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**DESIGNING AN ACTIVITY-BASED COSTING SYSTEM FOR A SPECIALTY RETAIL  
STORE**

Master's Thesis  
Department of Accounting  
March, 2014

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Title Designing an Activity-Based Costing System for a Specialty Retail Store			
Subject Accounting	Type of the degree M.Sc.(Econ.&Bus.Adm)	Time of publication March 2014	Number of pages 81
<p>Abstract</p> <p>This study designs an activity-based costing (ABC) system for a retail store specializing in one single product line and examines the suitability of ABC for such a context. This is of interest since traditionally ABC has been believed to have high-potential applications in business contexts where product diversity is high. The underlying assumption is that when product diversity is low, traditional costing systems manage to allocate costs accurately.</p> <p>A prescription glasses retailer serves as a research site for this study. Eyeglasses retailers have been considered in prior research to best represent businesses that offer one single type of goods. A contingency framework is used to preliminary assess the suitability of ABC for the studied company. Then an activity-based costing system is designed for the firm using a step-by-step approach. At the end ABC product costing is compared to current product costing obtained from traditional methods to compare and analyze the differences.</p> <p>The study finds that the existing traditional costing system produces inaccurate product costs despite the low product diversity in the company. ABC information proves to be more accurate and more useful for customer profitability analysis, and decision-making in product pricing and capacity planning.</p> <p>These results entail that the relation between product-diversity and ABC adaption should be revisited. This case study might give useful insights on contingent factors that have a higher enabling potential for ABC compared to product diversity, such as cost structure.</p>			
Keywords Contingent factors, constructive research, eyeglasses retailer, product diversity			
Additional information			

## **Acknowledgements**

I am much obliged to my supervisor Professor Sinikka Moilanen for her detailed comments in guiding this research. This study would have had considerably less value without her sagacious insights during the process. Any remaining weaknesses of this work are solely a responsibility of the author.

I would also like to acknowledge Professor Janne Järvinen and Irene Tan who taught Advanced Cost Accounting at Oulu Business School in Spring 2013—the knowledge gained from this course has served as the backbone for the design of the activity-based costing system in this study.

Much gratitude goes to the owners, management, and staff of the studied company—this study would have been simply impossible without their trust, support, and collaboration in data collection and analysis.

I am also indebted to my family for forgiving many missed skype calls and also a skipped Christmas holiday while I was dedicating much of my time to this research. They have been a source of patience and much appreciated support.

My friends Virve Honkanen and Jos Van Esbroeck deserve thanks for their continuous encouragement as well as their help with one of the management interviews that were conducted for this study. Markus Neuvonen has also dedicated this academic year to his thesis research and sharing the ups and downs of the process with him has been something I have truly enjoyed.

Last, I would like to thank Tuomas Salmi, an unwavering source of love, inspiration, and endless support. He has always been there to remind me of what is truly important in life.

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## 1 INTRODUCTION

Activity-based costing (ABC) is a product costing system that allocates indirect costs to products depending on their relative consumption of company resources. Started in the 80s as a method to allocate overhead costs in manufacturing companies, over the last four decades ABC usage has been extended to various service industries as a management accounting tool to monitor and manage business performance.

Since its very early stages of development activity-based costing has been claimed to have high-potential applications in businesses with high product diversity (Drury 1997; Cooper & Kaplan 1999). Subsequent empirical studies have confirmed a positive correlation between product diversity and benefits from ABC within a single firm (Jones 1991) or between product diversity and ABC usage across different industries and firms (Schoute 2011). Product diversity is defined as the number or range of different product lines or different product families offered<sup>1</sup> (Estrin 1994: 40; Watson 2009: 218).

This research aims to explore the benefits of ABC in a context where there is low product diversity. Can traditional costing systems provide misleading information even in businesses specializing in a single class of products? Is ABC a better suitable system to provide costing information for decision making in such a context? This study attempts to answer these questions through designing an ABC costing system for a business specializing in a single product line and evaluating whether this costing system provides better information for decision-making compared to the traditional costing system currently in use.

The business chosen for this research is a small-size specialty retail store of prescription glasses. Eyeglasses retailers have been considered in previous research as the best environment to represent retailers that sell many “horizontally differentiated varieties of a single type of good” (Watson 2009: 217).

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<sup>1</sup> Product diversity is defined in more detail in section 3.1.

Despite the wide expansion of ABC adaptation, many scholars affirm that this costing system does not automatically lead to superior organizational performance; instead superior performance is product of an appropriate fit between the ABC system and certain firm characteristics (Gordon & Silverster 1999; Cagwin & Bowman 2002; Itter et al. 2002). Many contingency-based studies examine the fit between ABC system and contingent factors such as size (Gunasekaran & Singh 1999; Hicks 1999), strategy (Gosselin 1997), and company life cycle (Kallunki & Sivola 2008).

This study offers a detailed description of relevant contingent factors of the research site company using Estrin et al. (1994) framework. Focusing on these contingent factors has two benefits: first, it helps the researcher to conclude whether an ABC system is suitable for the studied company; second, it helps the reader to have a better understanding of the context under which such a costing system is useful, which increases the transferability of the research results and enhances the external validity of the research (Labro & Tuomela 2003).

Once it is preliminary established that the studied company would benefit from an ABC system using Estrin et al. (1994) contingency framework, Gunasekaran (1999) generic model is used to design the costing system in a step-by-step approach. The ABC system is designed keeping in mind that the costing information will be used in customer profitability analysis and managerial decision-making regarding product pricing and capacity planning. These objectives were defined by the company management in the very early stages of this research. Costing information retrieved by the newly designed ABC system is then compared to the current product costing so that to evaluate whether ABC provides better-quality information for decision-making.

Results show that the existing traditional costing system provides inaccurate product costing information despite the lack of a wide product range in the studied firm. Instead, activity-based costing proves to be a better suitable system in providing information used for customer profitability analysis, as well as for managerial decision-making in product pricing and capacity planning. These results suggest that the relation between product diversity and ABC suitability should be revisited, at

least in a context where company cost structure is such that overhead costs represent the majority of the total incurred costs. This would be in agreement with Bjornenak (1997) who found no significant relation between product diversity and ABC adaption across Norwegian manufacturers, but concluded that cost structure influenced whether the company adapted or rejected ABC.

The structure of this research is as follows: chapters 2 and 3 give a summary of activity-based costing literature, with chapter 2 providing a general overview of the theory and chapter 3 presenting a more focused analysis linked to the objectives of this study. Chapter 4 introduces the background of the studied company and the research methodology. All the steps of designing the activity-based costing system are presented in chapter 5 which is then followed by conclusions of the study in chapter 6.



## 2 CONCEPT OF ACTIVITY-BASED COSTING

### 2.1 Origins and logic of ABC

Wherever capitalism began to show itself, better cost accounting practices followed within a short time (Garner 1947). Cost accounting practices originated back in the 15<sup>th</sup> century, had a major impetus during the Industrial Revolution in the 18<sup>th</sup> century, and had what Garner would define as their “most fruitful period of development” towards the end of the 19th century (ibid.: 388).

Clearly, when stating that Garner did not predict the watershed in management accounting theory and practice in the 80s. In 1984 Eli Goldratt, a business management guru accused management accounting practices of being one of the biggest reasons for the deterioration of US productivity (via Hicks 1992: 3).

He was not the only one to challenge the management accounting status quo at the time. In 1987 Robert Kaplan and Thomas Johnson published the first edition of “Relevance Lost: The Raise and Fall of Management Accounting”-- a statement that cost systems then-in-use had lost their relevance 50 years ago. The book was successively rewarded by the American Accounting Association, quickly translated into several languages, and widely read and discussed by scholars and practitioners alike. The need to reform costing systems to meet the demands of a more complex business environment was being broadly accepted. (Johnson & Kaplan 1990: xi-xii).

Convinced that traditional costing systems were obsolete, many academics and practitioners started to redirect their activities which resulted in a vast amount of publications on ABC mostly in professionally oriented journals but also in prominent research journals (Lukka & Granlund 2002: 171; Bjornenak & Mitchell 2002: 481). Lukka and Granlund (ibid.) have categorized this research into three different genres—consulting, basic, and critical—and study how these three categories communicate internally and externally to advance science and management accounting practice. They conclude that communication is fragmentary, used approaches do not usually meet each-other, and as a result there is little contribution to the advancement of the accounting knowledge.

Whereas this research might have been fragmentary and with little dialogue across different genres (Lukka & Granlund 2002), its abundance certainly influenced management accounting education and practice (Bjornenak & Mitchell 2002: 481). Starting from the 90s ABC knowledge was gaining a wider audience and its application spread across different firms, industries, and national borders (Lukka & Granlund 2002: 171-172).

Some researchers have studied how ABC practices spread across organizations as an accounting innovation using a framework derived from general diffusion theory (Bjornenak 1997; Malmi 1999). Bjornenak (*ibid.*) concluded that ABC adoption in Norway has gone through a diffusion process that takes a contagious form and where institutional influence is very important.

Malmi (1999) studied the driving forces of ABC adoption in Finland and found that the very early adopters of the new costing technique act on the basis of an efficient-choice perspective—these companies are certain about their goals and have assessed that adopting ABC will help them reach those goals, so they freely adopt the new costing system. However, in the take-off stage of this accounting innovation the efficient-choice perspective seems to have less explanatory power and what seems to guide organizational behavior at this stage is the fashion and fad perspectives—companies imitate other companies in their choice to adopt or reject ABC as a result of uncertainty and out of a concern that competitors might gain a competitive advantage from using a more sophisticated costing system (*ibid.*).

To conclude, we can say that ABC originated in the 80s when traditional costing practices were considered to be too obsolete to accommodate the needs of modern businesses (Johnson & Kaplan 1990). A vast amount of literature was published on the subject, which influenced highly management accounting education and practice (Bjornenak & Mitchell 2002). Many organizations across different industries and geographical locations have adapted ABC during the past decades either because it was an efficient choice to fulfill their goals, or because they were emulating strategies of the fashion-setting organizations (Malmi 1999). The following section explains the ABC logic and how these costing systems work.

### *Logic of ABC systems*

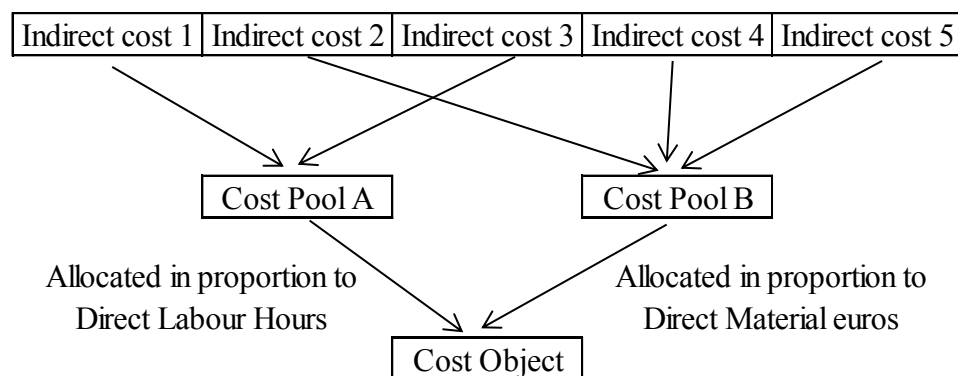
Cost is the amount of money paid or payable to acquire materials, services, or property (Dhillon 1989). Cost management systems are methods used to measure the cost of products, services, and customers (Atkinson et al. 2012). These systems have three primary functions:

- 1) Allocate costs between inventory valuation and cost of goods sold for financial reporting purposes;
- 2) Provide economic feedback on process efficiency to help managerial decision-making;
- 3) Estimate costs of activities, products, services and customers to provide information for planning, operational control, and performance measurement. (Drury 1994; Cooper and Kaplan 1999).

All cost management systems start by assigning direct material and direct labor costs to cost objects, a step that is straightforward and has been done reasonably well in the business environment for about a century (Atkinson et al. 2012). Where these systems differ is the treatment of indirect costs.

Indirect costs are expenses that cannot be easily traced to individual products like direct costs can. They include costs of operating the machines, quality control, maintenance, utilities, depreciation, etc. and are also called overhead or support costs (Atkinson et al. 2012).

In traditional costing systems indirect costs are grouped together into cost pools. From there they are then allocated to cost objects in proportion to direct labor/machine hours, or direct materials consumed, also known as volume-based cost drivers. Since many of these indirect costs are not really used by products in proportion to their production volume, this allocation is often arbitrary. As a result, traditional costing systems lead to inaccurate calculations of product costs. (Drury 1994). Figure 1 illustrates the allocation of indirect costs in traditional costing systems.



**Figure 1. Allocation of indirect costs in traditional costing methods**

Activity-based costing aims to avoid product costing distortions caused by allocating indirect costs directly to products. Instead ABC allocates overhead costs using the following set of procedures:

- a) Identify all activities performed using company resources;
- b) Compute the cost of performing these activities;
- c) Allocate the activity costs to cost objects based on their consumption of each activity. (Atkinson et al. 2012).

#### a) Identifying the activities

In the first stage the organization identifies the major activities performed with its resources. These can be machine-related, direct labor-related, or support activities (Drury 1994). Activities are described by a verb accompanied by its associated object, such as: schedule production, assemble products, inspect items, respond to customers, etc. (Atkinson et al. 2012).

The activities can be identified either by using the already-existing activity dictionaries that have been developed over the years by practitioners and consulting companies, or by using a bottom-up approach and asking the front-line employees to identify the activity dictionary. Whereas the first approach saves valuable time and

other resources, the second approach leads to higher employee commitment to the new cost model. (Atkinson et al. 2012).

The number of activities identified varies from ten to hundreds of them depending on organizational complexity and the objectives of the ABC system— i.e. if the purpose is to use the information for process improvement and process re-design, the number of activities identified is much higher than when the ABC is used just to compute product cost. (Atkinson et al. 2012).

#### b) Computing the costs of performing each activity

In the second stage the organization allocates all its spending and expenses from the financial and general ledger system among the activities in the dictionary using primary cost drivers. Personnel expenses are allocated in direct proportion to the time that employees spend on each of those activities. Employees are surveyed and asked to define what percentage of their time goes to each of the activities in the dictionary. Non-personnel expenses are allocated based either on direct measurement (utilities, telecommunication expenses) or on logical percentage estimates. Once all the company spending has been allocated to all the activities in the dictionary, the organization can compute the total cost of resources that go into performing each activity. (Atkinson et al. 2012).

