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Essays in Activity-Based Costing

Mass-Tailorization, Implementation and New Applications

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Vaasa, March 31st, 2005

Tom Wingren

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LIST OF ABBREVIATIONS

AA = activity analysis
ABB = activity based budgeting
ABC = activity-based costing
ABM = activity-based management
ACA = activity cost analysis
AMT = advanced manufacturing technology
BM = benchmarking
BPR = business process re-engineering
BSC = balanced scorecard
CBM = competence based management
CIM = computer-integrated manufacturing
CMP = cost management practices
CMS = cost management systems
CPA = customer profitability analysis
CRA = constructive research approach
ERP = enterprise resource planning
EVA = economic value added
FMS = flexible manufacturing systems
HRM = human resource management
IC = intellectual capital
IT = information technology
JIT = just-in-time
KM = knowledge management
MA = management accounting
MAS = management accounting systems
OPT = optimized production technologies
PBC = process-based costing
PVA = process value analysis
SCA = strategic cost analysis
SCM = strategic cost management
SCM = supply chain management
SMA = strategic management accounting
SVA = shareholder value analysis
TBM = time-based management
TCM = total cost management
TOC = theory of constraints
TQC = total quality control
TQM = total quality management
VCA = value chain analysis

ABSTRACT

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This doctoral dissertation examines the theory of activity-based costing/management (ABC/M) concept. The research has four related aims. The primary aim is to develop the existing theory by introducing a new mass-tailored ABC concept[1]. The next two aims are to contribute to the implementation process of ABC/M, as well as to the learning process, during the implementation of ABC/M. The last aim is to present a conceptual model how the relationship between strategic priorities, key success factors, performance measures and management accounting can be improved with the developed mass-tailored ABC system.

The success of the mass-tailored ABC is examined by comparing it to the traditional ABC method (essay #1), as well as to similar ABC implementation processes in case companies with different level of prior ABC experience (essay #1 and essay #2). One feature of the mass-tailored ABC is its potential to offer support in locating value creators in the company's value chain; this dimension is explored in this research (essay #3). Another framework to link strategic priorities and operational effectiveness by combining Balanced Scorecard (BSC) and Intellectual Capital (IC) with an ABC system is also presented (essay #4). All essays include empirical evidences from the selected case companies.

The empirical part consists of two groups of companies; one group has prior experience of ABC, while the other has no previous experience of this costing method. The group with earlier experience of ABC reported mass-tailored ABC to be better than the traditional ABC in many important respects. The empirical evidence exemplifies the way that the mass-tailored ABC can reach beyond the traditional role of ABC in identifying cost drivers, and can actually help to highlight and disaggregate an organization's value creators and the latent drivers behind those. The differences in the companies' implementation processes also extend the empirical data, especially in the context of learning process and the companies' prior experience of ABC/M.

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Key words: activity-based costing, activity-based management, constructive approach, management accounting, strategic management accounting, implementation, learning.

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[1] It is here referred to as the ABC2000. ABC2000 is a mass-tailored ABC/M system developed by this researcher in collaboration with members of FIABB ABC work group and FIABB ABC team for ABB Ltd companies in Finland.

1. INTRODUCTION

Activity-Based Costing/Management (ABC/M) has been studied from many different perspectives. Some examples of the perspectives are: the theory testing (ABC versus traditional volume based costing, and the benefits from using an ABC system), the implementing of ABC/M (from a single company to country level, and the factors associated with success and failure of ABC system), and combining ABC/M to other theories, methods or systems (ABC linked to theory of constraints, TOC, and ABC added into enterprise resource planning, ERP). This study's focus is on developing the existing ABC theory by introducing a new mass-tailored[2] method[3] of ABC/M concept. The constructed method is called ABC2000[4]. The method itself will be tested it practice besides the new applications.

One of the major aims of the mass-tailored ABC development project was to avoid the well-known shortcomings of prior ABC designs and implementation initiatives. The project was therefore informed by extensive consultations from ABB Corporate Research Center's project participants, as well as my analyses of a substantial amount of literature. The mass-tailored ABC sought to follow the evolvement of ABC/M, and meet the requirements of the third and fourth generations of ABC/M (Mecimore & Bell 1995), and, in some parts, even reach beyond those. In this research, the constructed method is presented in Chapter 4.

1.1 Structure of the research

This thesis is organized as follows: the introduction chapter presents the background of the research. Definitions for the research scope and objectives of the study are presented after the overview of the research area, while the research methodology and limitations are presented at the end of this chapter.

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[2] In this research the term mass-tailored refers to the modularity of the base structure of ACB2000 method from which the organization specific method is built.

[3] In this research the constructed method is understood as a way to practise the concept of the ABC. The method describes the phases of implementing the ABC project and the architecture of the ABC model.

[4] ABC2000 is not a registered name, but the developed method has always been called ABC2000 in projects and presentations.

The second chapter aims to give the reader background information about the evolution of the theory of activity-based costing and activity-based management. It describes the basis which is used in the development of the mass-tailored ABC concept. The existing ABC/M literature is presented and analysed, so as to establish an understanding of the ABC/M theory development, which in turn is applied in the development of mass-tailored ABC. ABC/M evolution is categorized into different development cycles. In this research, five cycles could be found, based on the contents of the articles in major journals[5] on management accounting (MA). The findings are compared with other longitudinal ABC/M studies (Mecimore & Bell 1995; Kaplan 1998; Bjørnenak & Mitchell 2002; Jones & Dugdale 2002).

Different approaches to the implementation processes and the studies concerning them are presented in the third chapter, so as to give the reader an overview of the literature on ABC/M implementations. Frequently used implementation models are presented along with the problems encountered during the implementation process. Social aspects and the learning process as part of the ABC implementation are discussed at the end of the chapter, and the related implementation models are presented.

The constructed mass-tailored ABC concept is introduced in the fourth chapter. Background for the development work is presented. Those, together with existing literature and practical findings in ABC implementations, are the initiators for the mass-tailored ABC concept, for its method, as well as for its implementation process and new applications.

The fifth chapter presents the methods applied in the research and the data collection process. The empirical data was derived from questionnaires and interviews, but also from participatory observation during the development and implementation processes. The selected case companies are presented together with the used methods and data collection. Short summaries of the four essays are presented at the end of this chapter.

Finally, chapter six summarises the main findings of the thesis and suggest the ideas for further research. Additionally the validity and reliability of the study are discussed.

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[5] Due to the nature and aims of this research, the presented journals represent both major academic ones, as well as those which are practically oriented. Consequently, the author has achieved a wide knowledge of ABC/M, which is essential in order to develop the ABC/M method.

All four essays are presented separately in the end of this thesis. The empirical feedback and data from all case companies is presented in essays. The structure of this research is presented in Figure 1.

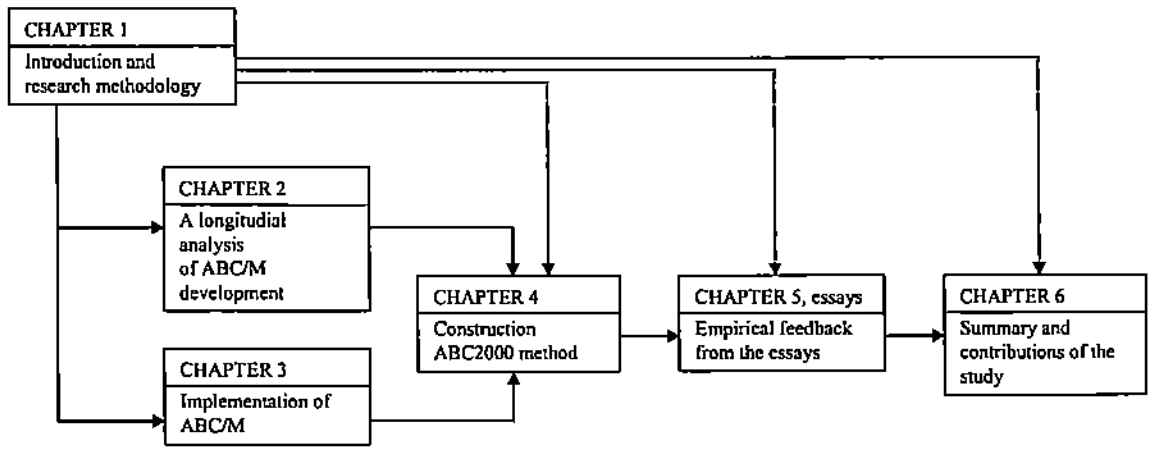

Figure 1. The structure of the research.

1.2 Overview of the research area

This chapter presents the research area. Thus, the development of management accounting (MA), strategic management accounting (SMA) and strategic cost management (SCM) are discussed[6]. An overview, covering the changes in organizations' environment and technological innovations from early 1980 to date, is presented. The changes are concerned with the kind of changes that have affected the theory of the activity-based costing and activity-based management. The aim of this overview is to follow the ongoing debate of MA, SMA and SCM so that this research can be linked to the existing literature of the research area.

[6] In this study the management accounting is defined to produce information mainly of historical data, and to be very production oriented. strategic management accounting (SMA) is defined to produce information mainly for future; the perspective is more external than internal, and a method in which the competitor analysis has a major role. The strategic cost management (SCM) is defined as a method in which the aim is to understand the cost behaviour from the strategic point of view. The object in SCM is to continuously decrease the unit costs.

1.2.1 Technological change

Changes in technology revolution since the mid-1970's, followed by growing global competition, led to striking innovations in the use of financial and non-financial information in organizations (Kaplan & Cooper 1998). The changes in manufacturing companies were more dramatic than at any time since 1940's (Green & Amenkhienan 1992). An obvious and observable aspect of this change has been in the technology and the complexity of manufacturing processes (Nanni, Dixon & Vollmann 1992). Companies had to adopt new philosophies and techniques, including just-in-time (JIT), total quality control (TQC), flexible manufacturing systems (FMS), computer-integrated manufacturing (CIM), and optimized production technologies (OPT) (Green & Amenkhienan 1992). This led to a rapidly changing manufacturing environment with open questions like; what do our products actually cost, why do they cost as much, what can be done to reduce the costs (Ostrenga & Probst 1992), and what does the customer service cost? Interest and need to change the traditional costing method rose during the 1980's (Johnson & Kaplan 1987b). The accounting model should match with the new way of operation (Peavey 1990). One of the solutions came independently and proximately from several different sources in the mid-1980's (Kaplan 1998). At this stage, that solution was an innovative approach called activity-based costing (ABC). Actions taken during the late 1980's can be referred to as developments of the basis of the ABC concept. Articles in Management Accounting, Journal of Cost Management and Harvard Business Review started the globalization of the concept (Cooper 1988a, 1988b, 1989a, 1989b; Cooper & Kaplan 1988a, 1988b).

At the early 1990's Carlson and Young (1993) presented, with empirical data, a model in which ABC was linked with strategic cost management (SCM) and total quality management (TQM). Process orientation turned the focus from functions to processes (Greenwood & Reeve 1992) and directed the perspective in the use of the ABC data to value chain analysis (VCA) (Shank 1989; Shank & Govindarajan 1992a, 1993; Dekker, 2003). In total cost management (TCM) the process value analysis (PVA) and activity-based costing (ABC) were linked together (Beischel 1990; Ostrenga 1990; Ostrenga & Probst 1992). In addition balanced scorecard (BSC) has moved the strategic thinking and operative measurement closer to each other with a perspective of internal processes, in which ABC can be used as one of the measurement systems (Kaplan & Norton 1996).

The above mentioned systems, methods and techniques were linked to some extent with the organizations' ERP systems as external sources. According to Schnoebelen (1993a,

1993b, 1993c) the existing ERP systems were used as the foundation for advanced cost management systems (Schnoebelen 1993a: 52), and the advanced cost techniques should be able to support and fulfill multiple cost management objectives (Schnoebelen 1993b: 61). Later on, he points out that, as with any system implementation project, the approach to developing and implementing the system is critical for its success (Schnoebelen 1993c: 41), and that the quality of data from feeder systems can be a major concern during the integration (Schnoebelen 1993a: 44). The linkage can be performed manually or automatically between the same or different software environments. Most of those who have tried, know that the linking is not an easy task (Balachandran & Sundar 2003). One reason for this is that companies' ERP systems have different modules, even different ERP systems, and that some of them are supporting more effectively the financial accounting (external) than the management accounting (internal), which would link the operational work together with accounting data (Green & Amenkhienan 1992). This lack has led to numerous types of rules and methods when translating the accounting data suitable for internal use. Also the blurred terminology confused many companies. For example, the term *activity* was understood as including differing amounts of organizations' work in activity-based costing (Kaplan & Cooper 1998), in value chain analysis (Porter 1985) and also in the ERP systems (SAP and BAAN).

1.2.2 Globalization

Accounting people have tended to concentrate on the internal affairs of their organizations, and rather ignore the external environment (Innes 1999), but globalization and the growth of world trade and global economic integration have been change drivers to this tendency. Deregulation, privatization, indeterminate industry boundaries and disintermediation, added with Internet, have worked as catalyses for the globalization (Prahalad 1998). Organizations have been pressurized to change their strategic perspectives and operational activities, so as to become more global market and customer oriented. From the MA point of view, the customer focus introduces problems for accounting systems, when multinational competition and multimarkets force companies to analyze their customer profitability more deeply. E.g. Tuomela (2000) has focused on this issue in his research from the balanced scorecard perspective.

The basic problem seems to be the same as fifty years ago, when multi-product companies were selling their products in several sales territories with different sales mix, different variable costs of selling, and with their own fixed selling costs (Marple 1955). One of the

findings then was to have separate reports of fixed and variable costs, in order to give the management a much-needed tool for appraising performance and planning the future. Today, one of the tools is ABC, which is designed to give information not only from a company's internal operations, but also from the external operations, such as sales and marketing. According to Cooper and Kaplan (1991) the ABC approach is broadly applicable across the spectrum of company functions and not just in the manufacturing. Customer-sustaining expenses are those that are traceable to individual customers, but independent of the volume and mix of purchases.

1.2.3 Information technology development

During the last 30 years the information technology development has clearly had profound effects on day-to-day organizational life. According to Scapens, Ezzamel, Burns and Baldvinsdottir (2003) there has been considerable advances in information technology and, particularly, the dispersion of personal computers and computing capacity has had a significant effect on the nature of work. Companies, large multinational and smaller ones, operating at domestic markets, have increasingly implemented different kinds of ERP systems in order to follow, manage and measure their daily operations.

Today, companies can have several databases to collect the information, and to feed the information to different kinds of reports and analyses (Balanchandran & Sundar 2003). The databases and personal computers have made it possible to disperse the information, even in real-time, to each employee around the organization, and even to integrate other companies of the network to the ERP system. Internet has made it possible to separate the place where information is produced from where it is used. Today, suppliers are able to follow the production queue from their own monitors and act proactively to the changes.

