80	11429.59	-10410.79
Customer148	947.20	11404.01	-10456.81
Customer149	315.00	10934.26	-10619.26
Customer150	645.00	11413.97	-10768.97
Customer151	691.53	11749.94	-11058.41
Customer152	118.66	10834.60	-10715.94

Table 7.14 Net value earned, total costs, and net profit of all customers for direct costing study period (Continue)

Customer Code	Net Value (€)	Total Costs (€)	Net Profit (€)
Customer153	52853.95	61156.66	-8302.71
Customer154	7910.11	17927.05	-10016.94
Customer155	435.60	10968.16	-10532.56
Customer156	2191.65	11841.32	-9649.67
Customer157	3998.85	12747.65	-8748.80
Customer158	206.10	10890.07	-10683.97
Customer159	5103.05	13007.10	-7904.05
Customer160	15932.20	24241.40	-8309.20
Customer161	2924.36	12062.62	-9138.26
Customer162	1350.00	11858.23	-10508.23
Customer163	1415.92	11417.99	-10002.07
Customer164	18116.52	25176.93	-7060.41
Customer165	62051.74	64570.83	-2519.09
Customer166	21479.50	34875.31	-13395.81
Customer167	2200.00	12884.50	-10684.50
Customer168	2583.00	13412.70	-10829.70
Customer169	169489.36	170070.65	-581.29
Customer170	30310.13	40787.60	-10477.47
Customer171	272087.79	267094.45	4993.34
Customer172	2121.89	12611.93	-10490.04
Customer173	49334.31	56781.83	-7447.52
Customer174	549259.60	507174.19	42085.41
Customer175	32547.90	43171.32	-10623.42
Customer176	10779.14	26401.07	-15621.93
Customer177	920.00	11628.93	-10708.93
Customer178	1673039.98	1675735.68	-2695.70
Customer179	86838.08	100921.70	-14083.62
Customer180	100608.88	105122.14	-4513.26
Customer181	556958.06	474032.89	82925.17
Customer182	645038.76	585967.67	59071.09
Total Net Value (€)			20721176.43
Total Costs (€)			18800143.25
Total Net Profit (€)			1921033.18

7.4. Conclusion

When the results are evaluated from Table 7.5 to Table 7.14 following comments can be done.

Comments and analysis on total quantity sold to customers and net value earned from customers are also valid in DC study. Because, these data's were used for distribution of costs, only the distributed costs are different.

60 customers are on the positive side of profitability. On the other hand, 122 customers are on the negative side of profitability. Profit from 60 customers is 2980694.29 €. Loss from 122 customers is 1059661.11 €. These 122 customers make loss from %35.6 of 60 customers' profit.

The amount of sold items to profitable 60 customers is 6270076.70 kg. Net value earned from these profitable 60 customers is 17092434.62 €. When these numbers are compared with total amount of sold items and total net value earned, therefore it is seen that %79.6 of sold items and %82.5 of net value earned is from the profitable side. Total cost of the profitable 60 customers for DC study period is 14111740.33 €. This is %75.1 of total costs of 182 customers.

The amount of sold items to 122 customers on the loss side is 1602342.96 kg. Net value earned from these 122 customers is 3628741.81 €. When these numbers are compared with total amount of sold items and total net value earned, therefore it is seen that %20.4 of sold items and %17.5 of net value earned is from the loss side. It is sure that, stop working with these 122 not profitable customers is not an easy issue. Total cost of 122 customers on the loss side for DC study period is 4688402.92 €. This is %24.9 of total costs of 182 customers.

If we use the same classification in ABC study according to the amount of sold items as big consumers, medium consumers and small consumers, following results occurs.

According to this classification, total costs for these 35 big consumers is 15044686.61 €, with a ratio of %80.0 over all total costs. Profit of these 35 big consumers is 2434027.05 €, which is over total profit.

According to this classification, total costs for these 41 medium consumers is 2254397.83 €, with a ratio of %12.0 over all total costs. Profit of these 41 medium consumers is 358286.34 €, with a ratio of %18.7 over all profit.

According to this classification, total costs for these 106 small consumers is 1501058.82 €, with a ratio of %8.0 over all total costs. Profit of these 106 small consumers is -871280.22 €. Total profit of these 106 small customers is in loss side.