Once all the activities have been identified and their costs have been computed, the organization can group these activities based on certain attributes such as:

- i) cost hierarchy –whether the activities are performed at a unit, batch, product line, or customer level (i.e. grinding metal is a unit level activity, setting up machines is a batch level activity, etc.)
- ii) business processes –depending on which business process these activities go under ( i.e. selecting vendors, ordering materials, scheduling material delivery, receiving materials, inspecting materials, paying vendor invoices go under the business process of procurement)
- iii) value adding –depending on whether this activity adds value from the customer perspective to the product/service or not ( i.e. inspecting materials is

a value-adding activity because the quality of direct materials affects the quality of the final product/service but receiving materials is not value-adding because it does not affect what the customer pays for). (Atkinson et al. 2012).

After knowing the total cost of performing each activity activities are grouped according to different attributes depending on the management information needs. For instance, for customer profitability analysis customer-level activities would be grouped according to their cost hierarchy attribute; to compare the efficiency of business processes across different organizational branches activities would be grouped using the business processes attributes, and when considering cost reductions management might be interested to start reducing costs in the activities that are non-value adding so that not to reduce revenues alongside expenses. (Atkinson et al. 2012).

All activities can be classified into primary and secondary activities. For primary activities the cost object that the activities are performed for (products, services, customers) can be directly identified. Secondary activities are not directly linked to the cost object (i.e. services of the HR department cannot be traced to a specific product or customer). Therefore, secondary activity costs are assigned to the primary activities they enable to be performed, i.e. HR costs are allocated to production and sales activities which are primary. (Atkinson et al. 2012).

Once all the activities have been defined, the costs of performing each activity have been computed, and the secondary activity costs have been assigned to primary activities, the organization can perform the ABC final stage: compute the cost of cost objects.

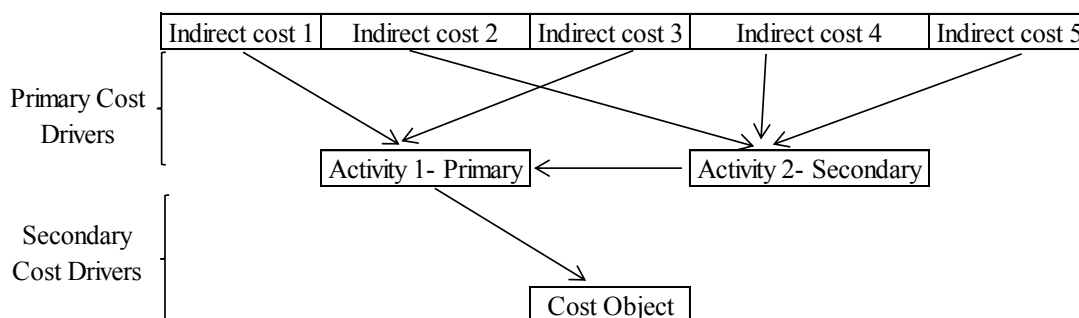
### c) Allocating activity costs to cost objects

In the third stage the organization computes a quantitative output for each one of its activities, also called activity cost driver (Atkinson et al. 2012). There are three types of activity cost drivers:

- i) Transaction drivers –count how often an activity is performed. Examples include number of set ups, number of receipts, etc. Transaction drivers can be used when all outputs (such as all set ups) have the same demands for the activity.
- ii) Duration drivers –measure how much time is required to perform an activity. Examples include set up hours, inspection hours, etc. Duration drivers should be used when different outputs have different demands for the activity. Duration drivers are more accurate and at the same time more expensive than transaction drivers.
- iii) Intensity drivers –measure all the resources used each time an activity is performed. This means that a job order costing system is developed for each activity performed. Intensity drivers should be used when the resources used to perform an activity are expensive and their quantity and price vary depending on the cost object that the activity is associated with. Intensity drivers are highly accurate and highly expensive. (Atkinson et al. 2012).

The activity cost driver should match the cost hierarchy level of the activity it is associated with. The number of the cost drivers should be optimized so that the same cost driver can be used for different activities that run in a similar logic (Atkinson et al. 2012).

All costs of primary activities (which include the costs assigned to them from the secondary activities) are allocated to cost objects using the activity cost drivers, also called secondary cost drivers. Figure 2 illustrates the allocation of indirect costs in ABC costing systems.



**Figure 2. Allocation of indirect costs in ABC systems**

## 2.2 Benefits of ABC systems

This section outlines the benefits of using activity-based costing in organizations. There is a vast amount of articles published around this theme and they have been classified as ‘consulting research’ by Lukka and Granlund (2002) or ‘propagator articles’ by Bjornenak and Mitchell (2002). The characteristics of this type of research are a propagating and prescriptive style that intends to sell the author’s ideas to the reader (Lukka & Granlund 2002: 168). These articles are usually published in practitioners’ journals and the authors can be academics, practitioners, or consultants (ibid.). A consultancy or quasi-consultancy orientation has been noted particularly among many US academics, compared to European researchers (Bjornenak & Mitchell 2002: 503).

Although the scientific value of this kind of research is questionable, these articles are included in the ABC literature discussion because they entail an integral part of activity-based costing knowledge, without the input from this type of research, there would be little (if at all) to elaborate on for the more scientific research; and because in accounting discrimination on the basis of scientific nature is not automatic and the field documents a long tradition of literature of a prescriptive nature (Lukka & Granlund 2002: 168,170, 172).

As a result of this analysis, consulting research is part of the reviewed literature for this thesis research. The author trusts the judgment of the reader to interpret the findings with the caution they pertain to. For this section the findings are classified



based on the type of benefit that ABC systems have been found to entail for an organization.

### *I. Cost Management*

Ittner et al. (2002) used a large cross-sectional sample of manufacturing plants to compare the operational and financial performance at plant level of ABC adopters with that of non-adopters. Results showed that extensive ABC usage was associated with higher quality level and decreases in cycle time, which indirectly led to significant manufacturing cost reductions compared to the non-adopters (Ittner et al. 2002).

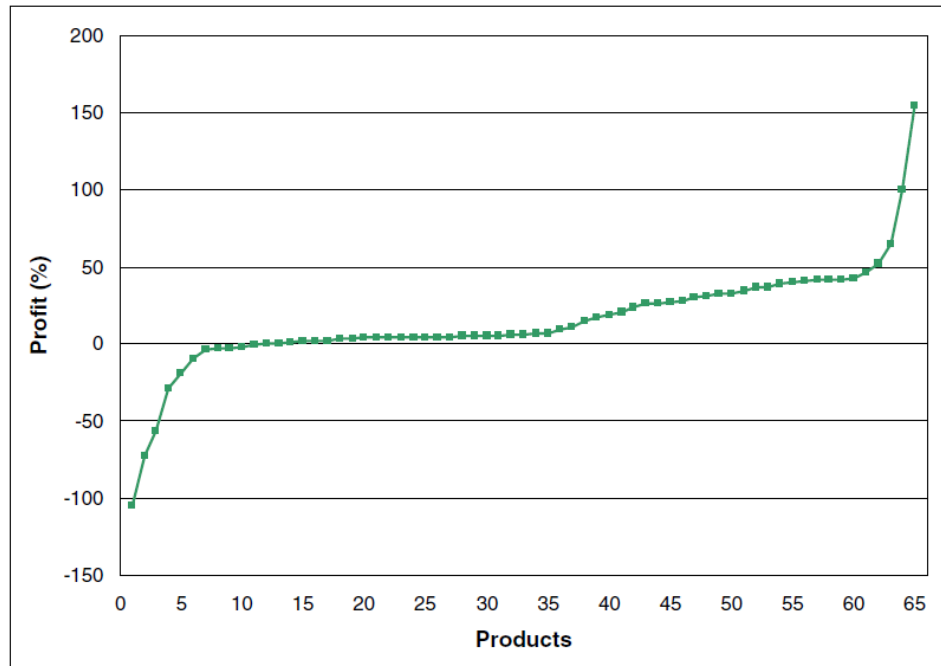
Similarly, Kennedy and Affleck-Graves (2001) concluded that through better cost controls, firms that adopt ABC techniques outperform matching firms which use alternative costing methods by approximately 27% in terms of stock market returns. However, authors warn to read these results with caution since other factors might have led to these abnormal returns of the adopters, making it impossible to prove definitively the causal link between ABC adoption and increase in shareholder value (Ibid.).

### *II. Product Profitability Analysis*

By focusing on business activities and these activities' demand for resources, ABC gives a clear picture of how products, facilities, brands, distribution channels, regions, or customers both produce revenues and consume resources. This information can be used by managers to conduct profitability analysis of different brands, facilities or customers as well as to channel managerial attention and efforts towards improving activities that have the biggest impact on the bottom line (Cooper & Kaplan 1991).

Success stories of practitioners have been published to illustrate the point. Figure 3 illustrates the example of a manufacturing company illustrated in *Common Cents* (Turney 2005). When using traditional costing methods, all products were profitable. ABC revealed that 25% of the company's products were selling at a loss and about

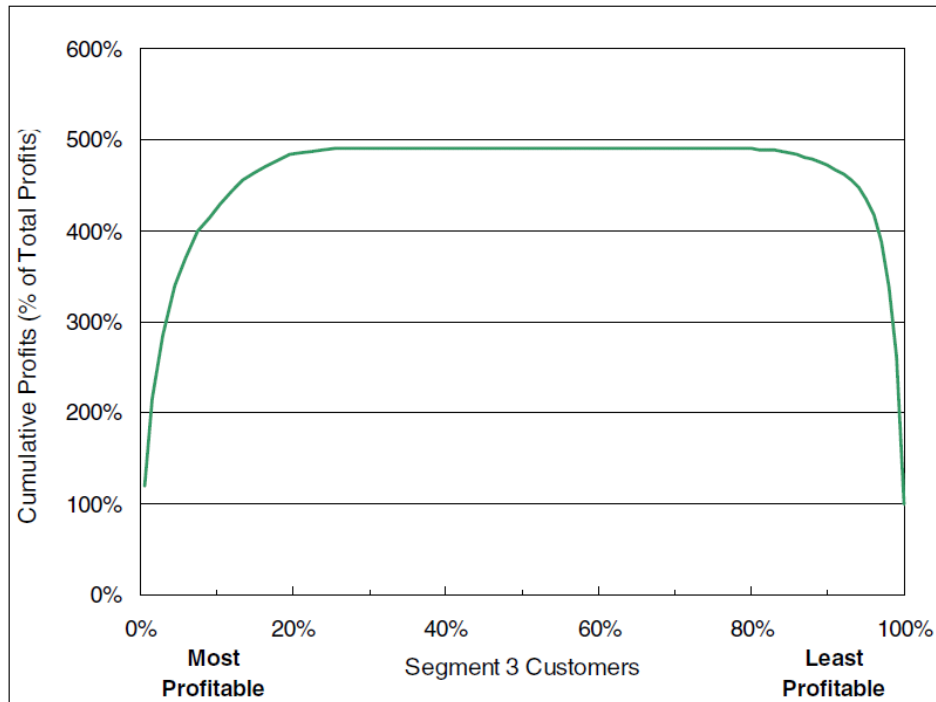
40% were at a breakeven point. This information helped managers focus only on profitable products, as well as redesign products and eliminate non-value adding activities to reduce costs. These changes transformed the company profitability from ‘worst in class’ to ‘best in class’ (ibid.).



**Figure 3. Product profitability analysis using ABC (Turney 2005)**

### *III. Customer Profitability Analysis*

In addition to product profitability, ABC provides valuable insights for customer profitability analysis (CPA). CPA involves identifying revenues, costs and profit of an individual customer or of a customer group (Noone & Griffin 1997). By allocating resource costs to activities, ABC provides an accurate representation of resource consumption by customers and activity cost drivers avoid distortions when allocating activity costs to customers (Smith & Dikolli 1995). Whereas it is generally known that 20% of customers produce 80% of revenue, using ABC it is revealed that 60% of customers produce 2-3 times of total profit whereas the remaining 40% consume more resources than revenues generated (Noone & Griffin 1997).



**Figure 4. Customer profitability analysis using ABC (Turney 2005)**

Turney illustrates the point via the ABC Profit Cliff curve (see figure 4) of an example company. Using ABC to allocate the cost-to-serve activities to customers, the company found out that 20% of its customers were producing profits as high as 500% of the reported net income, about 60% of its customers merely broke even on costs, and the final 20% destroyed profit by 400% to arrive to the final reported income number. It was also noted that one single customer was responsible for 120% of the profit (Turney 2005).

#### *IV. Supplier Evaluation and Selection*

In addition to customer evaluation, ABC can also be used for supplier selection. To improve their profitability companies should develop close working relationships with a distinctive group of suppliers that have been carefully selected based not only on the competitiveness of their bids, but also on various aspects of their product and service quality (Robinson & Timmerman 1987).

Due to this reason systems were developed in the late 80s to compare and rank different vendors, such as the Categorical Method that ranks different vendor

characteristics as ‘good,’ ‘satisfactory,’ ‘neutral,’ and ‘unsatisfactory’; The Weighted Point Plan that gives different weights to different supplier criteria and stipulates a total weighted score for each supplier, etc. (Roodhooft & Konings 1995). The problem with these ranking systems is that they are subjective and that stipulates a need to quantify the criteria so that to objectively compare and rank the suppliers (Robinson & Timmerman 1987).

Activity based costing provides a useful tool for objective and good decision-making in vendor evaluation and selection because:

- a) it quantifies the internal production problems caused by a vendor as a result of late deliveries, poor material quality, etc., giving an objective measure for the non-financial criteria
- b) it compares absolute cost figures of invoice costs, delivery time, material quality, post-sales service, etc., providing a solution for a multi-objective optimization problem (i.e. dilemma whether to minimize the invoice cost, reduce the delivery time, or maximize the quality of materials and services)
- c) it identifies the relative importance of different cost components, making it easier for the company to reduce or eliminate certain activities to increase efficiency (Roodhooft & Konings 1995).

Using ABC the company would choose the supplier that minimizes the sum of price differential (difference between the supplier’s bid and the price of the cheapest supplier) and estimated internal production costs caused by the supplier (Roodhooft & Konings 1995). This approach could be used not only for vendor selection, but also for make-or-buy decisions, determination of transfer prices, as well as for performance evaluations of purchasing managers (Roodhooft & Konings 1995).