Some researchers have pointed out that the development of business operations and philosophies, together with IT-systems, should need *new accounting systems* (Johnson & Kaplan 1987b; Kaplan 1994), and new knowledge of the users, *new accountants* (Cooper 1996a, 1996b). Perhaps the more challenging aspect is to understand the way that accounting information should be used in the *new environment*. In this respect, the behavioral and cultural aspects of management accounting and its changes should be taken into account (Burns, Ezzamel & Scapens 2003).

1.2.4 Management accounting

Management accounting (MA) systems provide information which helps managers to plan and control the organization's activities (Kaplan & Atkinson 1989). According to Amigoni (1978) organizations use the accounting information for the following three purposes[7].

- score keeping (have I reached the target or not)
- attention directing (which problems should I focus on)
- problem solving (what is the best way to perform this work)

Management accounting researches have traditionally focused on *problem solving*, while the use of *score keeping* and *attention directing* has been less researched (Emmanuel & Otley 1992).

During the last two decades, the changes in manufacturing environment and the development of information technology have improved the discussion of the importance of management accounting, strategic management accounting and strategic cost management. Organizations' work and thinking on different levels (operational, tactical and strategic) and different environments (internal, intra) require new methods and procedures. This leads to the need of new competences in the organizations' activities, also those in which the accounting information is collected, classified, processed, analyzed, and reported to managers (Kaplan 1994; Otley 1994; Clarke 1995; Cooper 1996a, 1996b; Horngren 1995; Anastas 1997; Innes 1998, 1999). Cooper (1996b) has pointed out that during the next decade management accountants should become effective members of the management teams, spend less time in dealing with financial accounting and more time in learning about product and process technology, operations, systems, marketing, strategy and the behavioral and organizational issues related to the implementation of the new systems.

According to Järvenpää (1998) some of the Cooper's assumptions about the changing role of management accountants have come true, especially on the operational level. At the same time, the work for and the number of reports increased. Granlund and Lukka (1998) found in their research that management accounting practices are strongly framed and driven by factors at the macro level (like ABC). Partanen (2001) has analyzed factors which have an effect on organizational learning process in the finance function. He found

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[7] These are the same three purposes that Simon et al. (1954) presented in their article "Centralization versus decentralization in organizing the controller's department".

that "*the contribution of controllers in the business-oriented development of management accounting techniques is extensive when they can identify interfaces, get together in interfaces and cross over interfaces*" (Partanen 2001: 329). He also found that some of the competences worked more as drivers for the development "*most important skills and knowledge for controllers in supporting business decisions are intervention and networking skills*" (Partanen 2001: 329).

The above findings have proved that the development of the new MA innovations has shifted the focus on those areas which have been less researched and whose nature is relatively undefined (Lord 1996; Tomkins & Carr 1996).

1.2.5 Strategic management accounting

The term strategy has its roots in the military. It started to expand into business during the 1960's. During that time Chandler presented a general definition of organizational strategy by describing it as "*the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action, and the allocation of resources necessary for carrying out these goals*" (Chandler 1962: 13). Chandler's definition highlights more the long-term and future-oriented notion of strategy, while Ohmae is focusing more on competitive advantage "*Business strategy is all about competitive advantage. Without competitors there would be no need for strategy, for the sole purpose of strategic management is to enable the company to gain, as effectively as possible, a sustainable edge over its competitors*" (Ohmae 1982: 5). As can be seen, there are several alternative perspectives from which the definition of the strategy can be drawn. All of them are correct, even if their contents differ.

The term strategy expanded into the management accounting literature by Simmonds (1981, 1982) when he, for the first time, presented the term strategic management accounting (SMA). SMA was designed to identify the strategic position and to support managers in their decisions. Other early writers of SMA were Bromwich (1990, 1992), Bromwich and Bhimani (1989, 1994), Govindarajan and Shank (1992), and Shank and Govindarajan (1992, 1993).

SMA was defined as a system which would in various ways assist managers in their decision making: competitor analysis (Simmonds 1981, 1982), strategic position (Miles, Snow, Meyer & Coleman 1978; Porter 1985), competitive advantage including value chain

analysis (Porter 1985; Shank 1989; Shank & Govindarajan 1992, 1993), cost driver analysis (Shank 1989), and strategic pricing including customer profitability analysis (Foster & Gupta 1994). According to Hoque (2001) strategic management accounting is the process of identifying, gathering, choosing and analysing accounting data in order to help the management team to make strategic decisions and to assess organizational effectiveness. Bromwich and Bhimani (1989) point out that SMA has its external orientation, but it provides the means for releasing MA from the company's daily operations. Later Bromwich and Bhimani (1994) describe that the aim of SMA is to allow management accounting, in addition to its conventional fields, to concentrate upon the consumer value generated relative to competitors. In other words, SMA is like MA combined with managing strategic issues and the competitive advantage of the organization.

Few years later Kaplan (1986) argued that a significant lack exists between the accounting systems and manufacturing processes, and that the traditional management accounting did not support the strategic decisions, because the strategic perspective was missing. Also Lord (1996) has claimed that the techniques and elements of SMA are nothing new, as they may already be found in companies, although not collected and used under the term strategic management accounting. Puolamäki (2004) argues that the concepts of SMA are vague. According to him one of the reasons for this is that techniques under the conceptual SMA umbrella can have both strategic and operative purposes (Figure 2.).

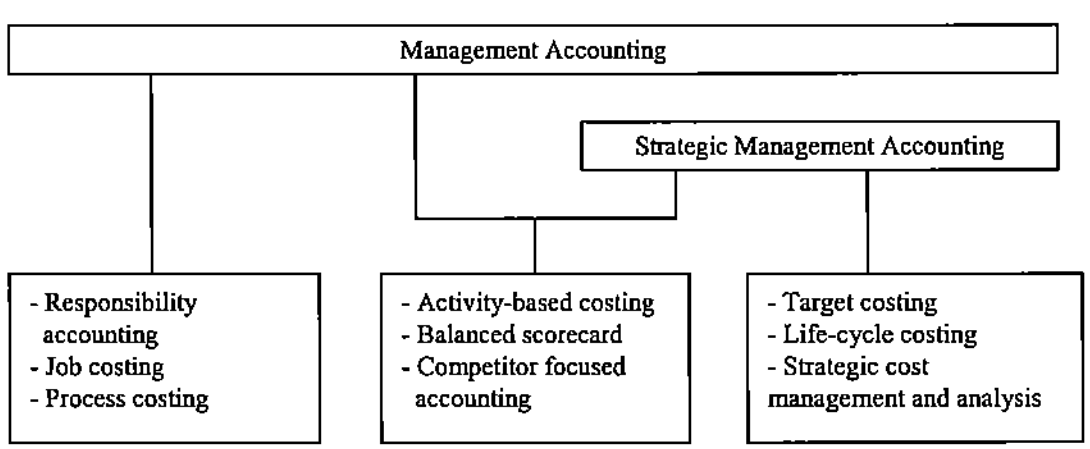

Figure 2. The MA and SMA concepts, adapted from Puolamäki (2004).

The techniques on the left side are traditional management accounting practices, while the others are introduced as strategic management accounting techniques. But those are just a sign of the evolving operative management accounting (Puolamäki 2004). In this thesis the SMA is defined as an approach of MA with a longer perspective (future), it is used to ensure the competitive advantage (customers, markets), and defined as an indicator for operational excellences (processes, products).

1.2.6 Strategic cost management

There are only few approaches which explain models that can be used in applying a strategic approach to management accounting. One of these approaches is strategic cost management, or in other words, strategic cost analysis as Shank and Govindarajan (1993) refer to it. Shank and Govindarajan (1993) use the earlier mentioned three purposes for applying the accounting information: score keeping, attention directing and problem solving, as an objective of cost analysis in MA context without regard to the strategic context. In the strategic cost management (SCM) context, although the three objectives are always present, the architecture of the cost management system should follow the strategic positioning of the organization (Porter 1985). Thus, in SCM, costs are seen as functions of strategic choices about the structure of how to compete, while in MA, costs are seen more as functions of output volume (variable cost, step cost, mixed cost) (Shank & Govindarajan 1993). In strategic cost management the aim is to develop and implement controls which monitor the success in achieving the strategic objectives (Hoque 2001).

Shank and Govindarajan's (1993) approach relies to a great extent on the work of Porter's competitive strategies (1985). They use a three-step method in their SCM approach: starting from determining the business unit's value chain which isolates each activity from supply to customer, followed by assigning the costs and assets to each value activity and identifying the cost drivers for those, so as to ascertain the total costs of the value chain and the resources it uses, and finally, the aim is to build a competitive advantage either by operating on the cost drivers so as to reduce costs, or by rearranging the value chain, focusing on those activities in which the company has competitive advantage. Only few examples of the above presented method have been published. Shank and Govindarajan (1993) have admitted that the analysis of value chain can turn out to be very difficult.

In this thesis, the aim of essay #3 is to show how a strategic cost analysis (SCA) can be made by using the material of developed mass-tailored ABC method. In that essay, the

structure of SCA follows largely the approaches of Shank and Govindarajan, and Porter. Essay #4 also discusses SCM, but from a more conceptual perspective.

1.2.7 Research area

Analysis of the changing world of management accounting, and the literature on management accounting, strategic management accounting and strategic cost management (or strategic cost analysis), outlined the research area to be as follows. This study takes into account the changing world of MA[8], globalization, and, to some extent, the mentioned strategic perspectives in SMA and SCM (or SCA) methods at the development phase of the mass-tailored ABC concept. The primary requirements are process and customer perspectives (to widen the MA system's focus), and to some extent knowledge management (implementing and learning to use new MA systems), and the analysis of profit creators in a company's value chain and as a link between operational performance and strategic priorities (new applications). As a summary, the research area of this research comprises of literature on MA, and partly SMA, SCM (or SCA) and learning.

1.3 Scope and objectives of the study

The suitability of the ABC method in different kinds of organizations, as well as its benefits, is well researched in the existing literature. Also the weaknesses of the method and its implementation process are well researched. Hundreds of articles[9] about ABC/M have been published in accounting journals since the 1980's. A large part of the existing empirical studies have had their main focus on the early stages of the ABC implementation process; they have studied the following questions: what is an ABC system (Cooper 1987, 1988a), what is the architecture of an ABC system (Howard 1995), is ABC suitable for your company (Cooper 1988b, Estrin, Kantor & Albers 1994), and how to use the ABC information (Cooper & Kaplan 1991). The implementation process of ABC itself has also been well studied in different kinds of organizations (Cooper & Zmud 1990; Norkiewicz 1994; Gunasekaran & Sarhadi 1998). Also the feedback on ABC implementations is a

[8] In this research this means, that the way traditional MA systems and techniques are used, has changed, together with the new tools and knowledge.

[9] Bjørnenak and Mitchell (2002) founded 404 articles in 17 accounting journals 1987-1998.

frequently studied subject (Cooper 1990a; Cooper, Kaplan, Maisel, Morrissey & Oehn 1992; Compton 1996, McGowan & Klammer 1997; Krumwiede & Roth 1997; Krumwiede 1998). Some researchers have studied ABC from a country perspective: in Canada (Armitage & Nicholson 1993), in Norway (Bjørnenak 1997), in France (Bescos & Mendoza 1995), in Australia (Corrigan 1996; Booth & Giacobbe 1998; Chenhall & Langfield-Smith 1999), in UK (Innes & Mitchell 1995; Innes, Mitchell & Sinclair 2000), in Finland (Malmi 1999), and in Ireland (Clarke, Hill & Stevens 1999). The above mentioned empirical studies investigate the first or second generation ABC System[10], and mostly focus on the technical or architectural part of the implementation process, and include empirical evidences of one case company (case studies) or from several companies (survey studies). The mass-tailoring or harmonization of the implementation process and its consequences are not included in those studies. They also lack studies of companies with differing prior ABC knowledge and comparisons between their ABC implementation processes.

Another large aggregation of studies focuses on behavioural, organizational and cultural aspects. In these studies the main focus has been on the use of the ABC model information and on the barriers of its usage (Cooper & Zmud 1990; Argyris & Kaplan 1994; Anderson 1995; Shields 1995; Shields & McEwen 1996; Cooper 1996b; Roberts & Silvester 1996; Gosselin 1997; McGowan & Klammer 1997; Krumwiede 1998). Behavioural aspects, such as unlearning the old routines, how individuals protect themselves, and removing the fear of new ideas, have served as a focus (Scapens & Roberts 1993). The focus has also been on the organizational aspects, like the organizational structures and cultures, and the changes in these (Shields & Young 1989; Partanen 1997), or on human aspects at the ABC implementation (Thorne & Gurd 1995). Again, studies about standardization and comparing the companies' differing ABC knowledge are lacking, not to mention the studies on social aspects, like new knowledge creation as an organizational learning process.

In addition to the above mentioned categories, there are both academic studies and practical papers which have their focus beyond ABC: on customer-base profitability accounting (Mariotti 1996), activity-based profitability analysis (Meyer 2002), feature costing (Brimson 1998), slimming the size of the ABC model down (Richardson 2000), linking ABC with economic value added (EVA) (Cooper & Slagmulder 1999a), linking

[10] The generations of the ABC system is according the Mecimore and Bell (1995).

ABC with process-based costing (PBC) (Lawson 1994), integrating ABC with the theory of constraints (TOC) (Cooper & Slagmulder 1999b), linking the ABC to the process value analysis (Beischel 1990, Ostrenga & Probst 1992; Shank & Govindarajan 1993; Hoque 2001; Dekker 2003) and linking ABC to inter-organizational cost management (Cooper & Slagmulder 1999a). In this respect, the value chain analysis lacks sufficient researching, concerning especially the studying and analyzing of the profit creators in an organization's value chain with empirical data.

On the whole, even though there are many categories of ABC studies, the empirical data of an ABC method, developed to a certain demand and tested in a group of companies with different existing knowledge about ABC, is weak. Anderson (1995) refers to a *Blitz* approach in her study. She studied the entire ABC project at a car manufacturing company. In her study, the case company noticed, during a certain period of the ABC implementation process, that they were behind the schedule. As a solution they developed a new ABC approach to achieve the time schedule. The approach was called *Blitz*. The case company hoped that the new fast implementation process, which included a standardized ABC method, could be used to meet the deadline. The *Bliz* pioneered as a cost-effective way of implementing a simple ABC system with a similar approach to all companies that were behind the schedule. Unfortunately the study does not cover the feedback or empirical data from the *Bliz* implementations.