If we also use the same classification in ABC study according to the net value earned as high value customers and low value customers, following results occurs.

According to this classification, total costs for these 39 high value customers is 15300488.82 €, with a ratio of %81.4 over all total costs. Profit of these 39 high value customers is 2706316.08 €, which is over total profit.

According to this classification, total costs for these 143 low value customers is 3499654.43 €, with a ratio of %18.6 over all total costs. Profit of these 143 low value customers is -785282.90 €. Total profit of these 143 low value customers are in loss side.

From all these evaluations done above it is seen that 122 customers are not profitable according to DC method. From these not profitable customers, the best way is to focus on the big consumers and high value ones. Big consumers in not profitable customers are Customer178, Customer017, Customer169, Customer081, Customer039, Customer180, and Customer179. High value costumers in not profitable customers are Customer178, Customer017, Customer169, Customer081, Customer039, and Customer180. Big consumers and high value earned customers in

not profitable side are the same customers. Therefore decision should be made over these customers.

It is seen from the evaluation that, DC study results show total profit of small quantity sold and low value earned customers are in the loss side. The actions to be taken for DC study results are similar to the actions to be taken for ABC study actions.

To make final decision, it will be better to compare results of ABC and DC studies. The comparison will be done in next chapter. After this comparison, decision will be taken better.

CHAPTER EIGHT

CONCLUSION AND DECISION

8.1 Introduction

In this chapter, ABC study and DC study results are going to be compared. The aim of the comparison is to see if there is a similarity or difference between these two method results and to see which method is more realistic. After comparing the results conclusion is going to be made and decision is going to be taken.

8.2 Comparison of Two Different Technique Results

ABC method profit results for 182 customers were shown in Table 6.66. DC method profit results were shown in Table 7.14. To see ABC and DC profit results together Table 8.1 is arranged. In Table 8.1, quantities sold to each customer and net value earned from each customer is given to see the general profile of customers.

Table 8.1 Total costs and net profit comparison of ABC study and DC study

Customer Code	Quantity (kg)	Net Value (€)	Total ABC Cost (€)	Total DC Cost (€)	Net ABC Profit (€)	Net DC Profit (€)
Customer001	843343.10	2069485.28	1897342.54	1800583.58	172142.74	268901.70
Customer002	500379.90	1231172.94	1073541.98	1073028.74	157630.96	158144.20
Customer003	220377.00	699037.57	557764.11	493122.80	141273.46	205914.77
Customer004	330516.40	966628.54	843673.59	726619.86	122954.95	240008.68
Customer005	286973.10	782613.59	685493.82	627071.67	97119.77	155541.92
Customer006	41869.00	108859.40	93119.63	100208.66	15739.77	8650.74
Customer007	293347.20	775886.31	684450.33	638530.07	91435.98	137356.24
Customer008	171425.80	494308.66	404647.99	381409.09	89660.67	112899.57
Customer009	251285.60	630673.70	551679.03	545379.38	78994.67	85294.32
Customer010	453124.10	1151712.38	1074950.68	976115.76	76761.70	175596.62
Customer011	156735.00	425298.57	350584.97	347182.45	74713.60	78116.12
Customer012	256500.70	709140.59	651852.24	562521.72	57288.35	146618.87
Customer013	112814.00	441210.69	384470.85	265411.93	56739.84	175798.76
Customer014	13237.50	115769.13	64132.38	46583.23	51636.75	69185.90
Customer015	122845.00	350865.91	303998.43	276066.43	46867.48	74799.48
Customer016	31597.00	158838.46	115720.75	85363.51	43117.71	73474.95
Customer017	135990.30	291193.05	254312.08	295460.58	36880.97	-4267.53
Customer018	19780.50	108706.91	73297.80	58330.75	35409.11	50376.16
Customer019	80139.00	219355.60	185682.87	182961.91	33672.73	36393.69
Customer020	90191.00	247106.51	217375.09	204580.21	29731.42	42526.30
Customer021	18559.80	91108.67	64654.22	54389.33	26454.45	36719.34
Customer022	19774.50	89784.68	65002.74	56569.05	24781.94	33215.63
Customer023	162978.00	406477.20	382352.77	357273.65	24124.43	49203.55
Customer024	44001.00	105602.40	92744.64	103948.11	12857.76	1654.29
Customer025	75036.00	201419.61	178354.70	171631.21	23064.91	29788.40
Customer026	30145.00	76869.75	69717.39	75029.36	7152.36	1840.39
Customer027	8910.00	51678.00	29517.21	32452.91	22160.79	19225.09
Customer028	33680.00	99704.00	78321.86	83841.36	21382.14	15862.64
Customer029	68820.50	188078.50	166978.71	158617.05	21099.79	29461.45
Customer030	94955.50	223759.00	203452.29	211450.58	20306.71	12308.42
Customer031	25181.00	75229.08	54951.14	65469.45	20277.94	9759.63
Customer032	13240.00	47537.60	27517.77	40276.46	20019.83	7261.14
Customer033	38430.00	112995.50	95985.22	94073.40	17010.28	18922.10
Customer034	46272.00	135882.11	119558.29	111053.19	16323.82	24828.92
Customer035	26705.80	118619.32	102582.69	72373.02	16036.63	46246.30
Customer036	27327.00	82139.76	69914.28	70175.96	12225.48	11963.80
Customer037	7126.50	36103.51	25034.34	27632.02	11069.17	8471.49
Customer038	17013.50	62774.45	51728.53	48837.71	11045.92	13936.74
Customer039	59429.00	135429.07	126376.87	135947.43	9052.20	-518.36
Customer040	7856.00	44834.26	35934.67	29822.23	8899.59	15012.03
Customer041	14329.00	43451.75	34884.63	41962.47	8567.12	1489.28
Customer042	4942.00	21177.02	12668.60	22111.07	8508.42	-934.05
Customer043	14020.00	42104.18	33610.39	41252.18	8493.79	852.00
Customer044	21753.00	61010.49	52796.96	57657.20	8213.53	3353.29
Customer045	34257.00	90180.00	82066.57	84053.95	8113.43	6126.05