#### *V. Pricing Decisions*

Activity based costing can be a powerful tool for marketers and sales managers in setting product or service prices. Amarshi et al. in 1989 advocated the economic sufficiency of the unit cost information derived by activity based costing for pricing decisions (via Banker & Hughes 1994). A study by Banker and Hughes (ibid.) also

proved that under conditions where capacity costs are committed ex-ante and demand in excess of capacities is met by incurring penalties, activity-based unit cost is sufficient information to achieve optimal pricing.

In 2000 Lere found three ways how ABC could support optimal pricing and price negotiations:

- a) By quantifying the use of company resources for each activity, ABC reveals costing information that differs among product specifications and as such makes it easier to price the products based on their product features
- b) ABC provides information about which product specifications have the biggest impact on cost, which can be used by marketers in customer negotiations to yield cost reductions and reach a competitive price
- c) Whereas traditional costing systems give cost only as a function of product volume, ABC shows what activities drive costs and enables cost reductions that satisfy customer wishes

## *VI. Internal Performance Measurement*

Performance measurement is the process of quantifying the efficiency and effectiveness of the actions that a business undertakes (Neely et al. 1995). Performance measurement is important in strategy execution because it measures goal accomplishment, predicts future performance, and gives feedback to trigger corrective action (Turney 2008).

Activity-based costing is a useful tool in providing performance measures related to cost (Neely et al. 1995). Often organizations have as much as 25% of their management performance measures sourced from their ABC model (Turney 2008).

Using ABC to derive performance measures encourages behavior that is well-aligned with organizational goals. An experimental study by Drake, Haka, and Ravenscroft showed that group incentive rewards combined with ABC performance measures led to cooperative innovations, lower costs, and higher profits (via Chenhall 2003).

Dickinson and Lere (2002) state that ABC measures are the right performance evaluation for sales representatives in companies that focus on profit growth. They argue that under traditional costing systems sales reps may agree to terms that undermine company profitability (such as having orders delivered to multiple locations, having products produced with unique parts to the customer, etc.) or may use large quantities of firm resources (such as services of the marketing department) in order to seal the deal with the customer and enhance their performance evaluation measure: sales revenues. ABC makes it possible to reveal the costs associated with such behavior and charge that against the sales revenue brought by the sales rep. This increases the sales reps' awareness of and sensitivity to firm cost and profitability management (Dickinson & Lere 2002).

### *VII. Financial Planning*

During the past few years ABC has been extended as a tool in financial planning and budgeting. Activity-based costing led to activity-based budgeting (ABB), which is very similar to zero-based budgeting (ZBB) and links activities to costs and as such gives a full picture on the costs of service and resource allocation (Shane 2005). ABC models with predictive capabilities due to their combination with forecasting and other analytic techniques can also be used to support fact-based what-if analysis (Turney 2008). Using ABC in budgeting and financial planning helps companies prepare budgets that are consistent with both their strategic goals and their resource capacity (ibid.).

### *VIII. Capacity planning*

ABC measures the cost of the activities being used. The financial statements measure the cost of the activities being supplied. The difference between these two is the cost of unused capacity, as follows:

Cost of activities supplied – Cost of activities used = Cost of unused capacity  
(Cooper & Kaplan 1992).

Unlike traditional cost variances, ABC gives the amount of unused capacity not only in financial terms (amount of euros), but also in number of outputs, i.e.: how many more purchase orders could have been processed with this unused capacity? This makes it easy for managers to plan their HR or machine capacity depending on the planned output volume (ibid.).

To summarize, we can say that ABC costing models provide information that supports cost management, product and customer profitability analysis, supplier selection, pricing decisions, performance management, and long-term financial and capacity planning.

### **2.3 Criticism of ABC**

Studies that criticize ABC and its underlying assumptions are number-wise much fewer compared to those that either propagate the system or are neutral in nature (Lukka & Granlund 2002: 178). These studies are from US and especially European academics and have mainly been published in academic journals, and mainly use mathematical modeling and field studies as research methods (Bjornenak & Mitchell 2002: 501-503). In this section findings have been presented based on the type of criticism towards ABC.

#### *I. Challenging ABC logic*

Piper and Walley (1990) question the fundamental assumption of ABC, i.e. that activities cause costs. They put forward competing assumptions instead, for example that decisions cause costs or passage of time causes costs. Authors argue that the causality relationship between activities and costs has not been tested logically or empirically (ibid.).

#### *II. Questioning ABC superiority*

ABC started as the answer to limitations in costing information derived from traditional costing systems, which were primarily designed for financial reporting. Compared to costing systems with a financial reporting orientation, ABC is superior

in providing information relevant for decision-making. However, it has not been proven that ABC is superior to alternative costing systems used in the 80s, such as the contribution approach (Piper & Walley 1990). The modular contribution approach builds a detailed database in which all transactions entering the system are classified and coded so that costs are matched with revenues at the desired aggregation level and this makes it possible to spotlight the behavior of controllable costs as well as indicate each segment's contribution to profit and indirect fixed costs (Dunne & Wolk 1977).

Another aspect triggering the questioning of ABC superiority comes from its comparison with Japanese management accounting practices. In Japanese companies cost allocation systems focus on influencing managerial behavior, rather than on deriving the most precise product cost information, as the comparison shows:

...high level Japanese managers seem to worry less about whether an overhead allocation system reflects the precise demands each product makes on corporate resources than about how the system affects cost-reduction priorities of middle managers and shop-floor workers. As a result, they sometimes use allocation techniques that executives in the United States might discuss as simplistic or even misguided (Hiromito 1989 via Dugdale 1990).

Another alternative to ABC that has often been argued superior to activity-based costing is Theory of Constraints (TOC). TOC was developed by Eli Goldratt in the mid 80s and is based on the two main assumptions that (i) each system must have at least one constraint (or else organizations would make unlimited profits); and (ii) constraints represent opportunities for improvement (since each constraint puts a limit on performance, an evolution of constraints improves performance) (via Rahman 1998). In the early 90s Low, as well as Spuede et al. illustrated through numerical examples that TOC led to a more profitable product mix than ABC (via Kee & Schmidt 2000).



### *III. Arguing ABC usefulness*

Some researchers have argued that ABC focuses on the existing cost structure of the company and as such its usefulness as a catalyst for managerial critical thinking and process re-design is limited (Neely et al. 1995). Similarly to this logic, ABC was also deemed inconsistent with the principles of continuous improvement and total quality management because it:

- a) did not focus on customers
- b) was not process-oriented
- c) did not involve employees (i.e. top-down approach)
- d) did not improve organizational learning (Turney 2008).

Bakke and Hellberg (1991) state that ABC is useful for long-run decision making but it is quite limited when it comes to short-term production scheduling.

More importantly, some researchers have argued that ABC yields accurate costing information only when certain conditions are satisfied—such as production should not involve cost complementarities or non-complementarities, inputs in a cost pool should be independent of those in other cost pools, and input mixes for a cost pool should not vary with volume—and since all these conditions are highly unlikely to be met in practice, ABC leads to inaccurate product costing and incorrect information for decision-making (Noreen 1991; Bromwich & Hong 1999).

### *IV. Implementation costs and failure stories*

One of the earliest criticisms of ABC cost model was that the analysis was too complicated to be of practical value because it produced so many activity-based cost factors (Maskell 1988). This might have triggered practitioner skepticism towards the new costing method.

The early 90s are characterized by the so-called ‘ABC paradox:’ whereas literature is strongly emphasizing the benefits of ABC, empirical surveys show that less and less firms and adopting ABC, many of those adopting it do not implement it in practice,

and some organizations that did implement ABC stopped using it (Gosselin 1997). In addition, many of the ABC systems introduced in the late 90s failed (Malmi 1997).

Turney (2008) explains this early failure with the immaturity of the ABC method combined with the obsolete technology using non-integrated company software. These technological challenges made ABC systems costly to implement, difficult to use, and inaccurate to rely on (ibid.).

Another limitation in practice is related to constraints on labor and overhead resources, since ABC identifies the product mix that is best aligned with the company strategy and as such is the best model to use under the conditions that the company has discretionary power over its labor and overhead resources (Kee & Schmidt 2000).

To conclude, although studies criticizing ABC are rather scarce one can find few academics that have challenged the assumptions of the system, have questioned its superiority compared to other costing alternatives, and have argued about its usefulness and its high implementation costs. The next chapter presents a more focused view of the ABC literature on system adaption.

### 3 ADAPTION OF ACTIVITY-BASED COSTING

#### 3.1 Contingent factors enabling ABC

It can be derived from the sections above that adopting ABC brings benefits and poses costs to an organization. ABC success stories are those where the benefits outweigh the costs—i.e. there is positive net benefit. Studies show that the net benefit of ABC adoption is positive depending on firm-specific characteristics (Cagwin & Bouwman 2002). Gordon and Silvester (1999) did not find a correlation between ABC implementation and stock market reaction and noted that the reason for that might be that the benefits of ABC vary across organizations depending on various organizational factors. Similarly, Ittner et al. (2002) find that the impact of ABC on accounting profitability is contingent on the plant's operational characteristics. This section outlines the contingent factors that lead to a positive net benefit of ABC adaption.

##### *I. Cost structure*

ABC is claimed to be needed especially in organizations where expenses in indirect and support resources count for a high fraction of the total product costs or where these expenses have been rapidly growing over time (Cooper & Kaplan 1999). Bjornenak (1997) tested the relation of cost structure with ABC adoption using a sample of Norwegian manufacturing firms and found that the higher the proportion of overhead costs compared to total costs the more likely it is that the company adopts ABC. Innes et al. (2000: 359) found that firms used the fact that they had low overhead costs as a justification not to consider adopting ABC.

##### *II. Product diversity*

Since its early stage of development ABC has been claimed to have high-potential applications in organizations that have high product diversity (Drury 1997; Cooper & Kaplan 1999). The underlying assumption is that when product diversity is low traditional costing systems manage to produce accurate product costs. As Bjornenak (1997: 11) pointed out it is very difficult to find operational definitions of product

diversity. Estrin et al. (1994: 40) explain that product diversity refers to “the quantity or range of distinct products or the variety of product families offered” and warn not to confuse minor product variations with product diversity unless these variations translate into differences in levels of complexity. Similarly, Watson (2009: 218) draws a difference between the *depth* of retail inventory—which refers to “the number of different product lines carried by a retailer” and is denoted as ‘product range’—and the *breadth* of retail inventory—which refers to the “number of different styles of a good on display” and which the author denotes as ‘product variety’.<sup>2</sup>

In this study ‘product diversity’ and ‘product range’ will refer to the quantity of different product lines with different levels of complexity (depth of retail inventory), whereas ‘product variety’ will refer to horizontal differentiation within the same type of good that leads to no differences in levels of complexity (breadth of retail inventory).

A study of 191 Dutch medium-sized manufacturing firms shows a positive correlation between product diversity and ABC usage (Schoute 2011). Using the example of Caterpillar, Inc. Jones (1991) argued that when manufacturing a number of large complex products, at varying volume levels, and using a variety of supply sources and manufacturing processes a company needs a sophisticated costing system to produce accurate product cost information. According to Innes et al. (2000: 359) survey firms specializing in few product lines would be much less likely to consider adapting an ABC system. However, Bjornenak (1997) study found no significant correlation between product diversity and ABC adaption among Norwegian manufacturers.

### *III. Industry*

There are not many studies done regarding ABC across different industries. There seems to be a general agreement among academics that although ABC started as a

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<sup>2</sup> It is important to notice that Watson’s (2009) ‘product variety’ is different from Estrin et al.’s (1994) ‘product family variety’—the latter referring to product families, as opposed to single products.

costing method in the manufacturing industry and most of the research might be within that context, ABC systems can be designed and applied for all types of business organizations across all different industries (Cooper & Kaplan 1999; Hicks 1992; Turney 2005; Malmi 1999).

Turney (2005) states that in the 90s many industries were facing a fierce competition and needed accurate product costing and as a result ABC adoption expanded into insurance, healthcare, energy, banking, and packaged goods. Hicks (1992) would add restaurants, car dealers, consulting firms, leasing companies, warehousing distributors, and sports clubs to that list. Activity-based costing has also been implemented by non-business organizations such as governmental agencies and the military (Turney 2008).

A survey of U.K.'s 1000 largest companies conducted by Research Foundation of the Chartered Institute of Management Accountants both in 1994 and 1999 showed no significant difference between the ABC adoption rates by manufacturers and non-manufacturers (Innes et al. 2000).

Chea (2011) argues that ABC is a viable strategic approach for service organizations to make good decisions and survive in a competitive market and analyzes a number of ABC success stories from the industry, such as investment and regional banks, a global insurance company, transportation services, public utility services, as well as an automotive retailer.

#### *IV. Company size and life cycle*

The survey conducted in the U.K. by Innes et al. (2000) showed both in 1994 and 1999 that there was a statistically significant difference of ABC adoption among large and small companies: among the smallest 50% of the respondents only 11% had adopted ABC, whereas among the largest 50% the adoption rate was 33%. Hicks (1999) would explain the difference with a 'myth' that had been created about ABC installation taking massive resources in terms of employee hours and consultation fees and as such small and mid-sized companies should steer clear of it.

Stories of small businesses succeeding in ABC adoption and utilizing its information to multiply their profits would debunk that myth in the late 90s (Gunasekaran & Singh 1999; Hicks 1999). There is general agreement among researchers that businesses of any size can install ABC systems and yield profits from them (Hicks 1992; Gunasekaran & Singh 1999; Gunasekaran 1999; Hicks 1999).

Using a questionnaire of 105 Finnish firms operating in different industries and life-cycles, Kallunki and Silvola (2008) conclude that firms in maturity and revival phases are more likely to adopt ABC costing models compared to firms in a growth phase.

#### *V. Other enabling conditions*

Studies also show that organizations are more likely to adopt ABC if they follow a prospector strategy and if they have a centralized and more formal organizational structure (Gosselin 1997).