There is a clear lack in the MA literature of constructive studies[11] in which the aim is to develop a special management accounting method (like mass-tailored ABC, or *Blitz*) to meet a certain demand, and in which the implementation process of such tailored systems in different kinds of organizations is followed and studied. There is much literature around the standardization, but the issue itself is clearly an under-researched topic in the overall MA context (Lukka 2001). This study will give an answer to the following questions, which are clearly under-researched:

Mass-tailorization

- What is a mass-tailored ABC concept?

[11] Examples of the applications of constructive research approach in management accounting are the licentiate theses by Puolamäki (1998) and by Tuomela (2000), and the doctoral dissertation by Puolamäki (2004).

- What kind of influence does the mass-tailorizing have on the ABC implementation process?

Implementation

- How does the ABC implementation process differ between the companies with prior ABC implementation knowledge and those without any prior ABC knowledge?

New applications

- Is it possible to locate the value creators from a mass-tailored ABC model in a value chain analysis?
- How the data of the ABC system can be used within an intangible and knowledge driven management accounting system?

In this study the research problem is threefold, as it is concerned with: (1) the kind of consequences the constructed concept has for the ABC implementation process, (2) the usability of the concept in practice, and (3) presenting new approaches for ABC.

The aim of this study is to find a relevant practical problem, construct a new concept and to test its usability[12] in the selected case companies, and to identify and analyse the theoretical and practical contributions of the constructed method. Furthermore, this research presents two new applications of how the ABC could be integrated within other SMA systems. Mass-tailored ABC has been constructed by using the existing literature on MA, SMA, SCM, SCA and the knowledge from people involved in ABC projects. The theory of ABC, which basis has been developed by a network included Kaplan and Cooper from Harvard (Cooper 1988a, 1988b, 1989a, 1989b; Cooper & Kaplan 1988a, 1988b; Kaplan 1983, 1984a, 1984b, 1985, 1986, 1988, 1990a, 1990b), Johnson (1988, 1991), March and Kaplan (1987a, 1987b) and CAM-I members e.g. Brimson (1988a, 1988b, 1991) and Berliner and Brimson (1988) has worked as a base for the mass-tailored ABC concept, together with the more recent literature about the development of the theory of ABC. The relevant problem in practice and the goals of the new method, have given the direction for the development work.

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[12] Usability here includes the functionality of the mass-tailored ABC system on traditional ABC issues and also on new applications that are following the development of the MA, SMA and SCM (or SCA).

The aim and the objects of the study can be encapsulated as follows:

The aim of this study is to construct and implement a process and customer focused mass-tailored ABC concept, with empirical evidences identify and analyse the theoretical and practical benefits of it, and to present a conceptual model of how to integrate ABC to other strategic management accounting approaches, in order to gain a comprehensive system for analysis of value (tangible and intangible) creation.

The objective of this research is to make a contribution to the theory of ABC, and to the use and implementation of ABC, especially from the new applications and learning process point of views. The objective is divided into four subcategories according to the essays from 1 to 4.

1. *The implementation process of mass-tailored ABC*, "Management accounting system improvement and implementation: a case study in a mass-tailored ABC Context"
2. *Learning during the ABC implementation process*, "The creation of a management accounting system – a demanding learning process: a case study in an ABC context"
3. *New perspectives of ABC*, "In search of value creating activities: an empirical study"
4. *Integrating ABC to other strategic management accounting approaches*, "Management Accounting in the New Economy: From "Tangible and Production-Focused" to "Intangible and Knowledge-Driven" MAS By Integrating BSC and IC"

1.4 Research methodology

The methodology could be defined as a generic research approach. A certain methodology cannot be classified as either the correct one, or the wrong one. Instead, it can be classified as being more or less practicable for the selection of theories, purposes and subject matters (Silverman 1993). The methodological backgrounds and choices of the study are presented in this chapter.

According to the paradigmatic framework, introduced by Burrell and Morgan (1979), philosophical assumptions, as well as assumptions about the nature of society, underlie the

different approaches to social science. They propose the use of two continuums, objectivist-subjectivist and radical-regulation, to analyze the key assumptions. Those can be conceptualized into four sets of assumptions related to ontology, epistemology, human nature and methodology. Burrell and Morgan (1979) provide a description of the extremes of each end of the continuum for illustration, while recognizing that research may be positioned at any point along the continuum. Within Burrell and Morgan's framework this study represents a subjectivistic approach in which the researchers are portrayed as concerned with an understanding of the way, in which the individual creates, modifies and interprets the world. However, this study also has some features from an objectivistic approach.

The subjectivist approach includes a nominalist assumption of ontology, an anti-positivistic assumption of epistemology, a voluntarist assumption of human nature and an ideographic assumption of methodology (Burrell & Morgan 1979). The ontological and methodological choices are ambiguous and less clear, as choices of epistemology and human nature. By using the two continuums of the Burrell and Morgan's paradigmatic frameworks; objectivist-subjectivist and radical-regulation, this study belongs to interpretivist paradigm. Later on, Denzin and Lincoln (1998) categorized the interpretivist paradigm as belonging to positivistic. According to Gray (2004) interpretivism is closely linked to constructivism in terms of epistemology.

In Finnish literature, the methodological discussion about accounting has popularly relied on the classification of research approaches introduced by Neilimo and Näsi (1980) (Figure 3.).

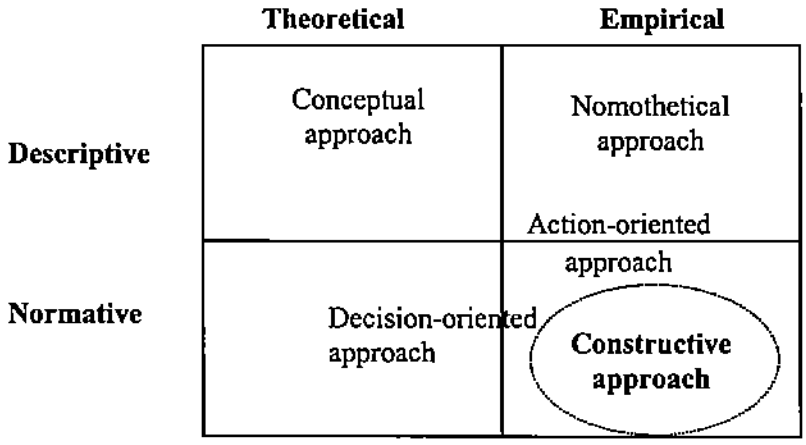


Figure 3. Different accounting research approaches (Kasanen et al. 1993).

It consists of four approaches: the conceptual, the nomothetical, the decision-oriented and the action-oriented approach. Afterwards, the constructive research approach (CRA) was introduced by Kasanen, Lukka & Siitonen (1993) as a specific approach to be used in problem solving studies through the construction of organizational procedures or models. The above mentioned research approaches are presented by using two continuums; theoretical-empirical and descriptive-normative, in Figure 3.

The aim of the conceptual research approach is to develop new conceptual systems, applied, for example, in illustrating or recognizing a phenomenon. According to Kasanen et al. (1993)[13] the nomothetical approach is closely linked to the modernist research tradition. The underlying explanatory model is causal, and attempts are made to state the findings in the form of general laws. Typically, the deduction has an essential role in nomothetical approaches. The hypothesis and models are built according to the theories, and the validity of those, are tested by empirical evidences (Salmi & Järvenpää 2000).

The decision-oriented approach is usually grounded on assumptions similar to the nomothetical approach. However, there is a difference in the fundamental nature of the research, which in this case is normative; the aim is to help the management run the firm with the results (Kasanen et al. 1993), but the decision-oriented approach usually does not include the empirical testing phase of the constructed method.

The action-oriented approach provides a kind of alternative to the nomothetical approach, as it brings the human being into the focus of the analysis. The explanatory model is often teleological and the historical background of the phenomena studied is examined carefully. The emphasis is usually laid on gaining a thorough understanding of the studied subjects, but the purpose may include an active participation in change process, too. The conceptual approach again is distinguished by its a priori basic nature: it produces new knowledge primary through the method of reasoning (Kasanen et al. 1993). The action-oriented approach does not have normative aims, which are essential in the constructive research approach.

According to Kasanen et al. (1993) the constructive research approach has much in common with the decision-oriented one. In both cases, theoretical analysis, thinking, etc., play an important role in leading to the creation of a new entity. However, the decision-

[13] They have summarized the essentials of these approaches from the studies by Neilimo and Näsi (1980), Lukka, Majala, Paasio and Pihlanto (1984) and Lukka (1986).

oriented approach typically uses the method of deduction, while heuristic innovations are characteristic of the constructive research approach. In heuristic research, one of the primary processes is the self-dialogue, in which the researcher enters into a conversation with the phenomena (Gray 2004). It is hoped that during that process, the researcher would be able to understand the problem itself, and also be able to develop the understanding of others (Gray 2004). Another main difference lies in the fact that the constructive research approach always entails an attempt to explicitly demonstrate the practical usability of the constructed solution. As a conclusion, a comment from Kaplan (1993): a decision-oriented study, which encompasses a successful implementation, may correspond to a constructive one, too.

The constructive research approach has been developed in the field of management accounting by Kasanen, Lukka and Siitonen (1991, 1993); Lukka and Tuomela (1998), and Lukka (2000, 2002). The phases in the constructive research approach are (Kasanen et al. 1993; Lukka 2000, 2002):

1. to find a practically relevant problem which also has research potential
2. to examine the potential for long-term research in co-operation with the target organization
3. to obtain a general and comprehensive understanding of the topic
4. to innovate and construct a theoretically grounded solution idea
5. to implement the solution and test whether it works in practice
6. to examine the scope of the solution's applicability
7. to show the solution's theoretical connections and research contributions.

The selection of the research approaches should be based on those fundamental assumptions, which have an effect on the researcher's reality, character of knowledge, people and methodology, and also on the distinctive features of the research subject and the nature of the research problem (Burrell & Morgan 1979).

By applying the above classification and procedures, the research approach is chosen. This study belongs as integrity to the category of constructive research even though the nature of some of the essays can be partly closer to action-oriented approach than constructive research approach. Motivation for this selection consists of several parts. The nature of this study is more empirical than theoretical, because the task is to construct a new method and

evaluate it with empirical tests. The aim in normative studies is to find results which can be used in the development of the operation or in the planning of a new operation (Olkkonen 1994). Based on that assumption, it can be stated that this study is more normative than descriptive. The used research method is more inductive than deductive, which is characteristic to the action-oriented and decision-oriented approaches. The aim in inductive approach is to establish patterns, consistencies and meanings through a process of gathering data, not trying to falsify the existing theory, which is characteristic to deductive approach (Gray 2004). The role of the researcher is quite interventionistic, which is more typical in the constructive research approach than in action-oriented research approach (Lukka 2002). The overall goal in this study is to construct a method for a practical problem, test it with empirical evidences and present theoretical and practical contributions. In addition the goal is to present new applications that can be done by the constructed ABC method. Presented new applications follow the development of the theory of ABC. The structure of the study from the chosen research approach perspective is presented in Figure 4.

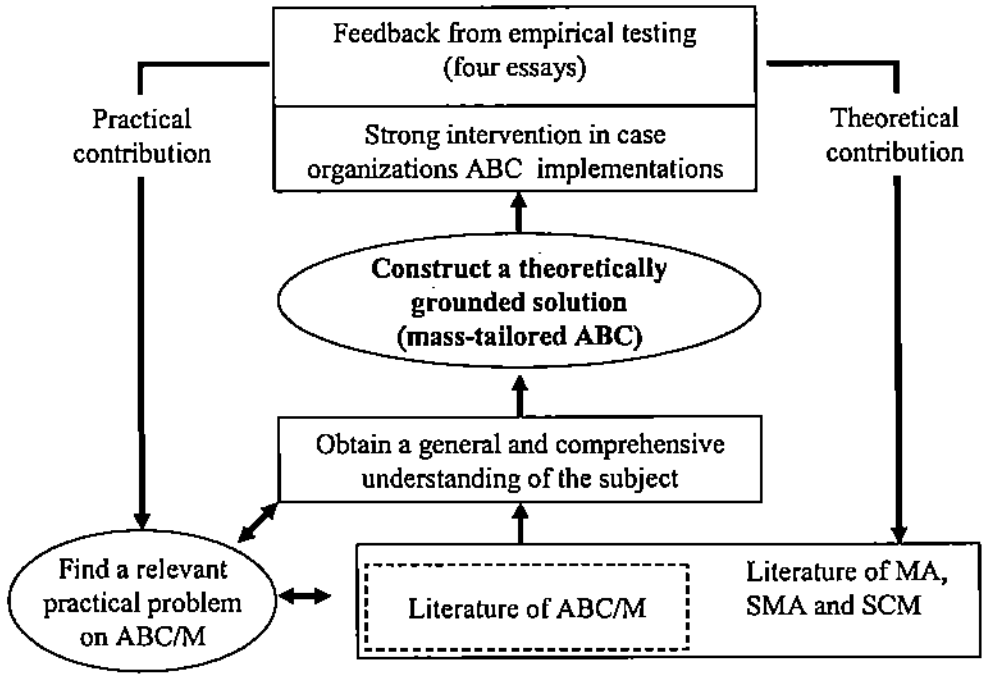


Figure 4. The structure of this research from the chosen research approach perspective.

Calls for the constructive type of research approach have been well grounded (Kasanen et al. 1993; Lukka 1999, 2000, 2002; Kaplan 1998; Lukka & Granlund 2002; Labro & Tuomela 2003) but the number of published studies using it is still very small. One reason for this can be that constructive research approach has been incorporated to the consultation. The presented arguments are of the following kind: the constructive research approach relies on a pragmatic notion of truth what works is true (Kasanen et al. 1993), and the intervening role of researcher is characteristic of the research process (Lukka 1999) like in the consultation work. This has lead to a discussion of what is different between the constructive research approach and consultation (e.g. Kasanen et al. 1993; Westbrook 1995; Eden & Huxham 1996; Kaplan 1998; Mouritsen, Larsen & Hansen 2002). Another reason for the low amount of published studies and the lack of common understanding of differences between constructive and consultation may be the absence of practical guidance on how to conduct this type of research (Labro & Tuomela 2003). Additionally, the confidential nature of the results can also hinder to publishing (Kasanen et al. 1993).

Also this research relies on empirical material from several case companies, material which includes confidential information not to be published. As a researcher, I do not see that as a disadvantage, as all the relevant material, containing the developed mass-tailored ABC concept and its implementation could be used. The main issue is that the researcher has a sufficient context, so as to permit the reader to assess the potential for generalizations and make comparisons with other reported situations (Westbrook 1995). Here, the researcher has an important role when he/she makes the choices of what to publish and how. In this research the author has tried to use all that material, which, in his knowledge of the topic, would be important for the development of the theory, and to describe and analyze the case projects in order to learn from them.