Table 8.1 Total costs and net profit comparison of ABC study and DC study (Continue)

Customer Code	Quantity (kg)	Net Value (€)	Total ABC Cost (€)	Total DC Cost (€)	Net ABC Profit (€)	Net DC Profit (€)
Customer046	14087.00	40212.20	32698.14	41204.15	7514.06	-991.95
Customer047	18174.50	57728.01	50334.80	50571.33	7393.21	7156.68
Customer048	21591.50	62978.89	55708.63	57533.20	7270.26	5445.69
Customer049	28210.00	74969.00	68284.61	71186.18	6684.39	3782.82
Customer050	20260.00	63308.60	56652.72	55040.14	6655.88	8268.46
Customer051	56845.00	160517.44	153897.36	133370.75	6620.08	27146.69
Customer052	4197.50	21501.10	14942.35	20730.02	6558.75	771.08
Customer053	10381.50	42219.28	36425.59	34366.86	5793.69	7852.42
Customer054	51071.00	131767.62	125990.91	119768.03	5776.71	11999.59
Customer055	15057.50	46849.65	41315.56	43657.49	5534.09	3192.16
Customer056	11791.00	41646.31	36364.89	36985.25	5281.42	4661.06
Customer057	24750.00	72938.92	67998.17	64440.74	4940.75	8498.18
Customer058	18000.00	40500.00	36044.00	48646.99	4456.00	-8146.99
Customer059	1400.00	8820.00	4650.69	14254.97	4169.31	-5434.97
Customer060	3130.00	11398.50	7483.32	17772.31	3915.18	-6373.81
Customer061	4420.00	15366.00	11626.89	20584.21	3739.11	-5218.21
Customer062	1485.00	10073.25	6417.47	14531.99	3655.78	-4458.74
Customer063	2517.50	12609.39	9065.21	16723.46	3544.18	-4114.07
Customer064	3684.00	14072.84	10921.34	19069.67	3151.50	-4996.83
Customer065	10800.50	30210.70	27095.85	34050.17	3114.85	-3839.47
Customer066	4179.00	20806.67	17973.11	20630.72	2833.56	175.95
Customer067	2820.00	10059.91	7426.97	17060.95	2632.94	-7001.04
Customer068	2119.00	11593.24	8974.50	15874.20	2618.74	-4280.96
Customer069	13479.20	40807.15	38430.48	40107.24	2376.67	699.91
Customer070	1688.50	7548.04	5214.31	14684.10	2333.73	-7136.06
Customer071	1443.00	7464.07	5189.25	14211.04	2274.82	-6746.97
Customer072	11050.00	28850.00	26613.23	34397.18	2236.77	-5547.18
Customer073	10500.00	25830.00	23756.18	33075.42	2073.82	-7245.42
Customer074	18818.50	50628.35	48571.92	51135.16	2056.43	-506.81
Customer075	2994.00	17103.70	15097.96	18042.29	2005.74	-938.59
Customer076	19000.00	38830.00	36858.35	50387.78	1971.65	-11557.78
Customer077	3360.00	9576.00	7610.38	18039.64	1965.62	-8463.64
Customer078	1350.00	7567.80	6099.36	14044.37	1468.44	-6476.57
Customer079	1248.00	6822.29	5389.31	13782.09	1432.98	-6959.80
Customer080	600.00	3972.00	2571.33	12290.30	1400.67	-8318.30
Customer081	71409.00	141910.91	140574.75	159252.41	1336.16	-17341.50
Customer082	1195.00	5325.55	4026.01	13543.19	1299.54	-8217.64
Customer083	1150.00	6474.00	5177.85	13564.14	1296.15	-7090.14
Customer084	500.00	3190.00	1919.52	12028.44	1270.48	-8838.44
Customer085	554.50	4490.10	3305.49	12251.99	1184.61	-7761.89
Customer086	1960.00	6593.00	5514.09	15110.32	1078.91	-8517.32
Customer087	520.00	3459.75	2456.04	12091.29	1003.71	-8631.54
Customer088	1151.00	3568.10	2655.97	13297.24	912.13	-9729.14
Customer089	2020.00	5353.00	4468.53	15109.34	884.47	-9756.34
Customer090	1000.00	3920.80	3083.96	13043.67	836.84	-9122.87