Cagwin and Bouwman (2002) use confirmatory factor analysis to test the findings of previous research on the conditions under which ABC yields positive net benefits and is associated with improved financial performance. Their findings suggest that ABC systems yield greater benefits when:

- (i) The company is employing concurrently other strategic business initiatives to improve its performance. This is the case because business initiatives complement and enhance each-other and it is more likely that the information received from ABC systems will be utilized to implement the new initiative and as such have greater impact.
- (ii) The company has diverse products, processes, customer demands, and suppliers. In such an environment traditional costing methods might provide misleading information and an ABC system will produce information that differs significantly from the existing information and as such will lead to important changes in decision-making.
- (iii) Cost information is important to the company because it operates in a highly competitive environment and uses cost information to set prices,

drive cost reduction efforts, and define its strategic focus. Under such conditions accurate product costing is highly important for the company and as a result ABC systems become highly beneficial for the company.

- (iv) The number of intra-company transactions is limited. In an environment of many internal transactions, business unit profitability analysis is distorted as a result of transfer pricing and there are constraints on decision-making regarding vendor and customer selection. The more limited these intra-company transactions are, the more important is the unit profitability analysis and the more power managers have in using costing information for decision-making. These are the circumstances when ABC systems would create the right behavior incentives and lead to improved financial performance. (Ibid.)

It can be concluded from all the studies above that ABC is not a guaranteed success story for all organizations. Company-specific characteristics are important variables in determining whether this costing methodology will yield the expected benefits or not. A study by Estrin et al. (1994) proposes a contingency approach that a company can use to determine whether it should adopt ABC or not. The authors suggest that ABC should be adopted provided these two conditions are assessed to be true:

- (i) ABC is likely to produce different product costing information compared to the existing cost system
- (ii) new costing information derived by ABC can and will be used by management in important decision-making

Factors that affect the first condition are:

- 1) number and diversity of products or services provided (positive correlation)
- 2) diversity of support services and differential degree of how different products use these common services (positive correlation)
- 3) extent to which common processes are used (positive correlation)
- 4) growth rate of period costs (positive correlation)
- 5) effectiveness of current costing methods (negative correlation) (Estrin et al. 1994).

Factors that affect the second condition are:

- 1) management's freedom to set prices (positive correlation)
- 2) proportion of period costs to total costs (positive correlation)
- 3) degree to which strategies override costs in decision-making process (negative correlation)
- 4) emphasis of cost reduction in the company culture (positive correlation)
- 5) discrepancy between desired and existing frequency of cost analysis (positive correlation) (Ibid.).

A series of questions should be answered to assess each of the two conditions and the answers are plotted on a grid. Depending on the positioning on the grid, the company can decide whether to continue using its existing costing system as it is, to upgrade its existing costing system using ABC elements, to start thinking about adopting ABC in the future after certain structural changes, or to switch to a full ABC costing system right away. (Estrin et al. 1994).

### **3.2 Designing ABC systems**

Literature addressing the design of activity-based costing systems and their implementation into organizations can be classified into three broad categories: books and textbooks seemingly aimed for students and consultants that need a deep understanding of the design process (Berliner & Brimson 1988; Hicke 1992; Cooper & Kaplan 1999); articles developing a conceptual model that give a generic framework of designing and implementation steps (Gunasekaran 1999); and constructive research designing ABC for a specific business organization such as a manufacturer (Alan 1995; Gunasekaran & Singh 1999), a restaurant (Raab et al. 2007), a coffee shop (Hyon-Oh et al. 2010), a software development firm (Neuman et al. 2004), etc.

Despite the vast amount of literature on the design and implementation of ABC in business organizations, there is virtually no difference in opinion among researchers when it comes to the steps of designing the cost system. The few variations in the practical implementation in case studies emerge as a result of ABC being used for



different objectives in different cases, as well as differences in the business environment where it was implemented.

Gunasekaran (1999) provides a comprehensive framework for the design of ABC, providing a list of steps that can be applied to all organizations regardless of size and industry. According to this model the design of an ABC system should go through the following stages:

1. Define the objectives of the ABC system
2. Create a team involved in the design of ABC
3. Pinpoint organizational issues that might affect the design of ABC
4. Build a company activity dictionary
5. Identify the primary cost drivers
6. Build activity cost pools
7. Identify the secondary cost drivers
8. Determine the cost objects
9. Compare ABC product cost with traditional product cost
10. Implement ABC

The stages are explained below using the Gunasekaran (1999) model.

### *1. Objectives of the ABC system*

Before starting the design of an activity-based costing system the design team should be very clear on the objectives of this new system, i.e. what function the cost system will have and for what kind of decision-making the cost information will be used. Some example objectives a successfully-implemented ABC system could accomplish are:

- Provide information about activities to support waste elimination programs
- Provide information about non-value adding activities to reduce costs
- Provide information to guide market focus
- Provide information to set pricing strategies

- Provide information to support make-or-buy decisions
- Provide information to facilitate studies of relative product profitability (Gunasekaran, 1999).

These objectives seem to be well-aligned with the benefits that ABC systems entail for adapting organizations which were explained in section 2.2 of this study.

## *II. ABC team*

The ABC system should be designed by a multi-disciplinary team involving experienced company experts from different fields other than finance. This is advised also in the case when the company hires external consultants to design the system. It is advised to include in the designing team someone who has good working knowledge of the company's existing accounting system. In addition, it is very important to include members from fields other than accounting because ABC is a management system and not a financial system. The designing team should have full support of top-management to ensure the new system will not face dysfunctional resistance. (Gunasekaran, 1999).

This is supported by Innes et al. (2000) survey who find that top-management support is a highly significant variable in explaining the variation of ABC success across different organizations.

## *III. Organizational issues*

There is a variety of organizational issues that affect the suitability of the ABC methodology for the firm. The following issues should be considered and analyzed by the design team before identifying the company activities:

- diversity of product lines
- proportion of overhead costs
- growth rate of overhead costs
- current allocation method of overhead

- differences in the degree of attention and service that the customers require (Gunasekaran 1999).

These points seem to be well-grounded on the idea that cost structure and product diversity are correlated with ABC suitability and adaptation which has been widely supported by research (Bjornenak 1997; Cooper & Kaplan 1999; Innes et al. 2000; Schoute 2011).

#### *IV. Identification of activities*

This is the basic step of an ABC system. Activities are processes or procedures in an organization that cause work to be performed. Identifying the activities means determining what is done with the resources committed at the overhead level of an organization. A systematic approach is required to ensure that all the activities are captured. (Gunasekaran 1999).

To identify the activities the designer should visit all the departments of a company, interview staff members, and determine the work done in each department. Identifying too many activities at a too detailed level would make it difficult to manage the data volume. On the other hand, identifying the activities too broadly would hinder the usefulness of the system for action and decision-making. (Ibid.).

To determine the volume of activities to be identified, the designer should take into consideration the following factors:

- degree of cost homogeneity associated with each activity
- level of detail required to provide enough cost visibility to management
- degree of accuracy required by management for product costs (Gunasekaran 1999).

The logic behind this step is well-aligned with the explanation on identification of activities by Atkinson et al. (2012) which was explained in section 2.1 of this study.

### *V. Primary cost drivers*

The primary cost drivers are the link between resources and the activities—they take a cost from the company general ledger and assign it to an activity. A cost driver is any factor that causes a change in the cost of an activity. As such, cost drivers provide the best explanation why costs in an activity cost pool are changing over time. The accuracy of product costs produced by an ABC costing system depends on the accuracy of the cost drivers; therefore the estimation of the cost for each driver should be very accurate. (Gunasekaran 1999).

To identify the cost drivers the ABC team should interview all employees to ask how they perform different activities and how much time they spend on each stage of these activities. The answers should be analyzed with caution since the way people think they spend their time might be very different from the way they actually spend it. During interviews the employees should be explained well the basics of ABC along with the high leverage opportunities that arise from the new costing system. To minimize inaccuracies, the designer might engage in some work study and time study to determine the actual amount of work. (Ibid.).

### *VI. Activity cost pool*

The activity cost pool is the total cost incurred when performing an activity. Each type of a primary cost driver that is traced to an activity is a cost element in the cost pool of that activity. Some resources can be traced directly to each cost pool. Some resources are shared by several activities and the costs need to be apportioned into different cost pools. When doing the apportionment the designer should consider the extent to which each activity consumes the resource. The best estimation of the apportionment rate does not affect the accuracy. (Gunasekaran 1999).

There are two views on the types of costs that can be included into an activity cost pool:

- all traceable costs—this creates fully absorbed activity cost pools as all the resource consumption is taken into account in the activity cost. Such systems

might become very complex in practice as they create a hierarchy of cross-charging that confuses the understanding of cost behavior.

- only relevant costs—under this approach only costs that are relevant to the decision being made and create information relevant for decision-making should be included into an activity cost pool. (Ibid.).

The designed should attempt to strike a balance between system complexity and the organizational needs for information when considering any of these views. (Gunasekaran 1999).

### *VII. Secondary cost drivers*

Secondary cost drivers link activity cost pools to the cost objects by assigning the cost of activities to a cost object. They represent a measure of the frequency and intensity of demands placed on activities by the cost object. (Gunasekaran 1999).

When selecting the secondary cost drivers the designer should exercise professional judgment and consider the following criteria:

- the cost driver selected should have a strong correlation with cost level in the activity cost pool
- the variable should be quantifiable and homogeneous
- cost and complexity are correlated with the number of drivers, so the number of unique drivers should be minimized
- cost drivers selected should encourage improved performance
- it is best to select cost drivers already available or which have a low cost of collection (Ibid.).

Once again, the logic behind choosing the cost drivers in Gunasekaran (1999) is virtually the same as that explained by Atkinson et al. (2012) included in section 2.1 of this study.

### *VIII. Cost object*

A cost object is a product, service, project, customer, or any other work unit for which a separate cost measurement is desired. Most companies have two hierarchies of cost objects—one for products and one for customers. Products are common cost objects for manufacturers and customers are typically used as cost objects in the service industry. (Gunasekaran 1999).

Products are individual items that are sold to customers. ABC links the cost of activities directly to the products that consume these activities. Ideally cost drivers should be selected with specific products, but a cost driver can also be effectively combined for several products and then is apportioned equally or proportionally among them. Costs such as depreciation and property tax are allocated arbitrarily to products under ABC because of the lack of a suitable cost driver for these costs. (Ibid.).

Customer costing is the calculation of the total costs of serving a customer. This cost includes the cost of products/services purchased by the customer and the cost of support activities provided for the customer. Costing customers makes it possible to assess the profitability of individual or groups of customers. (Gunasekaran 1999).

### *IX. Comparison of ABC with traditional cost information*

The implementation and maintenance of an ABC system is costly and when this cost is traced to products, it may be so that the product cost becomes higher than it would have been if the company continued to use its existing costing system. If it happens so that the product cost increases as a result of the ABC adoption, then the designer should revise the ABC methodology starting from the identification of activities and attempt to strike a balance between system cost and information accuracy. An ABC system should be implemented if its costs are less than or equal to those of the existing system and provides better and more relevant information for decision-making. (Gunasekaran 1999).

### *X. Implementation*

The designer should explain the results of the ABC analysis to the responsible management and affected employees. This explanation should make it clear how ABC differs from the existing cost system, what information can be provided with ABC, and how that information can be utilized in important decision-making. (Gunasekaran 1999).

It is important that from this meeting management understands that the purpose of ABC is not to create an elegant and technically robust solution, but instead a solution that changes behavior and allows management to improve business performance. The users should also be trained to use the system. (Ibid.).

In 'Activity-Based Costing for Small and Mid-sized Businesses' Hicks (1992) used a series of cost accounting solutions provided by D.T. Hicks & Co. to small business organizations over a six year period to provide an overall methodology of how ABC can be used in small business organizations. He states that this methodology is an alternative of ABC design in big organizations and can be designed and implemented successfully with the limited resources of a small firm.

When comparing Hicks (1992) approach with Gunasekaran's (1999) model, we see differences in:

- i) degree of advancement in starting point—whereas Gunasekaran (1999) sees ABC design starting with the identification of costing system objectives and formation of the designing team, Hicks (1992) skips these two steps in his model and starts straightly with the identification of activities.
- ii) level of detail in steps—Hicks (1992) methodology outlines a more detailed list of steps. For instance: identifying major costs, determining the relationship between activities and costs, and identifying cost drivers to assign costs to activities are three different steps in Hicks' model. In Gunasekaran (1999) they are summarized in one step: identifying primary cost drivers.
- iii) order of steps—Gunasekaran (1999) suggests identifying primary cost drivers before grouping activities into activity cost centers, whereas Hicks (1992)

organizes activities into cost pools right after identifying the activities and leaves the identification of cost drivers for a later stage.

- iv) different terms/steps—in Hicks (1992) we find steps such as establishing a ‘cost flow pattern’ or a ‘cost accumulation model’ which are terms that do not appear in Gunasekaran (1999). They represent a more detailed version of explaining the identification of cost drivers.

Hicks (1992) identifies two areas where ABC design for small organizations differs from that of large firms as a result of materiality: identification of activities, and identification of cost drivers. Both aspects are explained below.

In a large organization each process or procedure might represent a significant amount of cost and time and as such they are separate activities grouped into an activity cost center, i.e. collecting and filing receiving reports, purchase orders, and invoices; entering distribution data on invoices; assembling voucher packages; batching vouchers for data entry; forwarding voucher documentation to the cash distribution department, etc. are all different activities in the accounts payable activity center. In a small organization all these activities would take very little resources and as such ‘accounts payable’ represents an activity instead of an activity cost center. (Hicks 1992).

Causality is a very important factor in determining the cost drivers in a large organization: a cost driver is defined as ‘the root cause of a cost.’ This results in the identification of many cost drivers with very narrow definitions, such as lift-truck travel distance, number of material complaint notices, etc. In small organizations the linkage between costs and activities for cost apportionment reasons seems more important than causality when determining cost drivers. In ABC for a small firm a cost driver measures how a cost is incurred and/or how to best charge it to activities. In practice these drivers always indicate where to charge costs and often provide part of the formula for determining the allocated portion. (Ibid.).

It can be concluded that Gunasekaran (1999) model presents a good approach to the design of an ABC system as long as materiality is carefully considered when



identifying the activities and determining the cost drivers for a small business organization, as Hicks (1992) suggests.

### **3.3 Implementing ABC systems**

Literature about ABC implementation belongs to so-called 'factor studies.' These studies use change management literature and descriptive case studies that illustrate success or failure stories of implementing ABC in an organization to determine the aspects that influence the success of ABC implementation.