The existing literature presents also other methods of categorizing case and field research methodologies. The case and field research belongs to the minority in researches on management accounting (Lukka 1999). The structures of both case and field research methodology have been developed by Kasanen and Suomi (1987), Scapens (1990), Kaplan (1993), Kasanen et al. (1993) and Lukka (1999). There are many similarities in all of the approaches, but also differences can be found in meanings, research processes, as well as in strengths and weaknesses.

Scapens (1990) divides management accounting case and field researches into following categories: descriptive, illustrative, experimental, explorative and interpretive researches. The aim of this study is not descriptive or illustrative. According to Scapens the aim of the

experimental research is to study the implementation of new management accounting methods and the factors which affected the implementation process.

According to Kaplan (1993) the categories in case and field researches are: what is, what's new and to be researches. The last one, to be, includes studies with the aim of developing the management accounting systems, innovating new ones and implementing them. It also includes studies in which the researcher has a major role.

As a summary, this study belongs as integrity to the category of constructive research even some of the essays have partly the nature of other empirical – normative research approaches.

1.5 Limitation of the research

In this research the primary aim is four-folded: to find a relevant practical problem, to construct a new ABC concept (mass-tailored ABC), to examine its suitability implementation and new applications, and to show its theoretical connections and research contributions. The demand for mass-tailored ABC appeared from practical issues in the Finnish ABB companies, which were the main focus of the development work. The other part of it came from the appropriate literature on the evolution and implementation of ABC method. The business environment, into which the mass-tailored ABC was developed for, as well as the settled aims, placed certain requirements for the nature of this study. This influenced and emphasized also the selection of literature. Therefore, some of the issues or findings about the ABC method and its implementation were not taken into account in this study. But, because the nature of the research is to follow the development of the theory of ABC since early 1980's and to find new innovative approaches to it, the used literature includes not only academic studies but also articles and papers from more practically oriented journals. This choice was made so as to ensure sufficient knowledge about the theory of ABC.

The testing of whether mass-tailored ABC works in practice was carried out in two kinds of companies; those with earlier ABC experience, and those without it. The number of case companies where the data was collected was limited to 15 altogether. Some of them were only examined, so as to compare the *old* and *new* ABC concepts during the implementation, while others were investigated for a longer period. The case companies represent three different kinds of parent companies. The majority of the research data in

this study is from two international groups of companies. This is certainly not enough to suggest that the findings in this research are generally valid. However, the results are quite analogous, even though the case companies had different backgrounds (corporate culture and policies), which gives the possibility of generalizing the findings in certain circumstances. The validity and reliability of this research is discussed later in Chapter 6.2.

2. THE EVOLUTION OF ACTIVITY-BASED COSTING/MANAGEMENT

This chapter contains a longitudinal analysis of the trends and developments of both activity-based costing (ABC) and activity-based management (ABM). The evidence for the trends and developments are gathered from major journals, research papers, and case studies. During the past 20 years, the ABC/M has expanded and become a global cost and management accounting method, which has passed the boundaries inside the organizations as well as the academic communities.

2.1 Structure of the ABC/M evolution

The development cycles of the ABC theory that have taken place form early 1980's until the mid of 2004 are discussed next. According to the literature on ABC/M, five cycles can be distinguished: (1) *bases of ABC*, (2) *ABC vs. traditional*, (3) *ABC implementation*, (4) *new perspectives in ABC*, and (5) *ABC integration*. All these cycles are presented in figure 11 together with some of the main factors that have affected the development. The bases for the five cycles are discussed and compared with Kaplan's (1998) longitudinal study at the end of each sub chapter, and with the longitudinal study of ABC (Bjørnenak & Mitchell 2002), and with the study of ABC generations (Macimore & Bell 1995) in the summary part of this chapter. In addition to the other studies, the study from Jones and Dugdale (2002) has been taken into account when creating the development cycles of ABC/M.

Lukka and Granlund (2002) have studied the communication structures within the management accounting academia. They use ABC as an illustrating example. They categorized the published ABC literature into three genres; consulting research, basic research and critical research by the nature of the journal. As mentioned earlier, in this research the nature of the journal can be a part of any of above genres. According to Bjørnenak and Mitchell (2002) even most of the ABC/M articles published in professional journals are authored by academics.

The five cycles of ABC evolution are discussed next. Each cycle includes an example ABC model. Models for the first three cycles describe a typical model for each, based on the published literature. The model for the fourth cycle describes the structure of developed mass-tailored ABC system used in the empirical cases in this research, while the model for

the fifth cycle shows the basis for the latest structure of the mass-tailored ABC system. Structure in both version of ABC model follow the evolution of ABC/M and is taken into account in last two essays of this research.

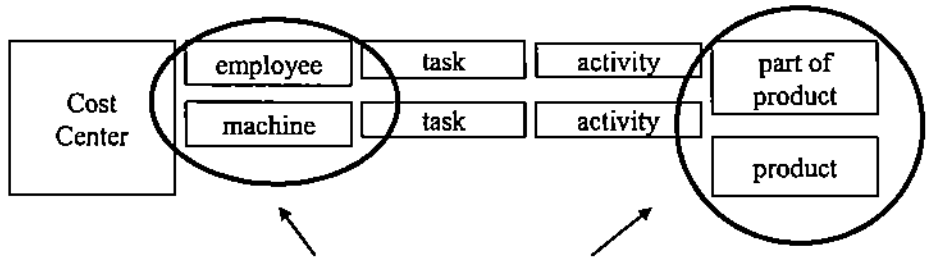
2.1.1 1st Cycle, bases for the new management accounting tool (1980–1990)

Approximately two decades ago, the need for an accounting technique appeared. It was required to allocate the indirect costs to the products in a more reasonable way, compared with the existing accounting methods. This need for an accounting technique emerged after technological innovations, such as JIT (just-in- time) and TQM (total quality management) became more common, together with AMT (advanced manufacturing technology), which was seen as a competitive advantage for Japanese companies and as a threat for US manufacturing companies (Jones & Dugdale 2002). Another concern was that consumer markets might be changing so that the long run, large-batch, long-term, mass production business would be obsolete in the face of demand for short-run, small-batch, short-lived products (Jones & Dugdale 2002). During that time, many organizations became dissatisfied with their accounting systems, because these systems could not allocate costs according to the new way of operation. Kaplan wrote three articles (1983, 1984a, 1984b) about it; one about his visit to innovative companies (Kaplan 1985) and about the emerged *gap* between the new needs of managers and the existing management practices. Miller and Vollmann (1985) documented a similar problem with companies' cost systems. According to Jones and Dugdale (2002) there was no sign of innovative management accounting during that time, but theories of globalizing manufacturing change, a critique of conventional costing systems, and a commitment to field research of local practices as a means of constructing new accounting knowledge was already accepted. The discussion of innovative costing practices started with a series of Harvard Case Studies by Cooper, Weiss and Montgomery (1985), while the articles of John Deere from March and Kaplan (1987a, 1987b) can be named as the first ones including the bases of ABC.

The need for a new management accounting innovation *ABC* expanded when Johnson and Kaplan published the article (1987a) *The importance of long-term product costs*, and the book (1987b) *Relevance Lost: The Rise and Fall of Management Accounting*. In addition to those following articles in the Management Accounting, Journal of Cost Management and the Harvard Business Review by Cooper (1988a, 1988b), Cooper and Kaplan (1988a, 1988b), Kaplan (1988), Cooper (1989a, 1989b), Kaplan (1990a, 1990b) continued the discussion and the design of the theory of the new innovation, while (Cooper 1990a;

Cooper & Zmud 1990; Kaplan 1990b) were more focused on its implementation process. Also the book *The Design of Cost Management Systems* by Cooper and Kaplan (1991) can be mentioned as a pioneer for today's ABC theory.

During this first cycle, the focus was strongly on seeking new ways of solving the discovered practical problem, the gap. The reason for this was that the traditional cost accounting systems could not follow the consequences of the new methods like JIT, TQM, AMT, and did not support the changed cost structure. Functionally modelled pilot cases covered, at very early stage, only one production machine, but extended the area to cover a production line or one department of the company. Used support systems (PC programs) in the ABC models were stand alone ones with manual data feeding. An example of a simple first cycle ABC model, based on the literature, is presented in Figure 5.



Object: to allocate production overhead costs more accurate to parts of products and products.
Nature: ABC is a costing system, which allocate the cost more accurately to products.

Figure 5. An example of an early ABC model which aims was to allocate overhead costs more accurately to parts and products.

Analysis of the existing ABC literature on the new management accounting tool (ABC) provided the name for the first cycle: *bases of ABC*. Comparing the findings with Kaplan's (1998) categorization of the ABC development process provides the following linkage between those. The first cycle, *bases of ABC,* includes the content of the first loop and part of the second loop from Kaplan's innovation action research cycle. According to Kaplan (1998) the first loop in the innovation action research cycle was nearly entirely designed to test the idea, and to formulate the new innovation together with few participants with different backgrounds. The time-period for the first loop was very short, and in fact, the general development work started from the second loop. Furthermore, the first loop of the first cycle overlaps Kaplan's second loop's first and second steps: observe and document

innovative practice, and teach and speak about the innovation. Kaplan (1998) has pointed out that the ideas for the innovation (ABC) rose from practice; the solution (ABC) came independently and proximately from several sources, and at the end of the second step, the initial theory became codified, generalized and presented.

2.1.2 2nd Cycle, comparable discussions between the new innovation and existing methods (1985–1993)

The 1st cycle can be defined as a period of the ABC development, which focused mostly on the Cooper-Kaplan-Johnson-CAM-I network (Jones & Dugdale 2002). The aim was to find ways to explicitly present the reasons for the appeared *gap*, and to construct a new management accounting technique, which would reduce the gap. This elaborates a natural continuum for the second cycle in the ABC development, which consists of discussions of the main differences and advantages between the traditional accounting and the presented new technique. During the second cycle, the new method became generally accepted and was named as activity-based costing (ABC). According to Jones and Dugdale (2002) there was no single creator for ABC; there was no eureka, as it emerged rather as the consequence of several events.

One of the basic differences between the *traditional cost accounting* and the *ABC* method was the allocation of overhead costs to the cost objects. According to the traditional accounting method, this was carried out by using volumes (products or machine hours), while ABC used the needed amount of the activities (resources), which are not necessarily in relation to the volume of products or machine hours (Figure 6).

The ABC allocation technique is called a two-stage procedure. Costs of resources are assigned to activities, and costs of activities are further assigned to cost objects (Figure 6.). Above mentioned assignments are done by first and second stage drivers (resource, activity and cost drivers), while in traditional cost accounting, the allocation is done mainly according to unit-base amounts (volume, pieces, weight, material, direct work or other unit-base)[14].

[14] See Cooper (1987, 1988a, 1988b), Cooper and Kaplan (1988a, 1988b) and Kaplan (1988).

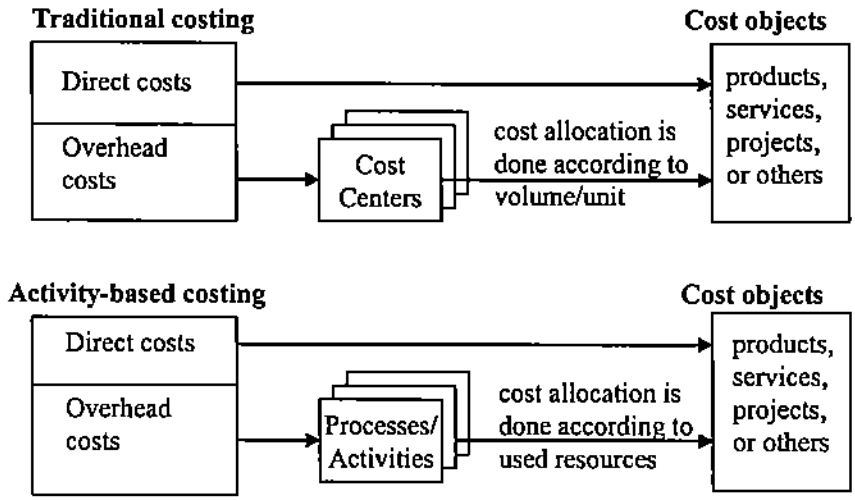


Figure 6. Comparing the traditional costing and the ABC costing methods.

Other differences between the methods are that ABC does not need to follow the functional borders of the organization. It provides insights, which overlap traditional functional boundaries in the organizations, by giving decision-makers a broader picture of how resources are allocated. It is also possible to separate the costs into different hierarchies (unit, batch, product, customer and facility) with the activity analysis (Kaplan & Cooper 1998). Furthermore, it is possible to measure and separate the cost of idle capacity and R&D for entirely new products and lines, which would not be taken into account when calculating cost object profits (Cooper & Kaplan 1988a).

The method of how costs are assigned to products may or may not be in proportion to the volume of output, but, instead, all costs must be strictly proportional to their cost drivers in ABC (Noreen 1991). There are few studies which discus the suitable conditions for ABC and the assumptions underlying ABC. The three necessary conditions for the relevance of ABC are: 1) total costs can be allocated into cost pools, each of which depends solely upon one activity, 2) cost in each cost pool must be strictly proportional to the level of activity in that cost pool, and 3) each activity can be divided into elements that depend solely upon each product (Noreen 1991). According to Roth and Borthick (1991) the two assumptions underlying ABC are: 1) the costs in each cost pool are driven by homogenous activities, and 2) the costs in each cost pool are strictly proportional to the activity.

During the latter part of the 1980's, the focus of ABC was on measuring the cost of activities (what is done in the organization), cost of processes (like marketing, production, R&D and sales), and cost objects (like products, services, customers and sales channels). Cooper and Kaplan stated clearly that the theory behind the ABC method is simple, "*virtually all of a company's activities exist to support the production and delivery of goods and services, and they should therefore be considered to be product costs*" (Cooper & Kaplan 1988b: 96).

ABC was presented as an individual system, which would give better (more accurate) information about the costs of the work (activities), as well as about both the cost and profit of objects (products, customers, projects, marketing channels). ABC was also a method where data for the ABC system was gathered from operational level, and the information, which the system calculates, was used to support management in their decisions.

> *"Activity-Based Costing is not designed to trigger automatic decisions. It is designed to provide more accurate information about production and support activities and product costs so that management can focus its attention on the products and processes with the most leverage for increasing profits. It helps managers make better decisions about product design, producing, marketing, and mix, and encourages continual operating improvements." (Cooper & Kaplan 1988b: 103.)*

In some aspects, ABC has got the status of being a very powerful tool for the managers. One reason for this could be that ABC has enabled managers to make decisions based on numbers (money) to every piece of the organization. In some organizations this has led to negative consequences, because ABC has been connected with cost cutting projects, or with the reducing of employees. This was also pointed at the early stages of ABC.