Table 8.1 Total costs and net profit comparison of ABC study and DC study (Continue)

Customer Code	Quantity (kg)	Net Value (€)	Total ABC Cost (€)	Total DC Cost (€)	Net ABC Profit (€)	Net DC Profit (€)
Customer091	1480.00	4349.51	3526.87	13993.06	822.64	-9643.55
Customer092	3151.00	11595.68	10782.87	17830.35	812.81	-6234.67
Customer093	1170.00	5976.60	5248.70	13556.03	727.90	-7579.43
Customer094	753.80	4178.54	3494.89	12600.90	683.65	-8422.36
Customer095	1000.00	3350.00	2708.98	12990.87	641.02	-9640.87
Customer096	1000.00	3100.00	2468.55	12967.75	631.45	-9867.75
Customer097	600.00	1656.00	1091.05	12076.07	564.95	-10420.07
Customer098	1200.00	4228.95	3715.57	13451.23	513.38	-9222.28
Customer099	3089.00	10542.05	10042.13	17615.38	499.92	-7073.33
Customer100	273.00	1523.39	1055.53	11444.04	467.86	-9920.65
Customer101	4037.00	9957.75	9492.28	19358.05	465.47	-9400.30
Customer102	390.00	1395.00	1005.66	11653.92	389.34	-10258.92
Customer103	195.00	1016.10	657.83	11249.29	358.27	-10233.19
Customer104	540.00	1537.80	1192.81	11951.42	344.99	-10413.62
Customer105	214.00	1926.00	1580.98	11369.47	345.02	-9443.47
Customer106	255.00	1734.00	1399.16	11429.41	334.84	-9695.41
Customer107	194.00	947.50	685.83	11241.05	261.67	-10293.55
Customer108	195.00	988.50	752.84	11246.74	235.66	-10258.24
Customer109	280.00	845.60	618.46	11394.62	227.14	-10549.02
Customer110	75.00	478.95	307.80	10972.17	171.15	-10493.22
Customer111	40.00	278.00	125.31	10887.25	152.69	-10609.25
Customer112	1915.00	7035.70	6884.14	15065.98	151.56	-8030.28
Customer113	503.00	1715.59	1565.41	11897.74	150.18	-10182.15
Customer114	16941.00	57037.21	56891.06	48169.60	146.15	8867.61
Customer115	443.20	1874.80	1740.57	11799.13	134.23	-9924.33
Customer116	1650.00	8580.00	8482.55	14706.59	97.45	-6126.59
Customer117	690.00	3830.00	3746.01	12447.74	83.99	-8617.74
Customer118	20.00	140.00	68.10	10836.57	71.90	-10696.57
Customer119	20.00	125.60	54.40	10835.24	71.20	-10709.64
Customer120	530.00	2835.70	2769.71	12052.52	65.99	-9216.82
Customer121	920.00	2824.40	2763.45	12790.63	60.95	-9966.23
Customer122	375.00	2370.00	2326.97	11715.68	43.03	-9345.68
Customer123	190.00	760.90	718.27	11216.21	42.63	-10455.31
Customer124	160.00	720.00	679.96	11155.56	40.04	-10435.56
Customer125	199.00	1653.69	1613.90	11315.85	39.79	-9662.16
Customer126	40.00	196.40	157.38	10879.70	39.02	-10683.30
Customer127	20.00	100.00	60.99	10832.87	39.01	-10732.87
Customer128	200.00	690.00	668.45	11228.60	21.55	-10538.60
Customer129	495.00	2294.90	2275.76	11936.16	19.14	-9641.26
Customer130	20.00	75.80	58.05	10830.64	17.75	-10754.84
Customer131	105.00	420.00	416.59	11023.57	3.41	-10603.57
Customer132	75.00	249.00	250.45	10950.90	-1.45	-10701.90
Customer133	1540.00	3657.14	3683.26	14042.73	-26.12	-10385.59
Customer134	2730.00	9762.47	9816.40	16862.86	-53.93	-7100.39
Customer135	34000.00	71738.64	71796.41	81861.01	-57.77	-10122.37