Pattison and Arendt (1994) use the example of an aerospace company that failed in its first ABC implementation and succeeded in its second attempt to illustrate the learning points about ABC implementation:

- (i) personnel affected by ABC implementation should be engaged in designing the new cost system to ensure commitment to its success
- (ii) information used in ABC should be easily attainable and understood, even if that poses a trade-off on accuracy
- (iii) the costing system should not only be used for cost accounting, but must be linked to performance measurement
- (iv) ABC should create the right incentives to encourage desired behavior among organizational actors

An exploratory empirical evidence of 143 firms that had adopted ABC until 1994 showed that there was a significant variation in the degree of success that firms had with the ABC model and this success was influenced by behavioral and organizational variables such as top-management support, link to competitive strategies, link to performance evaluation and compensation, training, ownership by non-accountants, and availability of adequate resources (Shields 1995). These findings are supported by Malmi (1997) who argued that factors inherent to the organizational culture or its power dynamics posed resistance to ABC models. Anderson (1995) combines the findings in IT implementation literature and cost system change literature with direct observations from ABC implementation in

General Motors from 1986 to 1993 and on the contextual factors that affecting ABC success. The findings are summarized in Figure 5.

Individual Characteristics	Role involvement
	External support
Organizational Factors	Functional specialization versus multi-disciplinary approaches
	Internal communications
	Extrinsic reward system
	Training investments
Technology Factors	Complexity for users
	Compatibility with existing system
	Relative involvement over existing system (accuracy and timeliness)
	Relevance to managers' decisions
Task Characteristics	Uncertainty / lack of goal clarity

**Figure 5. Factors influencing the success of ABC implementation according to Anderson (1995)**

To conclude, we can say that implementation is a very important stage of ABC adaption and its success depends on many factors. With these findings from ABC implementation literature this study concludes the review of activity-based costing literature. The next section introduces the research site company and the research methodology.

## 4 RESEARCH MATERIAL AND METHODS

### 4.1 Company background

The research site of this study is a small prescription glasses retailer located in Northern Finland that throughout this research will be (fictitiously) referred to as EyeCare Co. The justification for this choice is linked to the goals of this research: this study aims to design an ABC system for a business environment where there is low product diversity and then compare the new product costing information with the existing product cost to examine whether traditional costing systems lead to cost distortions despite the existence of one single product line. Eyeglasses retailers have been considered in prior research as the best environment to represent retailers that sell many “horizontally differentiated varieties of a single type of good” (Watson 2009: 217). Therefore, EyeCare Co represents a very suitable research environment for this kind of a study since it offers a high product variety with virtually no product diversity<sup>3</sup>. This section provides a detailed description of the company background. As explained by Labro and Tuomela (2003) a detailed description of the research site is useful in constructive research so that to increase the external validity of the study.

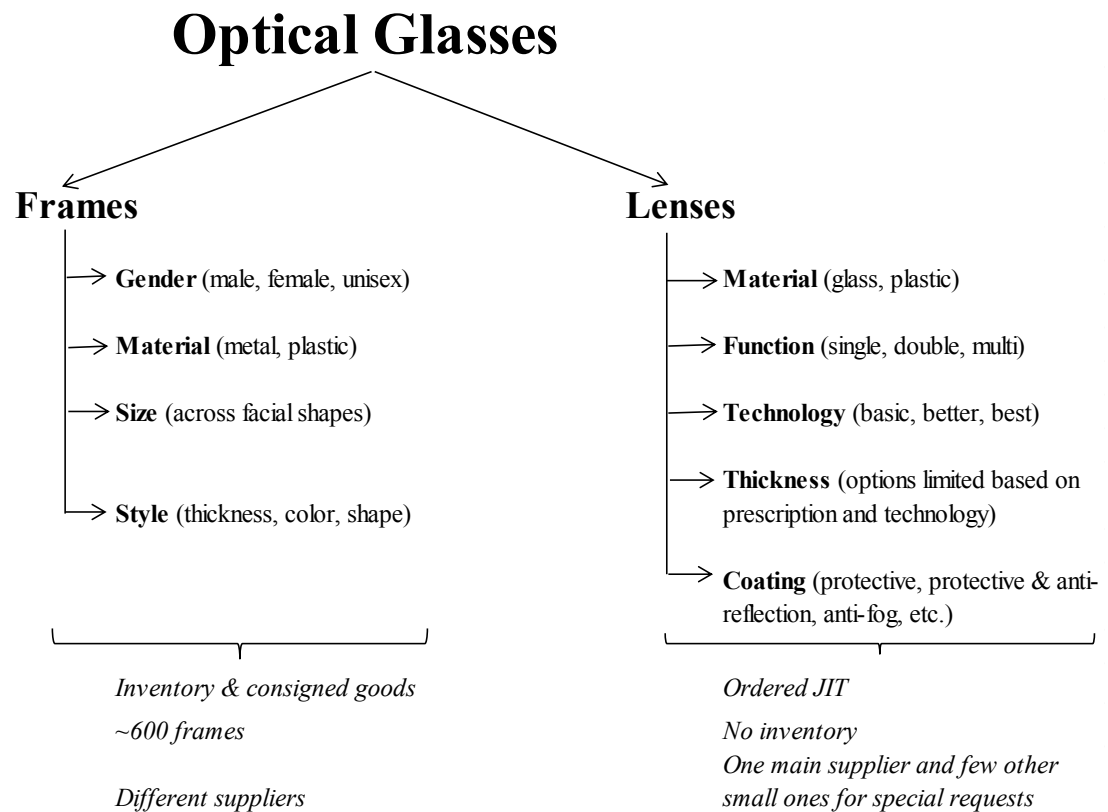
#### *Product selection*

The store sells frames and lenses which are assembled into ready-for-use prescription glasses for the customer. The store has a selection of about 600 frames which vary in material, shape, color, and thickness and are of different brands. Lenses are always custom-made, so there is no inventory for lenses. The customer is assisted through the lens selection process and then the lenses are ordered just-in-time from a lens provider. Lenses can be classified according to material (glass or plastic), and functionality (single function, double function, multifunction). The customer has different options to choose from in technology (basic, better, best), thinness (options vary depending on the technology chosen and prescription that the customer has from the doctor), and coating for plastic lenses (protective only, protective and anti-

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<sup>3</sup> The difference between ‘product variety’ and ‘product diversity’ is explained in section 3.1.

reflection, anti-fog coating, and many more in theory but not often offered practically). When the lens is very thick polishing is also needed. This service is always provided and is not subject to customer demand. Figure 6 presents a graphical illustration of the offered products.



**Figure 6. Product selection of EyeCare Co**

### *Intra-company relationship*

In addition to selling prescription glasses, the store also supports the operations of an eye care clinic owned by one of the owners and organized as a separate legal entity. The clinic is in the premises of the store and it pays rent to the retailer depending on the number of patients received during the month. The company receives a standard fee for each patient and the fee is paid by the patient as an addition to the doctor visit fee.

### *Management control systems*

One of the company owners acts at the same time as the manager of the company. He is assisted in management decision-making by his son who is a business consultant. In addition to the owner, the company employs one full-time sales person and a seasonal sales person who works about 12 weeks a year, mainly during the vocational leave of the full-time sales person and during special-offer weeks. Both the full-time and the seasonal employee are paid a fixed monthly salary and there is no commission or bonus related to the sales. There is no management control system in place and the two employees are trusted to act in the best interest of the organization regardless of the lack of external incentives to do so.

### *Decision-making in the company*

#### a) Strategy

Decisions regarding the strategy of the company are made by the owner. The chosen strategy seems to be that of product differentiation—high quality glasses encourage word-of-mouth marketing which then builds the image of a reputable store that attracts customers that require good quality products.

There is concern that the current pricing strategy does not support the strategy and the store is not really perceived by customers as it was intended to: the store with the best glasses in the market.

#### b) Suppliers

The store operates mainly with two types of suppliers: frame suppliers and lens providers. Frames are bought as inventory or taken on consignment by different suppliers. Lenses are ordered just in time mainly from one lens provider unless order specifications make it so that another lens supplier should be used. In addition to frames and lens' providers, the company has some small suppliers for other goods such as sunglasses, contact lens liquid, and contact lenses (ordered just-in-time).

Business relations with all these suppliers have been initiated by the suppliers themselves. There is no clear division of responsibilities between the salesperson and the owner when it comes to supplier selection and negotiation. There is no data used currently in supporting supplier selection decisions but there is interest by the owner to have such.

#### c) Inventory

Inventory consists mainly of frames. Decisions on inventory purchase are made by the owner and the sales person. Current inventory level is not known when making purchasing decisions and there is no data used to make inventory purchase decisions.

#### d) Pricing

The pricing methodology was decided by the founders since the beginning of the company and it has been followed ever since. Pricing for the customers is divided into lens price, frames price, and work price. The price of the lenses is taken as suggested by the lens provider. The price for the frames is computed multiplying the direct cost of the frames with a constant multiplier and adding a constant to that result. There are many exceptions to this computation and they are intuitively decided by the sales person.

Once the total price is computed, the sales person makes a discount that is typically about 15-20% of the total price. The discount is subjective, mainly inspired by the customer's reaction to the communicated price. Neither the total price nor the discount is well-explained to the customer currently and there seems to be little trust (especially from the new customers) about the pricing methodology as a result of poor understanding. Customers are not educated on the costs and how to compare the prices across different competitors. The company reacts to price sensitivity via discounts as a result of the inability to clearly communicate the value proposition. The company follows its own pricing methodology and is not really reactive to competitors' pricing.

The quality of service offered does justify premium prices: there is extensive support to choose the glasses, only good quality products are offered in the store, there is careful measuring of the center point and eye height, the lenses are always checked when received from the lens provides and the amount of mistakes is minimal. There is trust in the sales person and the doctor and the service is especially superior when the customer is at the same time a patient of the doctor.

Currently there is no data on the variance in cost between these different products and it is not clear how much more multi-function glasses cost compared to the single-function ones, for instance.

#### e) Special-offer weeks

The store has two types of special-offer weeks: discount on lenses, and special-offer discounts. The weeks with special deal on lenses are timed to coincide with the weeks when the lens providers have such deals and as such there is not much need for internal decision making—the store merely passes on to the customers the deal from the lens supplier.

Special-offer weeks are weeks during which every customer that purchases glasses gets the doctor's appointment free of charge. This is offered twice a year in autumn and spring. This offer seems to be very effective and it gives the company a competitive edge, since its rivals cannot currently emulate it. This offer is advertised in the regional paper. Otherwise, the company does not invest much in advertising itself.

#### *Challenges with the current costing system*

Currently company bookkeeping is outsourced and every month there is a report delivered to the owner by the bookkeeper followed by a discussion between the two. The data from the report is used mainly to time the purchasing of frames from suppliers and there is no product costing or profitability analysis.

Direct costs for the frames and lenses equal the purchase price of the items and in the case of the lenses also the work fee charged by the lens provider. Indirect costs are divided equally among all sales occurred in a year. No overhead rates based on labor hours or other allocation bases are used to assign indirect costs to the sold products.

This current way of product costing is deficient in providing information on the following issues:

- a) Product and customer profitability— currently it is not known which products or customer groups yield the highest profit for the company. This is associated with advertising challenges since management does not know what target market they are trying to reach and what are the most efficient channels to communicate the value proposition of their company.
- b) Product pricing— the pricing of products follows an old model that has not been evaluated or updated for years. Discounts are highly circumstantial and subjective. Customers do not seem to understand the pricing system and tend to distrust it. Moreover, the current pricing system does not seem to influence customer behavior in a way that it would benefit the company the most.

#### *Evaluating the need of the company for ABC system*

Studies have shown a significant relation between cost structure and ABC adaption (Bjornenak 1997; Innes et. al 2000; Schoute 2011). In EyeCare Co. indirect expenses in the company equal about 60% of the overall costs. Preliminary, we can say that this setting would benefit from activity-based costing.

To further evaluate the need of the company for ABC and the potential of this costing system, Estrin et al. (1994) framework is used. First, all the ten factors were listed and questions were posed to management so that to evaluate each factor and assign it a grade from -5 to +5. According to the model each factor could also be assigned a weight depending on the relative importance it has for the company. Management saw all the factors equally important and assigned no relative weight to them. A description of all the factors is provided in the paragraph below whereas the grades assigned by management are shown in figure 7.



- 1) Product diversity—product diversity is low. Although the store offers a wide selection of frames and many options for lenses to choose from, these are minor variations that do not cause a difference in product complexity and processes. As explained by Watson (2009) the inventory in eyeglasses retailers is horizontally differentiated and it lacks depth which translates into a very limited product range.
- 2) Support diversity—different products require different degrees of overhead resources. Some frames need to be mailed to the lens supplier; some only need to be measured in the store. Depending on the lens provider and the type of the selected frame, sometimes store personnel has to insert the lenses into the frames, but sometimes this is done free of charge by the lens provider.
- 3) Common processes—processes such as marketing, accounting, quality control, and administration are the common to all the products.
- 4) Cost allocation— indirect costs are not allocated by product.
- 5) Growth of indirect costs—indirect costs have not been growing over the years. They have been steadily fluctuating between 50% - 60%.
- 6) Pricing freedom— management has full freedom in pricing decisions. There are no price-setting regulations in the industry and the company is not a price follower. Although the company currently follows the supplier suggested prices for the lenses, it has full freedom not to do so. However, the market is very competitive and the store is a small player far from a monopoly.
- 7) Fixed expense ratio—the fixed expense ratio is high: about 60% of the total costs are fixed expenses.
- 8) Strategic considerations—although the concept of the store is to position itself as a high quality provider and follow the market niche strategy, in practice cost considerations are economic returns seem to be more important factors in decision-making than strategic considerations. However, management would like not to have decisions conflict its strategy.