> *"In the late 1980's the Cooper and Kaplan version of the vision for ABC was still relatively narrow according to Jones and Dugdale (2002), while Johnson approaches ABC a little bit differently. He argues that companies should manage activities, not costs." (Johnson 1988: 23.)*

Until the late 1980's, there were no discussions on how to link the ABC information to the organization's other existing information systems. Neither was there discussion on whether the managers would need a new kind of knowledge in order to make better decisions from the results calculated by ABC. The need of *new knowledge* emerged during the early 1990's. It was presented as necessary for fulfilling the benefits of the new technical

innovation. People in companies need to learn what kinds of matters cause the costs and why, as otherwise, the benefits of the new innovations could not be reached.

> *"ABC analysis also illuminates exactly what activities are associated with that part of the business and how those activities are linked to the generation of revenues and the consumption of resources. By highlighting those relationships, ABC helps managers understand precisely where to take actions that will drive profits." (Cooper & Kaplan 1991: 131.)*

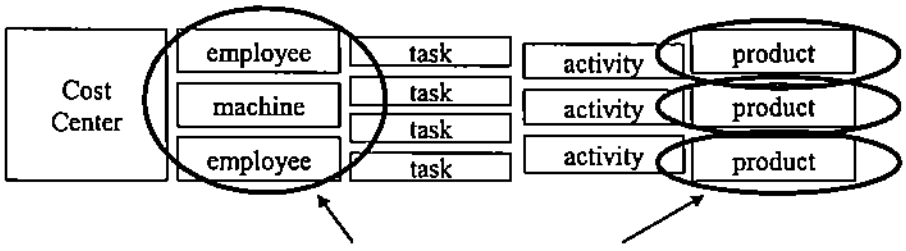
At the early 1990's many articles were published that offered practical instructions on how to build an ABC model (Greenwood & Reeve 1992; Miller 1992; Drumheller 1993; Schnoebelen 1993a, 1993b, 1993c; Baker 1994; Norkiewicz 1994), how to motivate and sell it for the management (Sharman 1991; Brausch 1992; Schiff 1992), instructions on how to test whether ABC is suitable for your company (Estrin et al. 1994), and sample ABC models and stories about ABC projects from case companies (O´Guin 1990; Ostrenga 1990; Clemens 1991; Haedicke & Feil 1991; Raffish 1991; Dhavale 1993; Gwynne & Ashworth 1993).

Criticism of where ABC originates, and the method and logic behind it, was published by Piper and Walley (1990, 1991), Kingcott (1991), Johnson (1992) and Macintosh (1994). Johnson (1992) has pointed out that there were paths that lead to discussions on the 1960's of a similar method with today's ABC. He mentioned one example from the academic world and one from the business world. Piper and Walley (1990) questioned the fundamental assumption on which ABC is based on from a philosophical position: is it activities or decisions that make the costs? Cooper (1990b) gave an answer to Piper and Walley and others, by presenting answers to six misunderstandings of the ABC logic. According to Piper and Walley (1991) Kaplan did not succeed in clarifying the fundamental assumption which they had asked, and claimed ABC to be an in vogue management technique. Fox (1991) continued the discussion on the logic of ABC. He described ABC as a classic example of the gap between theory and practise. The gap is too broad, and actually, the existing models are not sufficient to test the logic of ABC. Kingcott (1991) argues that the ABC technique is inaccurate and is based on a weak foundation, and companies should use opportunity based accounting, instead of ABC. Johnson (1992) explains that instead of an activity analysis, companies should seek the pathway to competitiveness by mapping and improving customer-focused processes. Macintosh (1994) criticises the novelty of ABC. According to him, the problem, which occurred in allocating costs based on direct labour, was not a new issue in those circumstances which are pointed out in ABC. He also argues that managers should have

instead taken a broader, more strategic view, than simply managing costs. He furthermore states that ABC is more like a fad.

During the second cycle, the focus was strongly on highlighting the differences between the ABC and traditional costing methods, which raised also critique against ABC. Advantages of ABC were well presented and used to awake the interest to test it. The central concern of the ABC model was divided into two: to the version of Cooper and Kaplan, focusing on more accurate measurement of cost; and to the Johnson's version, which was more concerned with attending to the activities that cause the costs, than to the accuracy of costs (Jones & Dugdale 2002).

In companies ABC models were still built according to functions, even though the discussions about the focus of the process had risen up. Models typically covered only some parts of the organization, and the product and customer profitability was typically not included in ABC models. Companies often started ABC with a pilot project. The possibilities for data transfers were improved, and were thus more sophisticated together with improved ABC stand alone programs, but all data was mainly produced and imported manually. An example of a simple second cycle ABC model based on the literature is presented in Figure 7.



Object: to allocate all overhead costs more accurate to products in multiple productionlines. Also support activities were taken into account.
Nature: ABC is a costing system. The cost of excess capacity and R&D are not allocated to product costs.

Figure 7. An example of the architecture of the second cycle ABC model which area was expanded compared to the first cycle model.

Analysis of the existing ABC literature's discussion about the new innovation and existing methods provided the name for the second cycle: *ABC vs. Traditional.* Comparisons between the findings and Kaplan's (1998) categorization of the ABC development process,

gives the following linkage between those. The second cycle *ABC vs. Traditional* includes the content of the third step of the second loop in Kaplan's innovation action research cycle: write journal articles and books. Kaplan points out that at this stage, the innovation has evolved far enough to be named and illustrated with experiences from companies. Kaplan explains that the discussion of the new innovation was vital in order to acquire the comments and feedback. In this stage, it was important to get managers from companies to implement the concept and discover the benefits and weaknesses of it compared to the traditional volume based accounting method.

2.1.3 3rd Cycle, implementation process of the new innovation (1988–2000)

The experiences from the first ABC implementations affected the nature of ABC. New features for handling the data were discussed by the designers of ABC. The ABC system was presented as a system, which pays attention to the hierarchy of the factory's operating expenses (Cooper & Kaplan 1991). It emphasised the understanding of the hierarchy of organization's operational work, for example, (1) using a machine (2) setting-up a batch (3) scheduling the production, and its link to the operating expenses, which are different from traditional cost accounting.

Simultaneously, ABC also had a new focus, while ABC literature presented the difference between calculating and managing. The new focus was presented by separating the cost assignment view from the process view[15]. The new process view was defined to activity-based management (ABM). The ABM view expanded the use of the basic ABC method to new fields which can be seen in the next (4th) cycle. The target of the cost assignment view was to allocate the right costs from the use of resources to activities and finally to cost objects, while the target of the process view was to provide information for the managers, concerning their decisions about the processes.

> *"Managers must refrain from allocation all expenses to individual units and instead separate the expenses and match them to the level of activity that consumes the resources." (Cooper & Kaplan 1991: 130.)*

The second cycle of the ABC development was a period when it became a widely known method. Numerous organizations were willing to test it in practice. These practical tests,

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[15] According to CAM-I Glossary (see Raffish & Turney 1991).

and especially the feedback from those, started the third cycle in the ABC development. Themes vary considerably in those studies and articles. While some were focused on giving advice for the upcoming projects, others pointed out the new knowledge that is required in the use of ABC. Some presented precise descriptions of the implementation process in a certain organization, or more general descriptions about the implementation process within a certain group of companies, or the findings at the country level. Also articles about the implementation process itself were included in the third cycle of the ABC development.

During the mid 1990's, three articles of activity-based technique implementation in Journal of Cost Management[16] were published. All of them were focused on explaining the pitfalls in an ABM implementation process. These articles can be named as factor studies. Other studies which have addressed the success and failure factors of the implementation process are Cobb, Innes and Mitchell (1992), Shields (1995), Andersson (1995), Roberts and Silvester (1996), Malmi (1997), and McGowan and Klammer (1997). Certain technical, behavioural and organizational factors and organizational change factors have been introduced as crucial for the implementation process by Shields and McEvan (1996), Shields and Young (1989), Krumwiede (1998), and Krumwiede and Roth (1997).

A year later, CIMA funded a research[17] about how the activity-based techniques have changed the information of management accounting and what kind of consequences they have had. Eleven companies who had implemented activity-based techniques in some form were involved with that research. The message of this research was clear: a new accounting technique cannot be evaluated simply by examining its financial consequences. One of the key findings of the research was the positive relationship between new management accountants and activity-based techniques. These new management accountants were accountants who could adopt the new internal cost flow from general ledger to resources and to activities and finally to cost objects, by using different drivers.

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[16] Player and Keys (1995a, 1995b, 1995c). Lessons from the ABM battlefield: getting off to the right start, lessons from the ABM battlefield: developing the pilot, and lessons from the ABM battlefield: moving from pilot to mainstream. Pitfalls discussed in both articles were identified through some 50 interviews with 30 members of the ABM experience interest group of the cost management system section of the Consortium for Advanced Manufacturing-International (CAM-I). Interviews included practitioners who were implementing ABM, users of ABM information, ABM consultants, and managers who had rejected ABM.

[17] The title of the research was activity-based techniques and the "new management accountant" in *Management Accounting*: magazine for chartered management accountants (1996).

They could adopt the use of the new information, and they realized the benefits of its use across the organisation.

There were some problems in implementations related to knowledge and learning. Lyne and Friedman (1996) found that accounting people needed to undergo a transformation *"it is almost inconceivable that activity-based techniques could be successfully implemented with the involvement of accountants who held the bean-counter attitude"* (Lyne & Friedman 1996: 35) or else the need for those is questioned *"operational managers claimed that the activity-based techniques were so transparent and intuitive that other managers had no difficulty in understanding them"* (Lyne & Friedman 1996: 35).

Some initiatives to create a deeper understanding of human processes within the implementation can be found in the literature by Argyris and Kaplan (1994), and Shields and Young (1989).

Starting from the mid 1990's there was a period when many studies about ABC/M implementation were published (Argyris & Kaplan 1994; Anderson 1995; Selto 1995; Shields 1995; Thorne & Gurd 1995; Compton 1996; Shields & McEwan 1996; Gosselin 1997; Malmi 1997, 1999; McGowan & Klammer 1997; Partanen 1997; Krumwiede 1998; Anderson & Young 1999; Agbejule 2000, Soin, Seal & Cullen 2002). The different implementation methods and researches are discussed in more detail in chapter three Implementation of ABC/M, including case and survey studies about the implementation processes.

The critique against ABC was focused on pointing out that ABC is not as easy as it seems to be. According to Fahy and O'Brien (2000) the following reasons were behind many unsuccessful implementation projects: the lack of knowledge among the ABC/M experts in the companies, a failure to link ABC/M to the corporate strategic objectives in form of increased product profitability and improved value added for customers, lack of effective sponsorship of ABC/M at a senior level, a failure to transfer ownership of cost management from the accounting function to those functions and processes where costs are incurred, and lack of knowledge of some of the fundamental principles of ABC/M. Also the changes in the nature of ABC were misleading some of the users and researchers.

> *"By 1991, ABC was not to be used to derive more accurate unit-level product costs. Instead, activity analysis should be employed in order to better: understanding the hierarchy of costs in the organization; identify relevant revenues and costs; and inform decision making. What produces this extraordinary change?" (Jones & Dugdale 2002: 141.)*

During the third cycle, the focus was strongly on testing the new innovation in the organization. These tests on different levels (strategic, tactic, operational) affected the discussions about whether ABC is suitable for all of them. Malmi (1997) found that the ABC model and its output can be suitable for the managers as an information tool for the strategic purposes, but at the same time, the same model was not accepted by the workers as an information tool for their operative purposes.

> *"Activity-Based Costing systems give managers a more strategic view of their business by helping them understand the sustainable economics of making products and serving customers. ABC systems trace costs from resources (...). Operational-control and ABC systems can't use the same inputs, primarily because the two systems define cost differently." (Kaplan & Cooper 1998: 110.)*

Mostly, the ABC models were still built according to the organization's functions. Yet, many organizations started with a pilot project. In those projects, the constructed ABC models typically covered only some parts of the organization, and did not include the product and customer profitability. Rather, those were built for activity analysis and for calculating possible savings at process development. Profitability analyses were included more often in full cost models which became more popular on the latter part of the third cycle. In comparison with the earlier cycle, the possibilities for data transfer were more sophisticated, combined with better ABC programs, which were still mostly the stand alone-type, but also some integrated systems were built. ERP packages[18] with ABC features became more common during the end of the cycle. An example of a simple third cycle ABC model, based on the literature is presented in Figure 8. The strengthened profitability analyses (product/service and customer) together with the management of activities (ABM) added the customer view to the ABC models.

[18] i.a. SAP included a ABC module and also a possibility to integrate SAP with a stand-alone ABC program of ABC Technologies. This integration was named as bridge.

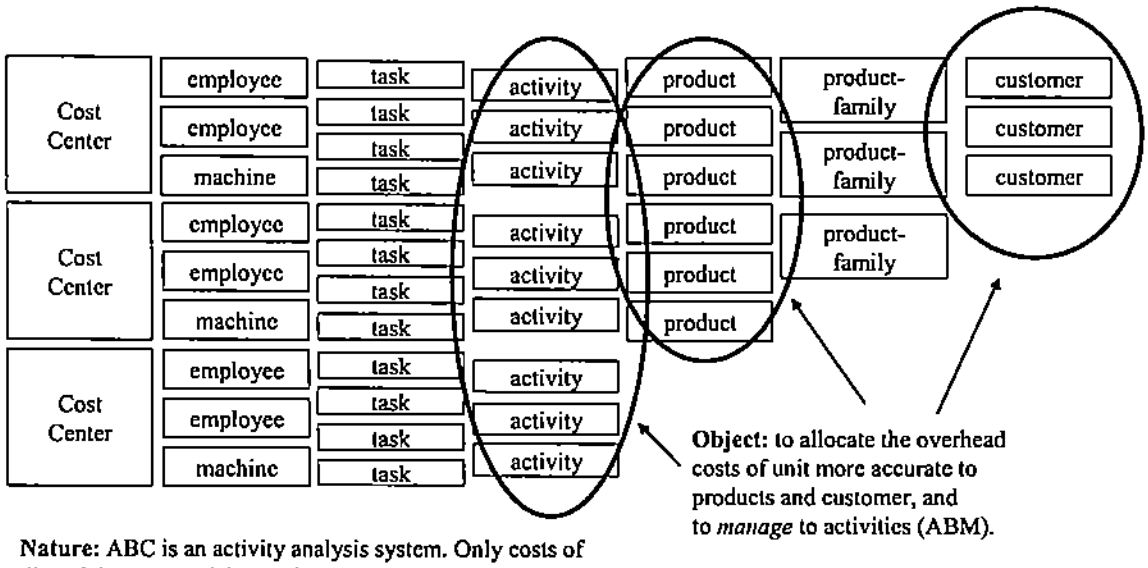

Figure 8. An example of the architecture of the third cycle ABC model which aims was extended to customer view.