Table 8.1 Total costs and net profit comparison of ABC study and DC study (Continue)

Customer Code	Quantity (kg)	Net Value (€)	Total ABC Cost (€)	Total DC Cost (€)	Net ABC Profit (€)	Net DC Profit (€)
Customer136	515.00	1530.40	1598.62	11903.35	-68.22	-10372.95
Customer137	958.00	3452.21	3540.54	12920.73	-88.33	-9468.52
Customer138	300.00	690.00	783.04	11418.13	-93.04	-10728.13
Customer139	40.00	178.60	274.70	10878.05	-96.10	-10699.45
Customer140	6.00	39.85	136.09	10800.78	-96.24	-10760.93
Customer141	90.00	360.00	486.21	10989.59	-126.21	-10629.59
Customer142	80.00	202.00	341.37	10956.03	-139.37	-10754.03
Customer143	694.00	1110.40	1259.48	12203.75	-149.08	-11093.35
Customer144	4741.70	11533.39	11860.40	20839.40	-327.01	-9306.01
Customer145	900.00	4482.00	4849.61	12906.06	-367.61	-8424.06
Customer146	2514.00	8235.27	8687.77	16312.22	-452.50	-8076.95
Customer147	290.00	1018.80	1480.27	11429.59	-461.47	-10410.79
Customer148	280.00	947.20	1435.17	11404.01	-487.97	-10456.81
Customer149	63.00	315.00	916.38	10934.26	-601.38	-10619.26
Customer150	300.00	645.00	1286.38	11413.97	-641.38	-10768.97
Customer151	475.00	691.53	1477.26	11749.94	-785.73	-11058.41
Customer152	20.00	118.66	962.92	10834.60	-844.26	-10715.94
Customer153	23997.50	52853.95	53716.66	61156.66	-862.71	-8302.71
Customer154	3381.90	7910.11	8779.72	17927.05	-869.61	-10016.94
Customer155	75.00	435.60	1550.20	10968.16	-1114.60	-10532.56
Customer156	450.00	2191.65	3390.33	11841.32	-1198.68	-9649.67
Customer157	840.00	3998.85	5218.33	12747.65	-1219.48	-8748.80
Customer158	45.00	206.10	1470.16	10890.07	-1264.06	-10683.97
Customer159	923.00	5103.05	6441.29	13007.10	-1338.24	-7904.05
Customer160	6322.00	15932.20	17277.53	24241.40	-1345.33	-8309.20
Customer161	531.00	2924.36	4335.43	12062.62	-1411.07	-9138.26
Customer162	500.00	1350.00	3330.79	11858.23	-1980.79	-10508.23
Customer163	264.50	1415.92	3406.35	11417.99	-1990.43	-10002.07
Customer164	6709.00	18116.52	20115.33	25176.93	-1998.81	-7060.41
Customer165	25350.00	62051.74	64575.34	64570.83	-2523.60	-2519.09
Customer166	11662.00	21479.50	24118.48	34875.31	-2638.98	-13395.81
Customer167	1000.00	2200.00	4845.83	12884.50	-2645.83	-10684.50
Customer168	1260.00	2583.00	5264.76	13412.70	-2681.76	-10829.70
Customer169	75771.00	169489.36	172483.87	170070.65	-2994.51	-581.29
Customer170	14350.50	30310.13	33417.66	40787.60	-3107.53	-10477.47
Customer171	121956.00	272087.79	275383.36	267094.45	-3295.57	4993.34
Customer172	860.00	2121.89	5753.54	12611.93	-3631.65	-10490.04
Customer173	21861.00	49334.31	53073.24	56781.83	-3738.93	-7447.52
Customer174	235101.00	549259.60	553112.44	507174.19	-3852.84	42085.41
Customer175	15499.00	32547.90	36839.35	43171.32	-4291.45	-10623.42
Customer176	7713.00	10779.14	15627.04	26401.07	-4847.90	-15621.93
Customer177	400.00	920.00	6050.99	11628.93	-5130.99	-10708.93
Customer178	796818.90	1673039.98	1679918.43	1675735.68	-6878.45	-2695.70
Customer179	43320.00	86838.08	95060.12	100921.70	-8222.04	-14083.62
Customer180	44864.16	100608.88	111948.96	105122.14	-11340.08	-4513.26
Customer181	217239.00	556958.06	573414.90	474032.89	-16456.84	82925.17
Customer182	272000.00	645038.76	669728.24	585967.67	-24689.48	59071.09