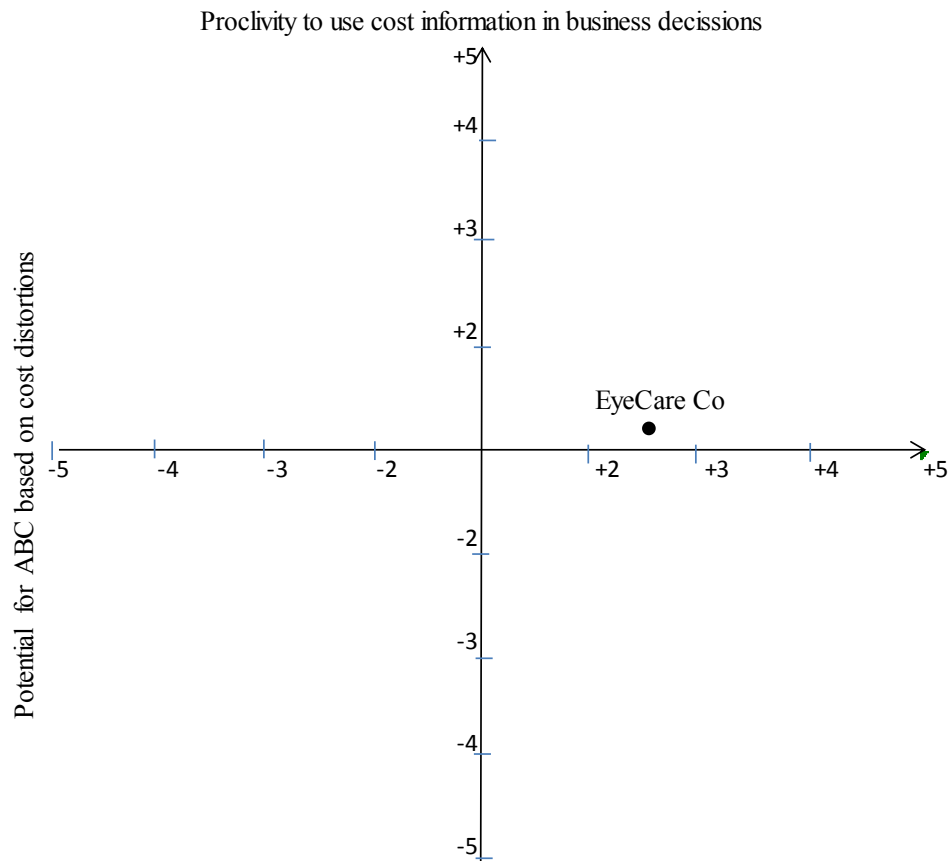
9) Cost reduction effort—management is concerned about cost reduction and considers it highly important. However so far there is no systematic analysis to drive these efforts.

10) Analysis frequency—accounting reports are provided to management monthly. While the frequency of these reports is of the desired level, the data presented is insufficient for many types of decision-making such as pricing, supplier evaluation, capacity estimation, etc. Therefore there is a discrepancy between the current and desired state of being.

'X' Axis: Proclivity to use cost information in business decisions		'Y' Axis: Basic potential for ABC based on cost distortions	
Factor	Grade	Factor	Grade
Pricing freedom	+3	Pricing freedom	-5
Fixed expense ratio	+3	Fixed expense ratio	+2
Strategic considerations	+2	Strategic considerations	+5
Cost reduction effort	+2	Cost reduction effort	+5
Analysis frequency	+3	Analysis frequency	-5
<b><i>Average</i></b>	<b>+2.6</b>	<b><i>Average</i></b>	<b>+0.4</b>

**Figure 7. Assessing relevant contingent factors of EyeCare Co**

After finding the average on a scale of -5 to +5 for both sets of five factors, the company was plotted into the grid as shown in figure 8. The company is positioned in the first quadrant of the grid, indicating a positive potential for ABC due to current product cost distortions, as well as a positive proclivity for management action in using ABC information in important decision-making. This means that current product costing is inaccurate and this information can be used by management in decision-making, which makes important decisions such as pricing, cost reduction, etc. be less than optimal. These circumstances indicate a need to implement ABC into the company.



**Figure 8. Contingency grid for EyeCare Co**

## 4.2 Data collection

For this research data was collected through interviews and informal discussions with management and the sales personnel. Financial statements from 2005 to 2013 as well as the general ledger from 2013 were used. In addition the sales' register from the company sale documentation software as well as the price lists from the suppliers of frames and lenses were used in the analysis. The researcher was also present in the company to observe the daily operations and measure the time of performing different activities for one week.

## 4.3 Methodology

This study follows the constructive research approach, which is generally defined as a research procedure that produces an innovative construction to solve an existing problem and by that means make a contribution to the theory of the discipline in

which it is applied (Lukka 2002). According to Lukka (ibid.) the core characteristics of a constructive research are:

(i) Focuses on a problem relevant to be solved in practice— this research focuses on the problem faced by a prescription glasses retailer in allocating indirect costs to find a more accurate cost for its products.

(ii) Produces an innovative construction meant to solve the practical problem— this research designs a new costing system—activity-based costing—for the company. This new costing system aims to solve the above-mentioned problem of inaccurate allocation of indirect costs that leads to suboptimal product costing.

(iii) Includes an attempt for implementing the developed construction and thereby a test for its practical applicability— this research finds product cost using activity-based costing and compares that to the product costing derived under the traditional costing method currently in use. The difference between the two can act as a guide towards assessing the practical usability of the system.

(iv) Implies a very close involvement and cooperation between the researcher and practitioners in a team-like manner, in which experiential learning is expected to take place— the researcher has been in direct contact with the company management and personnel during the different stages of designing the costing system and has learned from the experience.

(v) Is explicitly linked to prior theoretical knowledge— the costing system designed in this research is based on the ABC design theoretical models found in literature.

(vi) Pays particular attention to reflecting the empirical findings back to theory— this research reflects on the suitability of ABC systems for specialty retail stores as well as how applicable the theoretical models are for evaluating these businesses' need for activity-based costing and designing such a costing system for these businesses.

Constructive research is based on the assumption that one can make significant contributions to theory through a profound analysis of what works or does not work

in practice—a fundamental belief of the pragmatist philosophy of science (Lukka 2002). These theoretical contributions of constructive research can be derived from the development of objective constructs with universal applicability—close to positivist science, or from the development of inherently interpretative and subjective action-based research that illustrates, refines, or tests a theory (Labro & Tuomela 2003).

To illustrate, Degraeve et. al (2000) is an example of constructive research that designed a system that would help Alcatel Bell make the optimal airline selection for the procurement of business travel services for their employees. Through combining ABC with mathematical programming the research brought about a novel construction that minimizes the total cost of ownership in supplier selection for the procurement of a service—an objective construct with universal applicability (Labro & Tuomela 2003).

On the other hand, Tuomela (2005) is an example of constructive research that designed a strategic performance measurement system—Customer Scorecard and 3K Scorecard—for a Finnish ABB company. These constructs were marginal modifications of an already-existing management accounting tool—the Balanced Scorecard—that were adapted to the reality of the research site company and as such they lacked universal applicability (Labro & Tuomela 2003). However, the study contributed to the refining of theory through enhancing readers' understanding on the compatibility between customer focus and performance measurement (*ibid.*). It should be noted that in order to enhance this understanding of the readers the researcher should (i) describe the research process in a detailed fashion, and (ii) consider the relevant contingent factors of the research site company (Labro & Tuomela 2003). Further theoretical contribution can be achieved through means of elaborating a theory based on the constructive work findings in post-constructive work (Tuomela 2005).

This concept of this research is similar to that of Tuomela (2005) in terms of adapting an existing management accounting tool such as activity-based costing to the reality and needs of the research site company. As such, the theoretical contribution is sought in terms of theory refinement. As Labro and Tuomela (2003)

point out, when trying to contribute to the refinement of a theory through constructive research the researcher needs to consider the contingent factors in the studied company. As means to that end, this study takes the stand of a contingency-based approach.

In addition to enhancing the theoretical contribution of the study, a contingency approach also is useful for showing the scope of applicability for the constructed solution which defines the external validity of the research (Labro & Tuomela 2003). Internal validity will be assessed based on the market test—whether the studied company implements the designed costing system (Ibid.).

## 5 MATERIAL ANALYSIS

### 5.1 Designing an ABC system for the studied specialty retailer

The costing system is designed following the model from Gunasekaran (1999). Steps 2 “Create a team involved in the design of the ABC system” and 10 “Implementation” were not followed in this study. The costing system was designed solely by the researcher with the input data provided by company staff. Implementation of the ABC system falls outside the scope of this study which focuses solely on the design of the ABC system and its comparison with the currently-in-use system.

#### 1) Defining the objectives of ABC

As identified in chapter 2.3 “Benefits of using Activity-Based Costing” of this study, information derived from activity-based costing can be used in cost-reduction efforts, customer profitability analysis, supplier evaluation, product pricing, performance management, budgeting, and capacity planning.

All these benefits were listed and briefly explained to the management of the studied company. The manager was then asked to assign a grade from (+1) to (+5) to each of the benefits listed. A grading of (+5) would indicate that this benefit is highly relevant for the company context and as such the ABC system should be designed with this objective in mind. A grading of (+1) would indicate that this specific benefit is not very relevant for this company context and ABC information is not likely to be used for that objective.

A list of the ABC benefits and the grades given by management is presented in table 1. The three most important benefits from ABC for this company were identified to be: (i) product pricing; (ii) product profitability analysis; and (iii) capacity planning. These were identified to be the objectives of the ABC system to be designed.

*Table 1. ABC objectives for EyeCare Co*

ABC Objectives	Relevance for EyeCare Co.
Cost management	(+3)
Product profitability analysis	(+1)
Customer profitability analysis*	(+5)
Supplier evaluation and selection	(+3)
Product pricing*	(+5)
Performance management	(+1)
Capacity planning*	(+4)
Financial planning	(+1)

*(i) Product pricing*

Pricing is very unique in this industry. Every single pair of glasses sold has a unique price which is a combination of the price of the frames, the price of the lenses, and the price of work done on the lenses. The company uses a formula combining all the variables above to compute the price of one pair of glasses and this formula has remained the same since the start of the company operations. Management is interested to test its current relevance by using costing information derived by ABC.

*(ii) Customer profitability analysis*

Currently there is little investment in marketing. Management is interested in putting more efforts into advertising. This creates a need for information on customer profitability. When the most profitable customer group(age) is identified the marketing channels can be chosen more effectively by targeting that specific age group.

*(iii) Capacity planning*

As more effort will be put in marketing, an increase in sales is expected. Management is interested to know whether the company has the capacity to



accommodate for this foreseen growth in sales volume and plan HR and other resources accordingly.

The other benefits of ABC were considered less important by management and as such will not be the focus of the costing system designed in this study.

## 2) Outlining organizational issues that affect ABC

Organizational issues affecting the suitability of an ABC system are cost structure—proportion of overhead costs and how they are allocated—and differences in service to customers.

In EyeCare Co overhead costs amount for over 60% of the total costs and currently they are not allocated to products. They have been taken into account when computing the product pricing formula when the company first started the operations. Differences in service to customers depend mainly on their prescription (which defines the price of the work done on the lenses) and their choice of frames (certain frame shapes make it difficult to measure the frames within the store and require for them to be mailed to the lens provider, which incurs mailing fees).

In addition to the above-mentioned issues, there are some other organizational factors that were considered when designing the ABC system for this company, such as:

### *i) Limited human resources*

Currently the only full-time employee the company has is the sales person. Some administrative tasks are carried out by the owner or a manager on part-time basis. This limitation of the human resources creates a need for costing system simplicity. It also acts as a main bottleneck when computing the theoretical capacity.

### *ii) Undergoing change*

The company strategy and practices are about to be revised. This will create an environment that has to deal with change management. This creates a need for the costing system to provide information relevant to the decisions made about practice revision. It also requires for specific managerial recommendations to guide the process.

*iii) Intra-company relationship*

Part of the resources of the studied company are used in supporting the operations of another company—an eye care clinic. The clinic is located within the facilities of the studied company and the company assists the operations of the clinic in activities such as booking patient appointments, updating patient information, collecting patient fees, etc. The ABC system should identify the total cost of supporting the clinic operations.

All these issues were taken into consideration when identifying the activities of the company.

3) Identifying the activities

Activities are processes that use up the company overhead resources. Activities were identified by observing the company daily operations for one week, as well as interviews and informal discussions with management and the sales person.

The level of detail in the list of activities attempts to balance complexity of the ABC system with usefulness of the costing information—i.e. the list is detailed enough to list the processes the company resources are committed to within a reasonable amount of data volume. All the listed activities were grouped into three categories: (i) serving customers; (ii) serving patients; and (iii) organizational level activities.

*(i) Activities to serve customers*

This category includes all the activities performed to serve customers that purchase optical glasses from the store. They include: assisting the customer to select frames

and lenses; ordering the lenses from the lens provider; mailing the selected frames to the lens provider if needed; inspecting the quality of the lens order received by the lens provider; storing the ready-for-pick-up glasses; selling the glasses to the customer; and fixing minor problems for glasses of the existing customers. All these activities are explained below.

#### Activity 1: Selecting frames and lenses

Customer needs and preferences are identified via asking questions and having the customer try out different types of frames. The customer is guided through the selection to decide on the material, size, and style of the desired frame. Depending on the customer the process can last 10-30 minutes with the mode being about 10 minutes. Once the customer has decided on the frame, (s)he is asked to show the prescription for glasses. Judging by the prescription the sales person can introduce the available options for lenses. After the customer has selected the desired frame and the desired lenses, the sales person computes the estimated price and communicates that to the customer to make a deal.

Provided that there is a deal with the customer, the sales person then measures the center-point and the height of the eye of the customer and records the information. An order request is filled specifying the type of frame and lenses chosen, the eye-measurement information, as well as the contact information of the customer. Once this form is filled, the customer can leave the store and the sales person starts ordering the lenses from the lenses' supplier. This process differs depending on the type of frames that the customer has chosen, as well as the supplier chosen.

#### Activity 2: Ordering lenses

If the lenses are being ordered by the main lens provider, the frames are placed into a machine that measures them and saves their dimensions to be sent to the lens provider. Some frames have shapes that make it difficult to measure them using the machine. In this case the frames are mailed to the lens provider. Also, if lens providers other than the main supplier are used, the machine is not used and the frames are mailed. Once the frames have been measured, lens specifications such as

correction numbers, technology, etc. are specified in a computer software where the frame measures were as well saved. Once all the specifications are there, the order can be submitted and it is sent online to the lens provider.

Next the order is documented in Promeda— a documentation software used in the company—and printed. Frames are mailed to the lens provider for orders from lens suppliers other than the main one, or for orders that include special shapes of frames that cannot be measured by the machine. The company tries to always use the main lens provider, except for those cases when the customer order cannot be fulfilled by the main supplier as a result of the customer need in correction and their choice of lens thickness and technology.