Analysis of the existing ABC literature about the practical testing of the new innovation provided the name for the third cycle: *ABC implementation*. Comparing the findings with Kaplan's (1998) categorization of the ABC development process gives the following linkage between those. The third cycle *ABC implementation* includes the content of the fourth step of the second loop in Kaplan's innovation action research cycle: implement concept in new organizations. Kaplan has pointed out that at this stage, the following three functions are important: (1) testing the value of the concept for the companies, (2) providing learning opportunities about the concept, and (3) creating knowledge about the implementation process.

2.1.4 4th Cycle, new perspectives for the ABC/M (1990–2005)

During the 1990's, techniques, such as customer profitability analysis (CPA) and process value analysis (PVA) became more common (Hoque 2001). These new perspectives changed the focus into being more process based and customer focused, instead of having a product and functional based view. Organizations started increasingly to measure and analyse the performance of processes, as well as the profitability of products and customers. Organizations were beginning to be parts of a network, which influenced the

network economy (Kulmala, Paranko & Uusi-Rauva 2002). The changes mentioned, combined with many other alterations, as well as the feedback from practical implementations affected the development of the ABC method. They also gave new perspectives for the ABC method and for the ABC implementation process.

Studies of the new perspectives, which support the objects of this study, can be divided into three categories. To those, which are concerned with combining ABC to other techniques and methods[19] (TOC, PVA, VCA, SCM, BSC, KM), and to those which are concerned with the usage (organizational, behavioural and cultural perspectives), as well as to those which focus on the technical subjects (architecture of the model, IT systems, ERP).

Other techniques and methods (TOC, PVA, VCA, SCM, BSC, KM), which also were created or became more common during the 1980's and 1990's with ABC/M give the content for the first new perspective in this fourth cycle. During the 1990's, articles and papers of how to link these together with ABC were published increasingly. Cooper and Slagmulder suggest in their articles how ABC can be combined or integrated with the theory of constraint (1999a), with the economic value added (1999b), with the supply chain development (1999c), and with the budgeting (2000a, 2000b). How to include process focus to ABC together with a process value analysis (PVA) was presented by Beischel (1990) and later by Shank and Govindarajan (1992a, 1993), and Dekker (2003), while Ostrenga (1990) argued that activities are the focal point of total cost management (TCM). Wilkings, van Wegen and de Hoog (1997) used the ABC method to build a framework for valuing knowledge assets for knowledge management (KM). In addition to linking other techniques or methods to ABC, criticism of ABC/M system emerged, for example, between ABC and TOC (Tollington 1998).

Additionally, some articles were published in which the aim was to give new features to the ABC/M method or to its implementation process. Sharman (1991) has pointed out that there are two techniques in undertaking ABC: the cost decomposition and the process analysis.

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[19] theory of constraints (TOC); process value analysis (PVA); value chain analysis (VCA); supply chain management (SCM); balanced scorecard (BSC); knowledge management (KM).

> *"The key to both understanding the business and to building a representative ABC analysis is to think at a high enough level of aggregation to identify critical and expensive business processes. Indeed, it would be normal to apply the 80/20 rules in terms of identification of appropriate levels of information." (Sharman 1991: 24–25.)*

Lawson (1994) has asserted that currently, ABC is inherently unsuitable for its purposes, as it lacks process orientation, customer focus, and fails to include an understanding of the cost behaviour function. As a solution, Lawson mentions the customer-orientation, process based analyses, and importance of flowcharts showing the interrelationship among activities.

Mariotti (1996) prompted to go beyond ABC, to customer-based profitability accounting, while Brimson (1998) presented a method called feature costing as the next generation accounting system.

> *"Feature is an alternative approach to ABC that utilizes activity information but requires considerably less data to create a product cost and is presented in a format that leads more directly to reducing cost and improving performance. Feature costing uses a process approach to define activities and relate those activities to products and customers using the product's features." (Brimson 1998: 6.)*

The usage of ABC/M gave the content for the second new perspective for ABC. In usage oriented ABC research, the focus has been, among other things, on how the culture has changed after the implementation of ABC (Partanen 2001), how cultural changes require new information, like ABC (Shields & Young 1989; Shields 1995; Partanen 1997; Birnberg 2000; Bhimani 2003). Furthermore, the significance of the culture is addressed as a research area of management accounting system (MAS) studies (Takatera & Yamamoto 1989; Mouritsen 1989; Shields 1995; Birnberg 1989; Birnberg 2000; Bhimani 2003).

Other studies in this category are studies that are typically concerned with the implementation process from a usage perspective; their main foci have been on the MA system's roles, routines and practices (Scapens 1994; Burns, Ezzamel & Scapens 1999; Burns & Scapens 2000), how individuals protect themselves, removing the fear of new ideas, the effect of organizational structures (Cooper & Zmud 1990; Argyris & Kaplan 1994; Anderson 1995; Shields 1995; Shields & McEwen 1996; Gosselin 1997; McGowan & Klammer 1997), and how the employee resistance can affect the ABC implementation (Arguris & Kaplan 1994; Malmi 1997).

Furthermore, the changes in management accounting systems and in accountant's role have been studied (Innes & Mitchell 1990; Cobb, Helliar & Innes 1995; Järvenpää 1998; Burns & Vaivio 2001). The effects of new perspectives, new requirements, and changes in both external and internal environments have been studied in those studies.

The discussions of IT systems that started during the late 1980's give the content for the third new perspective for ABC in this fourth cycle. Kaplan (1988) suggested that one cost system is not enough, because companies need to address three different functions: inventory, operational control and individual products. In the early 1990's Kaplan (1990a) presented the four-stage model of cost system design. During the fourth stage the ABC would be integrated to cost systems and to operational control systems to derive information for preparing external financial statements.

> *"Ideally, companies could have development one integrated system that serves all these functions - financial reporting, strategic costing, operational improvement and performance measurement, plus inventory and production planning, engineering, sales order fulfilment and customer administration." (Kaplan & Cooper 1998: 7.)*

ABC would be linked to databases and systems and support the financial reporting, as well as product cost management. An example of the design and implementation of a fully integrated ABC system was discussed by Mangan (1995). According to Kaplan and Cooper (1998) integrated cost systems, where ABC is linked with other IT systems like ERP, can easily give wrong information, if operational real-time data and information are used in strategic decisions without an understanding of the differences in their contents. With real-time updating of costs, capacity, and driver information, the activity costs, the driver rate, and the costs of outputs, would vary from day-to-day.

> *"Managers will now be able to receive daily on-line reports about the costs of specific business processes for example, or the real-time profitability of individual products and customers." (Cooper & Kaplan 1998: 109.)*

According to Kaplan & Cooper (1998) the ideal situation was not technologically or conceptually possible, as neither the system's capabilities nor the theory was available until the end of 1990's. The first versions of the *ideal* system were driven from the ABC software companies. Single ABC programs were first linked to the existing ERP programs and later included as one of the modules in the ERP programs. PeopleSoft, Oracle and SAP started to integrate ABC features into ERP systems by purchasing or acquiring ABC

technology (Shaw 1998). One of the problems in these kinds of combined systems is the differences that occur when making financial reports.

> *"The financial reporting and ABC systems will always report somewhat different profits and balance sheets. The two systems can be reconciled, but managers will face ambiguity about which system to use in evaluating and rewarding performance." (Kaplan & Cooper 1998: 118.)*

Granlund and Malmi (2002) have studied the consequences of ERP implementation, which, according to them, as well as Mangan (1995), is an under-researched area. Granlund and Malmi (2002) found that the ERP implementations had led to relatively small changes in management accounting and control procedures. One reason for this was the undeveloped ABC modules in the existing ERP systems. It is difficult to modify the existing ERP system so that it includes the ABC features (Davenport & Prusak 1997), while Granlund and Malmi (2002) assumed that the organizational practices will typically change to fit the technology, not vice versa. From the social aspect of ABC implementation, the technical theory must first be demonstrably valid for the organization, before the change can happen (Arguris & Kaplan 1994).

During the fourth cycle, the focus was on developing the ABC method by linking parts of other techniques and methods to it, together with the feedback from the practical tests (implementations). These developments had different kinds of influences on the ABC method. In this research, the focus is on following the consequences of changing the ABC method into a more process-based and a customer-focused, as well as into a mass-tailored method, from the architecture and implementation process point of view. The background for the above change is presented in a more detailed way in chapter 4.

As a model, the consequences, which are taken into account in this study of new perspectives for the third cycle ABC model, are presented in Figure 9. Also these are presented in a more detailed way in chapter 4. Here are only few of the consequences of the development work. An important change, among others, was the direction of how the model is built. Typically, the direction has been from bottom to top, and now it changed to be from top to bottom. Moving on to build a process map of operation by processes, like in Porter's (1985) value chain method, influenced the change of direction. Mass-tailor method changed the model into being much simpler than before. The change of constructing a possibility to analyse customer profitability, had a stronger influence on the last part of the model. The structure and the implementation of the mass-tailored ABC concept will be presented in more detail in chapter 4.

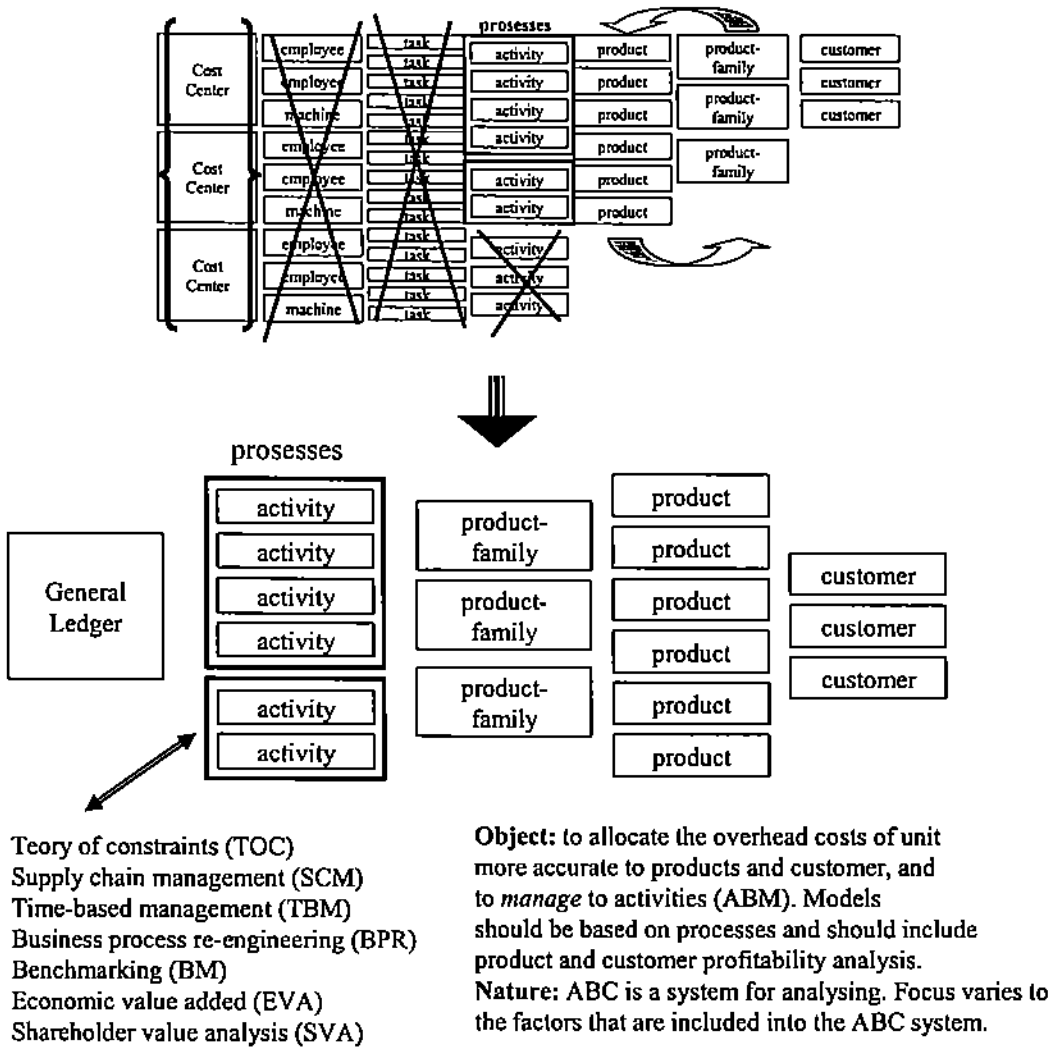

Figure 9. An example of the architecture of the fourth cycle ABC model according to the consequences of the selected actions (base for the mass-tailored ABC).

Analysis of the existing ABC literature provided the name for the fourth cycle: *new perspectives in ABC*. Comparing the findings with Kaplan's (1998) categorization of the ABC development process gives the following linkage between those. The fourth cycle *new perspectives in ABC,* includes those issues from the second cycle that are related to the new perspectives, and also partly the third loop in innovation action research cycle. Kaplan (1998) has pointed out that every time after finalising a loop, the theory and practice move

into a new and higher level. According to Kaplan (1998), he and Cooper were navigating during the mid of 1990's their third loop around the research cycle.

> *"During this cycle, we will integrate activity-based costing concepts into ongoing management reporting and budgeting systems. Most of the activity-based costing implementations done from 1986 through 1996 have been periodic snapshots of companies' cost structures, using specialized activity-based costing software running on PC platforms using data downloaded from legacy systems. We believe that the next learning opportunity will come from incorporating activity-based costing concepts into the enterprise resource planning (ERP) packages that many companies are now installing." (Cooper 1998: 108.)*

The fourth and fifth cycle in this study share more similarities than the other cycles. Both include things like the IT development and the linkages to other techniques and methods. During the fourth cycle the new perspectives were presented and tested, while during the fifth cycle, the focus seems to be more on discussing their benefits.

2.1.5 5th Cycle, linking the ABC/M to other systems and techniques (1995–2010)

During the fourth cycle, organizations faced many changes in their environment, which affected the management accounting, such as: other new innovations (TOC, PVA, VCA, SCM, BSC, KM), IT-systems (ERP) development, and chances in the organizations' structures (intra and inter) and business operations (business models). Organizations also continued to move towards being parts of networks. Changes affected both the architecture of the ABC model, its implementation process, and its use. One of the outcomes were new applications. Two of those are presented in essays #3 and #4 in this study.