When the results of two methods are examined by the help of Table 8.1, it is clearly seen that there are some similarities and also some differences. But roughly it is sure that the company has some not profitable customers.

For both methods, customers on the profitable side are from Customer001 to Customer057 (without exceptions of Customer017, Customer039, Customer042, and Customer046), Customer065, Customer069, and Customer114. For both methods, customers on the loss side are from Customer182 to Customer182 (without exceptions of Customer171, Customer174, Customer181, and Customer182).

The profit-loss condition of customers from Customers058 to Customer131 (without Customer065, Customer069, and Customer114) and the customers determined above as exceptions are not same in both methods. The profit-loss condition of these customers is uncertain.

To identify better which model is more realistic and logical Table 8.2 is arranged. In Table 8.2, with different classification criteria analysis of quantities, net values, total costs, profits, and their ratios are summarized.

Table 8.2 Summary of activity based costing and direct costing study results

Activity Based Costing Results								
Criteria	Num. Cust.	Quantity (kg)	Net Value (€)	Total Cost (€)	Profit (€)	%		
						Quantity	Value	Cost
Quantity								
<i>Small</i>	106	1001376.70	629778.60	549404.76	80332.84	12.7	3.0	2.9
<i>Medium</i>	41	828642.80	2612684.17	2214466.64	398258.53	10.5	12.6	11.8
<i>Big</i>	35	6042400.16	17478713.66	16036271.85	1442441.81	76.8	84.4	85.3
Profit								
<i>Profit</i>	131	5870743.50	16220132.44	14163571.84	2056560.60	74.6	78.3	75.3
<i>Loss</i>	51	2001676.16	4501043.99	4636571.41	-135527.42	25.4	21.7	24.7
Value								
<i>High</i>	39	6972174.06	18006804.90	16392930.57	1613874.33	88.6	86.9	87.2
<i>Low</i>	143	900245.60	2714371.53	2407212.68	307158.85	11.4	13.1	12.8
Direct Costing Results								
Criteria	Num. Cust.	Quantity (kg)	Net Value (€)	Total Cost (€)	Profit (€)	%		
						Quantity	Value	Cost
Quantity								
<i>Small</i>	106	1001376.70	629778.60	1501058.82	-871280.22	12.7	3.0	8.0
<i>Medium</i>	41	828642.80	2612684.17	2254397.83	358286.34	10.5	12.6	12.0
<i>Big</i>	35	6042400.16	17478713.66	15044686.61	2434027.05	76.8	84.4	80.0
Profit								
<i>Profit</i>	60	6270076.70	17092434.62	14111740.33	2980694.29	79.6	82.5	75.1
<i>Loss</i>	122	1602342.96	3628741.81	4688402.92	-1059661.11	20.4	17.5	24.9
Value								
<i>High</i>	39	6972174.06	18006804.90	15300488.82	2706316.08	88.6	86.9	81.4
<i>Low</i>	143	900245.60	2714371.53	3499654.43	-785282.90	11.4	13.1	18.6