#### Activity 3: Inspecting the quality of the lens order

It usually takes two weeks for the ordered lenses to arrive to the store. The lenses come together with a document specifying their price. A price sheet for each supplier is filed so that later on the invoice from the supplier can be compared to this document. When the frames have stayed in the store and the order has been submitted online, the lenses need to be placed to the frames by the salesperson. Next, the lenses need to be checked for any mistakes with the correction number and their center point. This is done using a machine. Once they are placed into the frames and checked, the lenses need to be cleaned.

#### Activity 4: Storing the ready-for-pick-up glasses

A customer info card is printed from the documentation software and laminated. The customer is notified that the order is ready via a generic text message or via calling, depending on the method the customer has chosen when ordering the glasses.

#### Activity 5: Selling of glasses to the customer

When the customer comes to pick up the glasses (s)he tries them on and checks the vision both indoors and outdoors to identify any discomfort. Once the lenses have been checked, the frames are twisted around the ear to provide more comfort for the

customer. The customer pays for the glasses in cash or via card payment. In some cases a detailed receipt needs to be filled in for the customer so that they can claim benefits from Kela or health insurance companies.

#### Activity 6: Fixing of glasses for existing customers

This activity usually consists of replacing a nose pad or a screw or twisting the frames around the ear and it is a service usually offered free of charge to customers.

#### *(ii) Activities to serve patients*

In addition to these activities related to the operations of the store, the salesperson engages daily in several activities that support the operations of the eye doctor. Such activities include:

#### Activity 1: Booking patient appointments

The sales person answers to patient phone calls to book them appointments at the eye care clinic that operates in the same facilities as the store.

#### Activity 2: Updating patient information

Every morning the sales person goes through the list of patients for the day and creates patient cards for the fist-time patients, or finds and updates the existing card for the returning patients.

#### Activity 3: Performing Schirmer's test

This is a tear liquid eye test and is only performed for certain patients when instructed by the doctor.

#### Activity 4: Collecting payment

The sales person collects the payment for the doctor's visit or sends the invoice when the patient asks for that. In most times a form is also filled out to allow the patient to claim for social security benefits from the social insurance institution of Finland, Kela.

*(iii) Organizational level activities*

These are activities that are performed at the organizational level and do not serve customers or patients directly. They include:

Activity 1: Filling in the bookkeeping report

At the end of the day the sales person processes the daily cash flow receipts and fills in a report that is submitted monthly to the bookkeeper.

Activity 2: Purchasing frames

There is a limited number of frame suppliers that the store deals with. These suppliers send their sales representatives to the store about four times a year and the sales person is guided through the selection and can then make an order. Although the number of frames bought is in proportion to the number of glasses sold, the estimated time in dealing with frame providers is constant—there is always the same amount of meetings with sales representatives in a year and always the same time dedicated to seeing the selection. Since the cost of this activity is not influenced by the sales volume, purchasing frames is considered an organizational level activity and not an activity that serves customers.

4) Identifying primary cost drivers

Primary cost drivers show the consumption of resources by activities. They take a cost from the general ledger and assign it to an activity on the basis of causality: what makes the costs of an activity change over time.

To identify the primary cost drivers the daily company operations were observed and the sales person was asked to estimate the amount of time spent on each activity. In addition some work study and time study was performed by measuring the time spent on each activity in different occasions so that to find the actual amount of work.

The primary cost drivers used in this study are labor hours, area occupation in square meters, percentage 'ownership' of equipment, and percentage usage of costs. Below an explanation follows per each:

#### *Labor hours*

The full-time salesperson and the seasonal sales-person are paid a fixed monthly salary, making "Salaries and wages" expense be an overhead cost. This cost is allocated to activities based on the amount of labor hours that the salesperson spends on each activity.

#### *Square meters*

Costs such as "Building costs and security," "Utilities," and "Insurance" are allocated among activities based on their occupation of the total area in square meters. The main components of utilities are lights and heating and all the equipment used in different activities is either operated manually or consumes insignificant amounts of electricity. For this reason the cost of utilities has been allocated on the basis of area occupation. Insurance is for the whole store as a unity to mitigate the loss from risks such a burglary or natural disasters. This cost is also allocated using "square meters" as a primary cost driver.

#### *Percentage 'ownership' of equipment*

Costs related to equipment such as "Maintenance of equipment" and "Depreciation" are allocated to activities based on their use of different equipment. A list of equipment used in each activity was made by observing company operations and discussing with staff members. Then a percentage was assigned to each activity based on their relative use of equipment.

*Percentage 'usage' of costs*

Costs such as “Post and phone” and “IT costs” were allocated to different activities based on an estimated percentage of how much each activity consumed these resources. The percentage was estimated through discussions with staff.

*Arbitrary allocation*

The cost of supplies was simply allocated equally among all activities. The reason for this arbitrary allocation was the significance of this cost compared to the total overhead—0,1% as well as the fact that all activities consume supplies with very small variations.

Table 2 lists all the costs and the primary cost drivers used to allocate those to activities.

*Table 2. List of costs and primary cost drivers*

Cost	Cost Driver
Salaries and wages	labour hours
Building cost and security	square meters
Maintenance of equipment	percentage 'ownership'
Depreciation	percentage 'ownership'
Utilities	square meters
Insurance	square meters
Post and phone	percentage 'usage'
IT costs	percentage 'usage'
Supplies	equal allocation

5) Identifying activity cost pools

Using the primary cost drivers identified above, all the costs are apportioned to all activities. Then for each activity the costs traced to that activity are summed up to



find the total cost of performing each activity. Table<sup>4</sup> 3 shows an excerpt of some of the cost pools identified for EyeCare Co using the activities to serve customers.

*Table 3. Activity cost pools in EyeCare Co*

Costs	Activities for serving customers						
	Sale of frames	Ordering of lenses	Mailing	Inspection	Storing	Sale of glasses	Fixing glasses
Salaries and wages	€ 10,478.72	€ 6,359.04	€ -	€ 6,359.04	€ -	€ 4,451.33	€ 3,551.59
Building cost and security	€ 3,563.50	€ 329.48	€ 658.95	€ 329.48	€ 658.95	€ 329.48	€ 988.43
Maintenance of equipment	€ -	€ 72.00	€ -	€ 36.00	€ -	€ 108.00	€ 18.00
Depreciation	€ -	€ 319.15	€ -	€ 159.57	€ -	€ 478.72	€ 79.79
Utilities	€ 663.65	€ 24.55	€ 49.10	€ 24.55	€ 49.10	€ 24.55	€ 73.64
Insurance	€ 669.53	€ 25.43	€ 50.86	€ 25.43	€ 50.86	€ 25.43	€ 76.29
Post and phone	€ -	€ -	€ 1,913.66	€ 159.47	€ -	€ -	€ -
IT costs	€ -	€ 139.01	€ -	€ -	€ -	€ 119.16	€ -
Supplies	€ 60.88	€ 16.32	€ 16.32	€ 16.32	€ 16.32	€ 16.32	€ 16.32
<b>TOTAL</b>	<b>€ 15,436.29</b>	<b>€ 7,284.98</b>	<b>€ 2,688.89</b>	<b>€ 7,109.86</b>	<b>€ 775.23</b>	<b>€ 5,552.98</b>	<b>€ 4,804.06</b>

#### 6) Identifying secondary cost drivers

Secondary cost drivers show the consumption of activities by products. They allocate the total cost of performing an activity across different products depending on the demand placed on each activity by a specific product. Table 4 presents all identified activities and their respective activity drivers.

<sup>4</sup> The table shows fictitious figures due to the sensitive and confidential nature of the information.

*Table 4. List of activity drivers in EyeCare Co*

Activity	Activity Driver
Selecting frames and lenses	number of sales
Ordering lenses	number of orders
Mailing frames	number of deliveries
Inspecting lenses	number of orders
Storing glasses	number of orders
Selling of glasses	number of customers
Fixing glasses	number of glasses fixed
Booking patient appointments	number of appointments
Updating patient information	number of patient visits
Performing Schirmer's test	number of tests
Collecting patient fee	number of paying patients
Filling in bookkeeping report	labour hours
Purchasing frames	number of purchases

## 7) Identifying cost objects

For activities related to serving customers cost objects are products—i.e. spectacles sold. For activities related to serving patients, a cost object is a single patient. Organizational level activities are allocated to products using an overhead allocation rate based on the number of sales.

Twelve groups of products were identified as cost objects that place a demand on the activities performed by the company. This classification was based on the type of lenses sold—single-function, double-function, and multi-function lenses. For each of these three lens categories the lens material could be plastic or glass. And each lens is sold with a pair of frames that can be a model for men or a model for women. The possible combinations give twelve product categories: Men-Single function-Plastic; Men -Single function -Glass; Men- Double function -Plastic; ... ; Women-Multifunction- Plastic; Women- Multifunction -Glass.

This product categorization was concluded the most suitable one because it is suggestive of customer classification. For instance, if product profitability analysis shows Women-Multifunction-Plastic to be the most profitable product, it means that customers that are women over 50 years old are the most profitable customer group. Such information is useful to decision-making regarding the target market of the

company and the most effective marketing channels for advertising. Providing information on this kind of decision making was considered a primary objective of the ABC system designed.

The total cost of serving patients was simply divided with the total number of patients so that to calculate the cost of serving one patient. This information is important so that compute the total amount of resources consumed to support the operations of the eye care clinic. Management defined this study of the intra-company relationship of high interest.

Organizational level activities were not distributed to products directly but were pooled and allocated using as an overhead allocation base the number of sales. This was considered the most suitable allocation base because the higher the sales volume for a specific product, the more time goes into processing those sales receipts to fill in the bookkeeping report, the more purchased frames are used up by that product category, and the more advertising has been targeted to the corresponding customer group. Other costs in this category such as “Membership fee” and “Bank expenses” are of an immaterial value.

Although the allocation based on an overhead allocation rate is considered to hinder the precision of a product costing system, in this case its use is supported by considerations of materiality—organizational level costs amount for only 11% of the total period costs—and relevance—these costs cannot be highly influenced by management in the short-run and as such are less important for decision-making.

#### 8) Computing the cost of overcapacity

One of the objectives of the designed ABC system as defined by management was to give information suitable for capacity planning decisions. Towards that end, a theoretical capacity of the number of customers and patients served was computed. From that starting point the theoretical capacity of all activities was computed. The actual activity level was then compared to the theoretical capacity to determine what percentage of capacity the store is currently operating at.

From the computations it is concluded that the store currently serves around 31% of the customers that it theoretically has the capacity to serve and the eye care clinic receives about 42% of the patients that it could theoretically accommodate in one year. Activities such as “Mailing” and “Storaging” have a current operating capacity of 100% because no labor hours have been allocated to these two activities, so an increase in the amount of customers to the theoretical capacity would not increase the number of labor hours dedicated to these two activities. The other two activities that would not require more time to perform regardless of the increase in the sales volume would be the processing of the daily cash receipts for the bookkeeping report and the purchasing of frames—the same amount of time is spent to go through the frame selection and there is no difference in the amount of time spent to order 20 or 30 pairs of frames.

## **5.2 Comparing ABC with current product costing**

After designing the new costing system ABC information is compared to current product costing. This comparison allows assessing whether the now-in-use costing system provides accurate product costs. This assessment is important to this research since the objective is to examine whether traditional systems lead to cost distortions in business contexts where product diversity is limited.

Currently the company allocates the period costs equally to all annual sales simply by dividing the total overhead costs with the yearly sales volume. Example computations of the product cost and profit margin for sales within each product category were made using both the current method of allocating overhead costs and then ABC. Computations revealed that under the current product costing the profitability in one product category—which corresponds to one customer age group—is underestimated by about 22%. Computations made in another product category showed an overstatement of profitability by 16%.

These examples show that there is a significant difference in product costing and profitability analysis when using ABC to allocate the indirect costs across different product categories. Since the current overhead allocation method leads to significant

product cost distortions, ABC would be a better choice for this company's costing system.

Using this product costing information preliminary recommendations were passed on management regarding the customer groups that should be targeted in marketing campaigns, the pricing of different product categories, and the HR capacity planning in case of an increase in sales volume. These are presented briefly in the next chapter.

## 6 CONCLUSION

There is general agreement in literature that a wide product range creates a need for activity-based costing (Jones 1991; Drury 1997; Cooper & Kaplan 1999; Schoute 2011). The underlying assumption is that when the product range is limited, traditional costing systems are able to provide accurate information on product costing (Cooper & Kaplan 1999).

This study aimed to examine whether ABC would provide better quality information compared to that from a traditional costing system in a business that offers a wide horizontal differentiation of a single product line: a small prescription glasses retailer.

It is concluded that despite the lack of a multitude of product lines, traditional costing system provides inaccurate product costing information for the studied company. Hence, this retailer would benefit from the adaption of an ABC system by getting better quality information for decision-making in pricing, customer profitability analysis, and capacity planning.

Several studies in the past have attempted to reject claims that ABC was needed more in large businesses (Hicks 1992; Gunasekaran & Singh 1999). In a similar way, this study might start challenging traditional views on the relationship between product range scale and the need for ABC. Future studies can explore further the conditions under which traditional costing systems become unreliable despite the business focus on one main product line.

Estrin et al. (1994) contingency framework was used to evaluate whether the company had a need for an activity-based costing system. According to this framework the company is analyzed on two dimensions: (i) the likelihood that product costs are distorted by the current allocation method of indirect costs; and (ii) the likelihood that product costing information is used by management in important decision-making. If both these likelihoods are positive, there is a perceived need for activity-based costing in the company. Both dimensions are a composition of five

different factors that management has to evaluate by answering certain questions with a grade from negative five (-5) to positive five (+5). (Ibid.).

The challenge of applying this framework lies in the fact that the framework is not clear whether the answers should describe the status-quo or the desired state of being. For instance, one of the evaluated factors is “Cost reduction effort,” which is supposed to measure whether managing costs is important in this business environment. If cost management is important, the perceived benefit of ABC implementation is higher since this costing system makes cost reduction efforts more efficient. In the current state of being the company does not put any systematic efforts into cost reduction. So, if the status-quo was to be evaluated, the grading would have been (-4). However, management is interested in managing costs in a desired state of being where this factor would have been graded (+3). The framework does not specify which of these two states should be considered.

Applying Estrin et al. (1994) framework it was established that EyeCare Co does need a costing system based on activity-costing. The ABC system was designed applying Gunasekaran (1999) generic model using a step-by-step approach. The last step of implementation was left out of this study for reasons of research scope limitations. An additional step was added to the Gunasekaran (1999) model “Computing the cost of overcapacity.” The company is a small retailer that does not operate under full capacity and as such it was seen relevant to compute the indirect costs per unit using both actual and theoretical capacity. The other steps of the model were found applicable in this business context.