During the late 1990's, the ABC system was presented as a system for both strategic decisions (doing the right things) and for the operational decisions (doing things right) (Kaplan & Cooper 1998). Kaplan (1998) believed that the next wave of innovations would come from theory development, combined with observations of organizations that lacked the theoretical understanding of advanced ABC system. During the third cycle, ABC was tested in practise by implementation projects, while during the fourth cycle ABC was faced with many new perspectives. The fifth cycle appears to be a period of analyzing the implementation of ABC, combined with new perspectives (new applications), and developing packages of those combinations which are suitable for certain organizations in a certain business environment, culture, strategy and values, together with the interorganization's human drivers, like motivation, reward system, and other incentive

systems. This is in line with the latest movement of articles of ABC/M. Those include social aspects, and are published in other journals than major accounting ones[20] (i.a. Driver 2001 & Chenhall 2004).

Examples of the fifth cycle studies are analyses of what kind of combinations of cost management techniques and methods organizations have implemented. According to Miller (1993) successful organizations focus more narrowly and passionately on one or two pervasive and dominant goals, and concentrate only on certain skills required to implement their current strategies. According to Laitinen, Wingren and Nixon (2004) ABC has typically been implemented together with TBM (time based management) and BPR (business process re-engineering). The combinations that were found referred to smaller companies with a few people employed in financial management. Only few of the companies for this MCS implementation type were mass production oriented. Krumwiede and Leikam (2002) found ABC/M to be most commonly associated with the following cost management practices (CMP): value-chain analysis (VCA), balanced scorecard (BSC), quality practices (like TQM), and benchmarking (BM). Chenhall and Langfield-Smith (1998) have studied the linkages between strategic priorities (low cost and differentiation), management techniques and management accounting practices. One of the findings was that ABC and traditional accounting can form an effective combination. Baird, Harrison and Reeve (2004) found in their research that it is worth to separate the level on which activity management practices are implemented[21]. Their results showed that activity management practices are widely used by Australian business units, but not all refer to them as ABC.

In the fifth cycle the theory of ABC is more merged with other systems and techniques. ABC is comprehended as a part of other systems. This requires that ABC is both technically and behaviorally understood and accepted. According to Burns and Vaivio (2001) the accounting degrees will likely incorporate elements of and direct linkage to such subjects as strategy, information technology, change management and other aspects of business life. This promotes organizations to embed techniques and systems that previously were viewed as outside accountant's domain. Those organizations which reach

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[20] In this research the major accounting journals are defined according to selection of Bjørnenak and Mitchell (2002).

[21] They used categories according to Gosselin (1997): activity analysis (AA), activity cost analysis (ACA), and activity-based costing (ABC).

this stage have gone through the knowledge creation as an organizational process (Nonaka & Takeuchi 1995). In other words, ABC/M has been combined and also further internalized. It means that individuals have adopted the new knowledge and changed their activities (Nonaka 1991: Nonaka & Takeuchi 1995; Nonaka & Konno 1998), or that the theory of ABC has been institutionalized in this stage (Burns et al. 2003).

The second example of the fifth cycle ABC/M studies (Figure 10) are studies about human resource management (HRM) and competence-based management (CBM). Driver (2001) has studied ABC as a tool for organizational learning, while Anderson, Hesford and Young (2002) studied factors influencing teams during the ABC implementations. Another study about HR management and CB management is the second essay in this study[22].

The third example of the fifth cycle ABC/M studies (Figure 10) are studies made from the value point of view. Studies that include the focus on the company's performance are Roztocki and Needy (1999), and Kennedy and Affleck-Graves (2001). They found empirical evidences, proving that the adoption of ABC significantly improves a company's relative performance, in terms of both market- and accounting based measures. Another study about searching the value creation is the third essay in this study[23].

As a summary, the integration between ABC/M and other techniques, systems and practices in the fifth cycle is more clustered than in the fourth cycle (fourth essay in this study[24]). Typical clusters are those with the focus on human, organizational and operation, or value creation issues (Figure 10).

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[22] The creation of a management accounting system – a demanding learning process: a case study in an ABC context, (essay #2 in this study).

[23] In search of value creating activities: an empirical study, (essay #3 in this study).

[24] Management accounting in the new economy: from 'tangible and production-focused' to 'intangible and knowledge-driven' MAS by integrating BSC and IC, (essay #4 in this study).

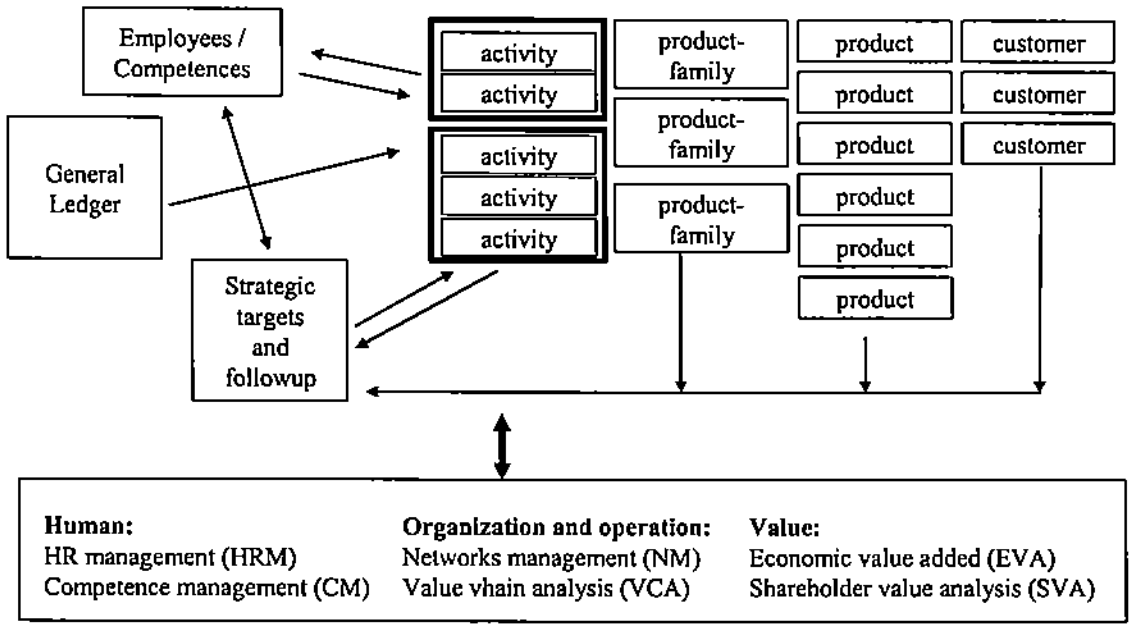


Figure 10. An example of the architecture of the fifth cycle ABC model (base for the mass-tailored ABC).

According to analyses of the existing ABC literature and my own experiences, the ABC is going to interconnect with other approaches, techniques and applications. This phase has started at the mid 1990's and will continue approximately five more years[25]. The interconnection started with technical integrations (ERP systems). Now it is moving towards behavioural issues. The growing strategic, customer oriented and network based thinking will increase this development. Therefore, the name for the fifth cycle is: *ABC integration*. Comparing the findings with Kaplan's (1998) categorization of the ABC development process gives the following linkage between those. The fourth cycle *new perspectives in ABC*, includes the latter part of the third loop in innovation action research cycle. According to Kaplan (1998) he and Cooper expect the stock of knowledge about ABC to increase during the third loop.

[25] This is the estimation of the researcher in the beginning of 2005. The next cycle (6^{th}) seems to consist of even more standardized and behavioural aspects. Otherwise it seems to be much similar with the fifth cycle.

2.1.6 The five cycles of ABC/M evolution

According to the evidences, the development of the ABC/M technique can be grouped into five cycles presented in Figure 11. The five cycles are presented in the middle of the figure as waves. All cycles are named according to the literature on ABC/M during the period. The findings are compared with others in the next chapter. In addition to those, Järvenpää, Partanen and Tuomela (2001) have shortly presented the different phases at the development of the ABC models in their book. Their findings are heavily based on the ABC models presented by Mecimore and Bell (1995). In this research the original source is used as one of the examples of the ABC evolution, although it has been published in a journal that is practice-oriented rather than an academic one. This selection is made according to the usability as a source for different kind of journals, studies and books.

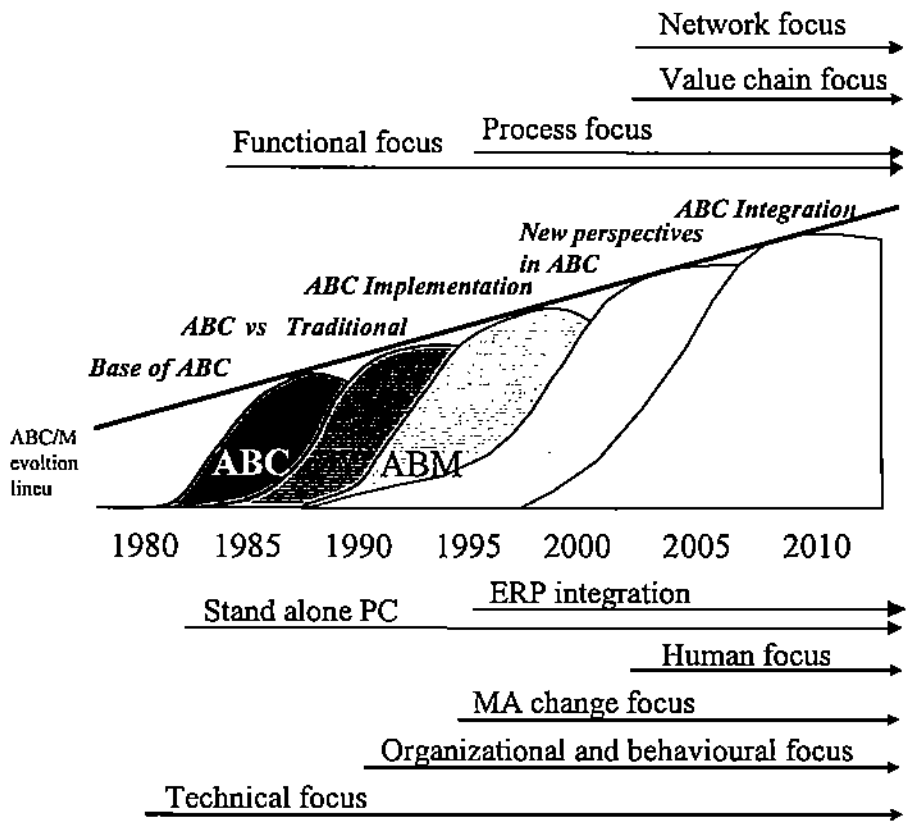


Figure 11. The cycles in the ABC/M development.

In Figure 11, the main effects on the evolution of ABC/M are presented above and below the cycles. Functional and process focuses describe the structure of the ABC/M model. The first models were built according to the functions. After the process-focus increased in the mid 1990's, the structure of the ABC model started to follow that. More recently, the network and the value chain focuses have become more important in developing the global and local business operations.

Below the cycles, the stand alone and ERP integration show the technological developments, while the rest describe how the importance of different factors has changed during the ABC implementation.

2.1.7 Comparing the findings

In this study, the findings are compared with other longitudinal ABC studies. Bjørnenak and Mitchell (2002) presented an analysis of the activity-based costing literature (both ABC and ABM) including articles from seventeen accounting journals (Figure 12.). Totally 404 articles were ranked as articles about ABC or ABM, see Figure 12 and Table 1. The survey of Bjørnenak and Mitchell (2002) included articles from accounting journals from 1987 to 2000. In this research the same journals have been investigated, starting from 2001 until 2004, so as to find articles about ABC/M from the following databases: EBSCO, ProQuest ABI / INFROM and Science Direct. The total number of the ABC/M articles found is added to the Figure 12. Bjørnenak and Mitchell (2002) point in their research that a search in ProQuest ABI/INFORM will not necessarily include the same articles as they do. Therefore, the comparison between the findings from 1987–2000 and 2001–2004 is not carried out. In addition, the analysis of articles from 2001 to 2004 is only presented as totals per year.

Results of the Volume dimension of the research can be seen in Figure 12. From 1987 to 1989 the yearly publication raised from 5 to 12 pcs. In 1990 there was a considerable increase in the number of articles. The yearly level increased to 35 pcs. The yearly amount had varied from 33 to 38, until 1995, when there was a second peak with 54 articles. After that the amount of articles decreased again, being about 30–35 psc per year. The last year (2000) in Bjørnenak and Mitchell's research included 17 articles of ABC or ABM. After that the number of articles increased to 20 during the years 2001 and 2002. During the last two years the number of ABC/M articles has decreased to around 15 per year.

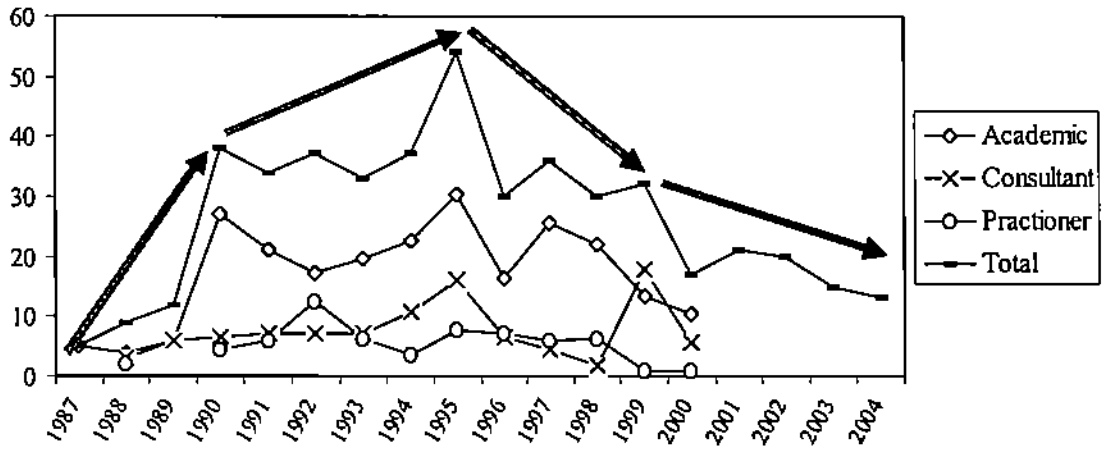
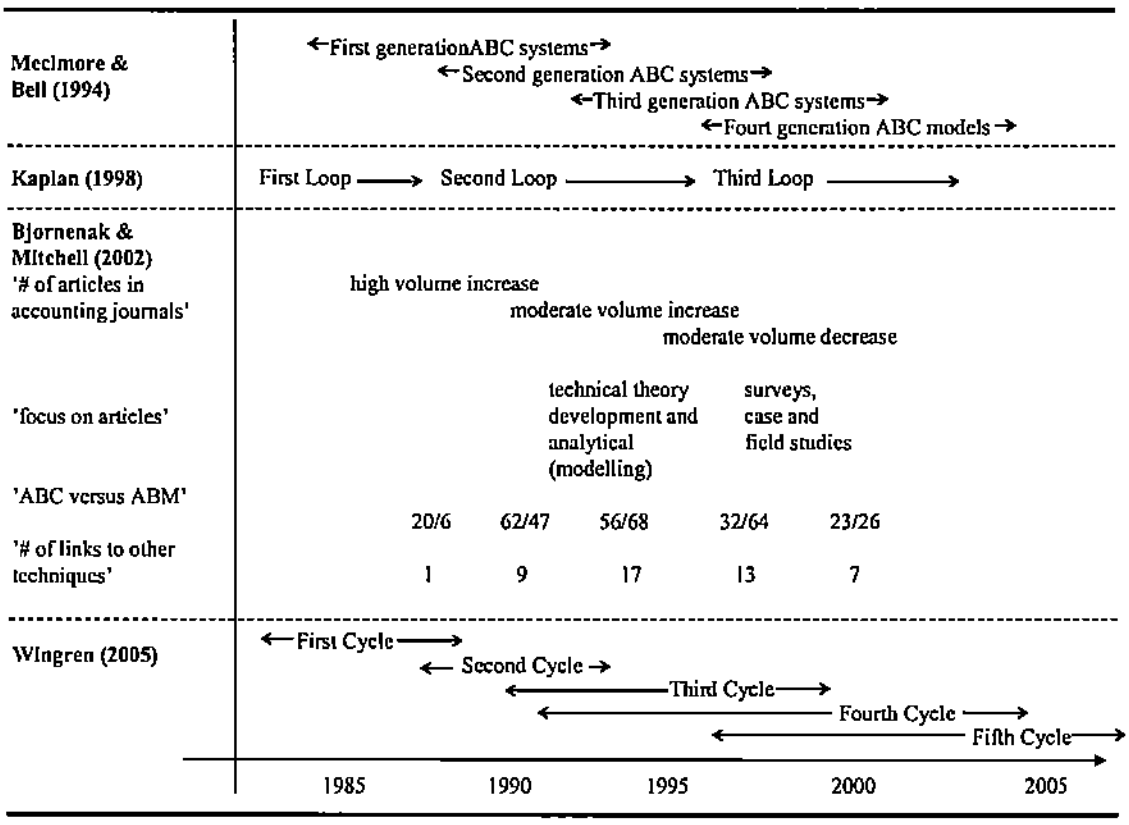