As seen in Table 8.2 cost distribution in ABC is more realistic than cost distribution in DC. When quantity based classification results are examined, it is sure that in DC method too much cost is distributed to small consumers. Therefore, small consumers became not profitable in DC. However, small consumers are not this much not profitable in ABC. This condition is opposite in big consumers. This means the profit of big consumers seems too much in DC. Medium size consumers' profit situation is approximately similar in both methods.

When net value based classification results are examined, it is sure that in DC method too much cost is distributed to low value customers. Therefore, low value customers became not profitable in DC. However, low value customers are not this

much not profitable in ABC. This condition is opposite in high value customers. This means the profit of high value customers seems too much in DC.

When the profit based classification results are examined, too many customers seems like they are not profitable in DC, even they are profitable in ABC.

All the comparisons show that, because of the cost distribution in ABC is more detailed over cost centers, the results are more realistic and reliable. According to all these results conclusion and decision to be taken is explained below.

8.3 Conclusion and Decision

ABC uses the “activity” concept and by using this concept ABC gives more realistic cost values, as also seen from the study above. The decision to implement ABC must care the relative benefits and the costs of the ABC project.

After many implementations and researches, the context of ABC was expanded and today it is called ABM. ABM covers a great set of data and works parallel to ERP systems. Contradictory to the well-known phrase “ABC is for manufacturing firms”; ABC implementations in service sector proved that it is a wrong belief.

ABC supports the 80/20 rule. Typically 20% of the company’s customers are creating 80% of the company’s profits. This rule is also generally valid for this study. 35 big consumers are forming %19 of all customers and creating %75 of all profit. After some improvements 80/20 rule will be completely valid for the company.

In this study, by the help of ABC method not profitable customers of the company are seen. Also by using an alternative method, the results are compared. According to this study, following actions is decided to be done step by step.

First action is decreasing costs. Costs of the company can be decreased by optimizing shipments, optimizing production plan, by minimizing raw material costs

as using common raw materials in different products, and by minimizing stock level. At the same time in all departments, department managers are going to look for minimizing costs without changing the service quality.

Second action is searching profitable costumers. This action will be done at the same time with first action. The aim is replacing not profitable customers with new profitable customers. Because of this action will take time, third action should also start.

Third action is increasing product sales prices. This should be started from especially, the big consumer and high value not profitable customers. Without loosing any market share, increasing all prices is impossible. Therefore, next action should be started for customers, who are resisting to price increases.

Fourth action is to stop working with not profitable customers, if they are resisting to price increase. This is the hard issue, but to continue working with not profitable customers is dangerous for company's future.

This all actions should be done like a cycle, because all of them are related with each other. And it should not be forgotten that, ABC should be renewed every year, if possible every six months. In every new ABC study, changes in costs and changes in profits of each customer should be followed closely.

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ABBREVIATIONS

Activity Based Costing	ABC
Activity Based Management	ABM
Administration Cost	ADMC
Absorption Costing	AC
Direct Costing	DC
Enterprise Resource Planning	ERP
Job Order Costing	JOC
Just In Time	JIT
Modern Cost Management	MCM
Manufacturing Cost	MNFC
Material Requirements Planning	MRP
Process Costing	PC
Target Costing	TC
Theory of Constraints	TOC
Traditional Cost Management	TCM
Transportation Cost	TRNC
Variable Costing	VC
Work In Process	WIP