The contingency framework of Estrin et al. (1994) and the ABC design model of Gunasekaran (1999) are aimed for practitioners and are prescriptive in nature. As such their scientific nature is questionable from the more conservative circles of academia. Nevertheless these studies were found suitable to use in this research given that they are written by academics and are well founded on ABC theory. Moreover, as argued by Lukka and Granlund (2002) prescriptive research published in practitioners’ journals should be included in the ABC literature discussion because they entail an integral part of activity-based costing knowledge; without the input from this type of research, there would be little (if at all) to elaborate on for the more

scientific research; and because in accounting discrimination on the basis of scientific nature is not automatic and the field documents a long tradition of literature of a prescriptive nature.

The contribution of this research to the academic discussion on ABC can therefore be summarized as follows:

- a) Activity-based costing is proved a suitable and beneficial costing system for a specialty retail store of a small size despite its focus on one main product line
- b) Estrin et al. (1994) contingency model of evaluating whether a specific company needs an ABC system has significant practical value but should be expanded to clarify whether the status-quo or the desired state of being are analyzed (for cases when these two are different)
- c) Gunasekaran (1999) generic model of designing an activity-based costing system for a company is proven applicable in the context of a prescription glasses retailer but should be modified to measure the company overcapacity in order to account for the size of a business operations

The costing system was designed having three objectives in mind: (i) better product pricing to reduce price subjectivity and generate customer trust, (ii) customer profitability analysis to channel marketing efforts, and (iii) capacity planning to understand what increase in sales volume can be handled with the current resources. The designed costing system increases the accuracy of the information used in these three areas of decision-making. During the comparison of the current product costs with the product costs computed using ABC, the following conclusions were made:

- a) The company needs to revise its current pricing formula. The multifunction glasses could be priced lower whereas the price of the single-function glasses needs to be increased.
- b) The most profitable products are multifunction lenses which identifies as the most profitable customer group seniors of above 60 years of age. Consequently, this group should be identified as the target market and advertising channels should be chosen to that to best appeal to this demographic group.



- c) Annual sales volume could increase by 70% with no need to invest more in HR and building area resources.

It can be concluded therefore that this research did fulfill its goals of practical contribution.

This research is subject to various limitations stemming from the constructive research approach or the limited resources of the researcher. The constructive approach of this study accounts for a high risk of subjectivity from the researcher when interpreting the results of the study. Being highly involved in the process of generating the findings hinders the objectivity of the results to an extent that an inexperienced researcher might not be well-equipped to fight.

In addition, this research is also subject to Hawthorne effect—the behavior of the company staff might have been altered in response to the fact that they are being observed and studied. This might lead to inaccurate results when measuring the time of performing certain activities. To minimize this effect each activity was observed and timed multiple times during one week to account for any variances.

Another limitation of the study might stem from the fact that the costing system was designed solely by the researcher and in practice it is advised to have a team of experts and company employees engaged in the task. Conducting the project in a team addresses the challenges of limited knowledge and misjudgment which are bound to hinder the results of individual work. To mitigate this limitation the researcher engaged in several discussions with company management during the designing process.

Despite these limitations and challenges, this study was concluded with a new product costing system for EyeCare Co and an executive summary with management recommendations for the company and provided insight on how Estrin et al. (1994) and Gunasekaran (1999) models could be further improved to enhance their practical applicability.

The findings of the study were introduced to the company and management expressed intention to adapt the constructed ABC system. Although a weak market test constitutes of the actual adaption of the constructed solution and not just an 'intention to adapt' (Lukka 2002), the time span between the time when these findings were presented to management and the time when this research report is being written is too short to have allowed for an adaptation of the new costing system. According to Labro and Tuomela (2003) internal validity of constructive research is enhanced when management of the research site company reads the research findings and at least that was achieved.

When it comes to external validity of the research, there was an attempt to engage in a detailed description of the research process as well as the contingent factors of the research site, which should allow readers to derive some conclusions in terms of the transferability of the solution and the scope of its applicability (Labro & Tuomela 2003). How successful this attempt has been, it is subject to evaluation.

**REFERENCES**

- Alan WR (1995) ABC: a pilot approach. *Management Accounting* 76(7): 50-55.
- Anderson SW (1995) A framework for assessing cost management system changes: the case of activity-based costing implementation at General Motors 1986 – 1993. *Journal of Management Accounting Research* 7: 1-51.
- Atkinson AA, Kaplan RS, Matsumura EM & Young MS (2012) *Management Accounting: Information for Decision Making and Strategy Execution*. 6th Edition. United States, Pearson Education Ltd.
- Bakke NA & Hellberg R (1991) Relevance lost? A critical discussion of different cost accounting principles in connection with decision making for both short and long term production scheduling. *International Journal of Production Economics* 24 (1-2): 1-18.
- Banker RD & Hughes JS (1994) Product costing and pricing. *The Accounting Review* 69(3): 479-494.
- Berliner C & Brimson JA (1988) *Cost Management for Today's Advanced Manufacturing: The CAM-I Conceptual Design*. Boston MA, Harvard Business School Press.
- Bjornenak T (1997) Diffusion and accounting: the case of ABC in Norway. *Management Accounting Research* 8: 3-17.
- Bjornenak T & Mitchell F (2002) The development of activity-based costing journal literature 1987-2000. *The European Accounting Review* 11(3): 481-508.
- Bromwich M & Hong C (1999) Activity-based costing systems and incremental costs. *Management Accounting Research* 10: 39-60.

- Cagwin D & Bouwman MJ (2002) The association between activity-based costing and improvement in financial performance. *Management Accounting Research* 13: 1-39.
- Chea AC (2011) Activity-based costing in the service sector: a strategic approach for enhancing managerial decision-making and competitiveness. *International Journal of Business and Management* 6(11): 3-10.
- Chenhall RH (2003) Management control systems design within its organizational context: findings from contingency-based research and directions for the future. *Accounting Organizations and Society* 28: 127-168.
- Cooper R & Kaplan RS (1991) Profit priorities from activity-based costing. *Harvard Business Review* 69(3): 130-135.
- Cooper R & Kaplan RS (1992) Activity-based costing: measuring the costs of resource usage. *Accounting Horizons* 6(3): 1-13.
- Cooper R & Kaplan RS (1999) *The Design of Cost Management Systems*. 2nd Edition. United States, Prentice Hall.
- Degraeve Z, Labro E & Roodhooft F (2000) An evaluation of vendor selection models from a total cost of ownership perspective. *European Journal of Operational Research* 125(1): 34-59.
- Dhillon BS (1989) *Life-cycle Costing: Techniques, Models and Applications*. New York, Gordon and Breach Science Publishers S.A.
- Dickinson V & Lere JC (2002) Problems evaluating sales representative performance? Try activity-based costing. *Industrial Marketing Management* 32: 301-307.
- Drury C (1994) *Costing: An Introduction*. 3rd Edition. Hong Kong, Chapman & Hall.

- Drury C (1997) *Management Accounting for Business Decisions*. London, International Thomson Business Press.
- Dugdale D (1990) Costing systems in transition: a review of recent developments. *Management Accounting* 68(1): 38-42.
- Dunne PM & Wolk HI (1977) Marketing cost analysis: a modularized contribution approach. *Journal of Marketing* 41(3): 83-94.
- Estrin TL, Kantor J & Albers DC (1994) Is ABC suitable for your company? *Management Accounting* 75(10): 40-45.
- Garner SP (1947) Historical development of cost accounting. *Accounting Review* 22(4): 385-389.
- Gordon LA & Silvester KJ (1999) Stock market reactions to activity-based costing adoptions. *Journal of Accounting and Public Policy* 18: 229-251.
- Gosselin M (1997) The effect of strategy and organizational structure on the adoption and implementation of activity-based costing. *Accounting, Organizations, and Society* 22(2): 105-122.
- Gunasekaran A & Singh D (1999) Design of activity-based costing in a small company: a case study. *Computers and Industrial Engineering* 37: 413-416.
- Gunasekaran A (1999) A framework for the design and audit of an activity-based costing system. *Managerial Auditing Journal* 14(3): 118-126.
- Hicks DT (1992) *Activity-Based Costing for Small and Mid-sized Businesses: An Implementation Guide*. New York, John Wiley & Sons.
- Hicks DT (1999) Yes, ABC is for small business, too. *Journal of Accountancy* 188(2): 41-43.

Hyun-Oh K, Sang-Mook L & Young HK (2010) Menu analysis for coffee shop operation: using activity based costing. Presented at International CHRIE Conference-Refereed Track.

<http://scholarworks.umass.edu/cgi/viewcontent.cgi?article=1408&context=refereed>. Cited 14.11.2013.

Innes J, Mitchell F & Sinclair D (2000) Activity-based costing in the U.K.'s largest companies: a comparison of 1994 and 1999 survey results. *Management Accounting Research* 11: 349-362.

Ittner CD, Lanen WN & Larcker DF (2002) The association between activity-based costing and manufacturing performance. *Journal of Accounting Research* 40(3): 711-726.

Johnson HT & Kaplan RS (1990) *Relevance Lost: The Rise and Fall of Management Accounting*. 2<sup>nd</sup> edition. Boston, Harvard Business School Press.

Jones L (1991) Product costing at Caterpillar. *Management Accounting* 72(8): 34-42.

Kallunki J-P & Sivola H (2008) The effect of organizational life cycle stage on the use of activity-based costing. *Management Accounting Research* 19(1): 62-79.

Kee R. & Schmidt C (2000) A comparative analysis of utilizing activity-based costing and the theory of constraints for making product-mix decisions. *International Journal of Production Economics* 63: 1-17.

Kennedy, T. & Affleck-Graves, J. (2001). The impact of activity-based costing techniques on firm performance. *Journal of Management Accounting Research*, 13, 19-45.

- Labro E & Tuomela T-S (2003) On bringing more action into management accounting research: process considerations based on two constructive case studies. *European Accounting Review* 12(3): 409-442.
- Lere JC (2000) Activity-based costing: a powerful tool for pricing. *Journal of Business and Industrial Marketing* 15(1): 23-33.
- Lukka K (2002) The constructive research approach. *Metodix Methods*. [http://www.metodix.com/en/sisallys/01\\_menetelmat/02\\_metodiartikkelit/lukka\\_const\\_research\\_app/?tree:D=168562&tree:selres=&hrpDelimChar=%3B&parentCount=1&type=4](http://www.metodix.com/en/sisallys/01_menetelmat/02_metodiartikkelit/lukka_const_research_app/?tree:D=168562&tree:selres=&hrpDelimChar=%3B&parentCount=1&type=4). Cited 18.12.2013.
- Lukka K & Granlund M (2002) The fragmented communication structure within the accounting academia: the case of activity-based costing research genres. *Accounting, Organizations, and Society* 27: 165-190.
- Malmi T (1997) Towards explaining activity-based costing failure: accounting and control in a decentralized organization. *Management Accounting Research* 8: 459-480.
- Malmi T (1999) Activity-based costing diffusion across organizations: an exploratory empirical analysis of Finnish firms. *Accounting, Organizations and Society* 24: 649-672.
- Maskell B (1988) Relevance regained— an interview with professor Robert S. Kaplan. *Management Accounting* 66(8): 38-42.
- Neely A & Gregory M & Platts K (1995) Performance measurement system design: a literature review and research agenda. *International Journal of Operations and Production Management* 15(4): 80-117.
- Neuman BR, Gerlach JH, Edwin M, Finch M & Olson C (2004) Cost management using ABC for IT activities and services. *Management Accounting Quarterly* 6(1): 29-40.

- Noone B & Griffin P (1997) Enhancing yield management with customer profitability analysis. *International Journal of Contemporary Hospitality Management* 9(2): 75-79.
- Noreen E (1991) Conditions under which activity-based costing systems provide relevant costs. *Journal of Management Accounting Research* 3: 159-168.
- Pattison D & Arendt C (1994) Activity-based costing: it doesn't work all the time. *Management Accounting* 75(10): 55-61.
- Piper JA & Walley P (1990) Testing ABC logic. *Management Accounting* 68(8): 37-38.
- Raab C, Shoemaker S & Mayer KJ (2007) Activity-based costing: a more accurate way to estimate the costs for a restaurant menu. *International Journal of Hospitality & Tourism Administration* 8(3): 1-15.
- Rahman S (1998) Theory of constraints: A review of the philosophy and its applications. *International Journal of Operations and Production Management* 18(4): 336-355.
- Robinson M & Timmerman J (1987) How vendor analysis supports JIT manufacturing. *Management Accounting Journal* 69(6): 20-24.
- Roodhooft P & Konings J (1995) Vendor selection and evaluation: An activity-based costing approach. *European Journal of Operational Research* 96: 97-102.
- Schoute M (2011) The relationship between product diversity, usage of advanced manufacturing technologies and activity-based costing adoption. *The British Accounting Review* 43: 120-134.



- Shane J (2005) Activity-based budgeting: Creating a nexus between workload and costs. Jonmshane Working Paper ABB1.  
<http://www.jonmshane.com/ABB1.pdf>. Cited 29.10.2013.
- Shields M (1995) An empirical analysis of firms' implementation experiences with activity-based costing. *Journal of Management Accounting Research* 7: 148-166.
- Smith M & Dikolli S (1995) Customer profitability analysis: an activity-based costing approach. *Managerial Auditing Journal* 10(7): 3-7.
- Tuomela T-S (2005) The interplay of different levers of control: a case study of introducing a new performance measurement system. *Management Accounting Research* 16(3): 293-320.
- Turney PBB (2005) *Common Cents: The Activity-Based Costing and Activity-Based Management Performance Breakthrough*. 2nd Edition. New York, McGraw-Hill.
- Turney PBB (2008) Activity-based costing: an emerging foundation for performance management. *Cost Technology Working Paper*.  
[http://cmaprepcourse.com/wp-content/uploads/2012/07/ABC-support-document\\_Study-Unit-2.pdf](http://cmaprepcourse.com/wp-content/uploads/2012/07/ABC-support-document_Study-Unit-2.pdf). Cited 22.10.2013.
- Watson R (2009) Product variety and competition in the retail market for eyeglasses. *The Journal of Industrial Economics* 57(2): 217-251.