Figure 12. The development in the number of articles on ABC/M, 1987–2004, adapted from Bjørnenak and Mitchell (2002).

The findings in Bjørnenak and Mitchell's (2002) paper are in line with what is found and presented in this study. The technical theory development and analytical (mathematical modelling methods) studies are concentrated around the middle of the period, while the empirical studies by survey and case-studies appear mainly at the end of the period.

Table 1 summarizes the findings of ABC/M development. According to Bjørnenak and Mitchell (2002) the linkages to other techniques continued to increase until the mid 1990's (Table 1.). After that, they have decreased. Again, one reason for this is the fact that those articles started to appear in other than accounting journals. Comparisons between the ABC and ABM focus are shown in table 1. During the late 1980's the majority of the articles had an ABC focus. The breakeven point relents to the early 1990's (1993–1995). After that, the majority of the articles have had an ABM focus, though during the last period in their study (1999–2000) the movement has again been directed more on ABC. The decrease in the amount of ABC articles was 28 %, while the decrease in the amount of ABM articles was 59%. Again, the great decrease in ABM articles could be due to the fact that the articles have appeared in other than MA journals.

Table 1. Summarising the findings of ABC/M development (Mecimore & Bell 1995; Kaplan 1998; Bjørnenak & Mitchell 2002) with findings in this study (Wingren 2005).



This study's findings are i.e. compared with the findings of an article on ABC generation (Mecimore & Bell 1995). According to them, the first generation ABC systems emphasized product costing with major output as a better product cost accounting system (Mecimore & Bell 1995: 22). This is in line with the general findings presented in this research, and with the presentation of simple ABC models during the first and second cycle. According to Mecimore and Bell (1995) cost drivers were associated with resource consumption, not processes. Nevertheless, those models made a significant contribution to the identification of internal cost drivers.

During the second generation of ABC systems, the focus was on the changes in process based and customer orientation, because the focus only on product cost did not support continuous improvement methods and procedures (Mecimore & Bell 1995: 24). In order to describe the operation of the company, the processes should not be forced or defined to fit

activities: activities should fit processes (Mecimore & Bell 1995: 24). This means that the view of the ABC model should be broader, and one action towards that was to change the mapping method from task-activity-process to process-activity-task (like in mass-tailored ABC). The cost analysis was still tactical as in the first generation ABC systems, and the planning and controlling were carried out in cost center level. The second-generation system should be considered as a significant expansion of the first-generation system, rather than a completely new system, but both systems focused on internal activities and provided the management limited information for strategic planning (Mecimore & Bell 1995: 25).

In the third-generation ABC systems, both external as well as internal activities are considered within the realm of the system (Mecimore & Bell 1995). The structure of the system has changed from cost center to business unit, and the activities are business and process oriented. The focus has moved so that the cost drivers are used to enhance the company's competitive strategy through value chain analysis (Mecimore & Bell 1995: 25).

> *"First- and second-generation ABC systems applied the concepts of value added vs. non value added within corporate internal activities to eliminate waste, improve efficiencies, and reduce costs. Companies believed that cost reduction was a necessary step in lowering product costs and improving cost competitiveness. They paid little attention to support activities that add value to a product, so it was easy for them to fail to see the value-added relationships of support activities to the final product or service." (Mecimore & Bell 1995: 25.)*

The next step forward towards the fourth-generation would be to link activities together with business units (Mecimore & Bell 1995). The system would rather be a macro system compared to the first-generation micro system. It would also be much more complicated and the life cycle of it should become shorter and shorter as the technology advances in response to the ever increasing needs of management (Mecimore & Bell 1995).

According to Jones and Dugdale's (2002) research about the early stages of ABC and its background, the first and second cycle in this study would be covering the first-wave ABC from 1984 to 1989. It covers the periods from the beginning to the point where Kaplan and Cooper, Johnson, and CAM-I have presented their versions of the bases of ABC. It continues with the period that formed the second-wave ABC, from 1989 to 1992.

As mentioned earlier and presented in the figures about the ABC models and in the table 1, the included researches about ABC/M development have many things in common. The time-periods are almost equal. The content of different cycles and steps has much in

common. Therefore, in this research, the presented five cycles of ABC/M evolution: (1) *bases of ABC*, (2) *ABC vs. traditional*, (3) *ABC implementation*, (4) *new perspectives in ABC*, and (5) *ABC integration* can be understood as cycles which show the trends and needs for the development work of the new ABC/M concept.

2.2 Summary of the ABC/M evolution

The first cycle which started in the early 1980's, presented a time when the base of the ABC theory was developed. The second cycle developed during the late 1980's, presented a period of time when ABC was contradicted with the other cost allocation methods. The benefits of ABC were highlighted and the discussions about the ABC and traditional accounting methods were carried out in the journals.

The third cycle during the 1990's, presented a time when ABC was implemented as a new tool, which would provide the managers with more accurate information for their decision-making. The basic ABC method was broadening into ABC/M, while its views were divided into cost view (ABC) and process view (ABM). This enlarged the use of the base ABC method.

The fourth cycle started in 1990, but was not strengthened until the late 1990's and is still going on. During that period, the ABC/M was combined[26] with many other techniques and systems, like: activity-based budgeting (ABB), balanced scorecard (BSC), theory of constraint (TOC), value chain analysis (VCA), supply chain management (SCM), and knowledge management (KM).

The fifth cycle has started in the late 1990's. It has not been strengthened yet. The focus of this cycle seems to be integration. Organizations are integrating and clustering ABC together with other techniques, methods, strategies and values. One of the outputs of that are new applications. At the individual level, employees will integrate ABC information together with their other competences, knowledge, and as part of the decision processes.

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[26] In this research combination refers to the technical association together with the conceptual linkages between the different techniques and systems, whereas integration (fifth cycle) means the behavioural thinking beyond the borders of different techniques and systems.

This means that ABC is included in organizations' rules and routines[27]. During this cycle, the technique of ABC has merged with other techniques and systems, and also the understanding of the usage is partly changing to be internalized (tacit knowledge) instead of being an unconnected concept, which has to be argued with documents and other instructions in daily operations.

In this study, the trends in ABC/M evaluation are taken into account when the mass-tailored ABC concept is developed (chapter 4). The following features consequently follow the literature on strategic management accounting, strategic cost management and the evolution of ABC/M: it must have a strong process and customer orientation, it must support the value chain analysis, it must be possible to link it with other systems, and it has to be easier to utilize in the organization's work.

[27] The differences between fourth and fifth cycle can also be seen from the role of the management accountant. E.g. Järvenpää (1998) has analyzed how the role changes. He argued that the role of management accountants is expanding from traditional, indirect and administrative management through an information style into a role, which gives much more emphasis to management through people and management of actions themselves. Järvenpää (1998) also points out that management accounting should be brought to the organizational context through communication, interpretation, explanation, co-operation and participation. These are good examples of both the challenge and the need of the human dimension between the fourth and fifth cycles.

3. IMPLEMENTATION OF ABC/M

In order to be able to understand the implementation of ABC/M, we need to consider the different types of implementation process studies. Earlier ABC/M[28] implementation studies can be divided into three different groups by the nature of the research focus:

- technically oriented implementation studies
- behaviourally and organizationally oriented implementation studies
- organizational change oriented studies

In technically oriented researches the implementation process has typically been studied from a new innovation angle (Kaplan 1990a; Cooper et al. 1992; Shields 1995; Anderson 1995). The main focus has been on the building phase of an ABC model more than on the usage phase of ABC information.

Behaviourally and organizationally oriented researches have typically dealt with the implementation process from a usage perspective. Less emphasis has been laid on technical issues. The main focus has been on the use of the ABC model information, barriers of the usage, unlearning the old, the influence of old routines, how individuals protect themselves, removing fear of new ideas and effecting organizational structures (Cooper & Zmud 1990; Argyris & Kaplan 1994; Anderson 1995; Shields 1995; Shields & McEwen 1996; Foster & Swenson 1997; Gosselin 1997; McGowan & Klammer 1997; Krumwiede 1998; Anderson & Young 1999; Anderson et al. 2002). However there is very little empirical research that explains why and how the behavioural factors are improving the likelihood of successful ABC implementation (Chenhall 2004).

Organizational change-oriented researches have typically considered the implementation process from the standpoint of organization culture. The main focus has been on how the culture has changed after ABC implementation or how cultural changes require new information and new tools to produce it (Shields & Young 1989; Shields 1995; Partanen 1997; Birnberg 2000; Bhimani 2003).

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[28] Also those IT implementation studies are taken into account which have been used as a base or have influenced today's ABC implementation process (Kwon & Zmud 1987; Cooper & Zmud 1990; Shields & Young 1989).

According to IT implementation literature, Kwon and Zmud (1987) categorized the processes of developing a better understanding of IT implementation problems and resolved these problems into a) factor researches, b) process researches and c) political researches. Factor researches focus on technological, individual and organizational forces, which are important for an IT implementation. Factors that were discovered to have a significant impact include top management support, good IT design (architecture) and relevant understanding of the model-design and use of the information. Process researches study social change activities. Factors that were discovered to have a significant impact include commitment to change and implementation, extensive project definition and planning, and management of the process guided by organizational change theories. Political researches focus on managing the diversity. Factors that were discovered to have a significant impact depend upon recognizing and managing the diverse vested interests of IT stakeholders. The categorizing of researches to develop better understanding of the IT implementation by Kwon and Zmud (1987) and the categorizing of ABC implementation researches (technical, behavioural and cultural) are nearly equal. They both contain the social aspects as a part of the implementation process, although these have not been very popular in the field of research.

3.1 ABC implementation models

Kwon and Zmud (1987) proposed a stage model of IT implementation, which includes six stages. Later Cooper and Zmud (1990) have made a variation of the model. The base for Cooper's and Zmud's model is Levin's change model[29] from 1952 and Kwon and Zmud's model from 1987.

Six stages of implementation according to Kwon and Zmud (1987), and Cooper and Zmud (1990) are presented in Figure 13.

[29] Levin's change model includes three stages: the unfreezing stage, the change stage and the refreezing stage.

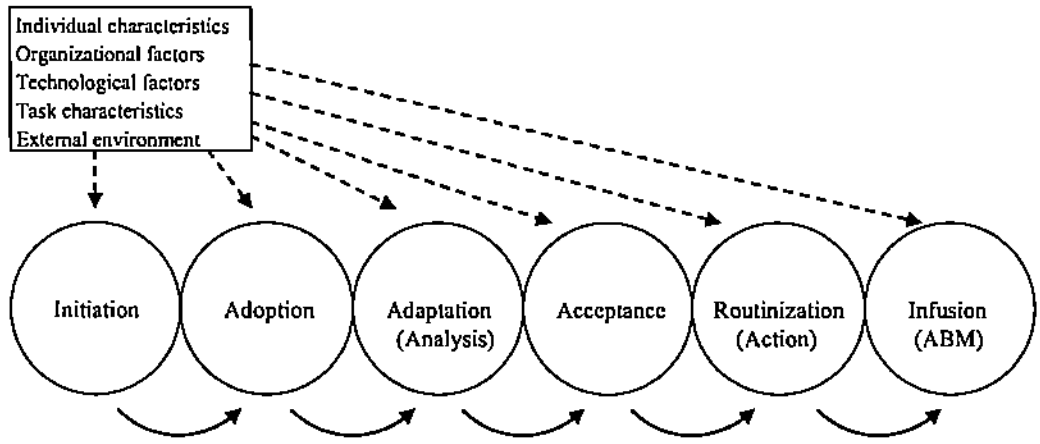

Figure 13. Adapted from Anderson (1995) and Krumwiede and Roth (1997)[30].

Kwon and Zmud (1987) identified five major contextual factors which influence processes and products associated with each of these stages, see Figure 13. These factors are related to

- characteristics of the user community (individual: education, resistance to change)
- characteristics of the organization (organizational: specialization, centralization, formalization)
- characteristics of the technology adopted (technological: complexity)
- characteristics of the task to which the technology is being applied (task: uncertainty, autonomy, responsibility, variety)
- characteristics of the organizational environment (external: interorganizational dependence)

Krumwiede and Roth (1997) investigated the different stages of the process in a case study. They illustrated an adaptation of Cooper and Zmud's (1990) implementation model, Figure 14.

[30] Anderson used words according to Kwon and Zmud (1987), and Cooper and Zmud (1990), while Krumwiede and Roth (1997) used different words for the adaptation, routinization and infusion stages, see parentheses.

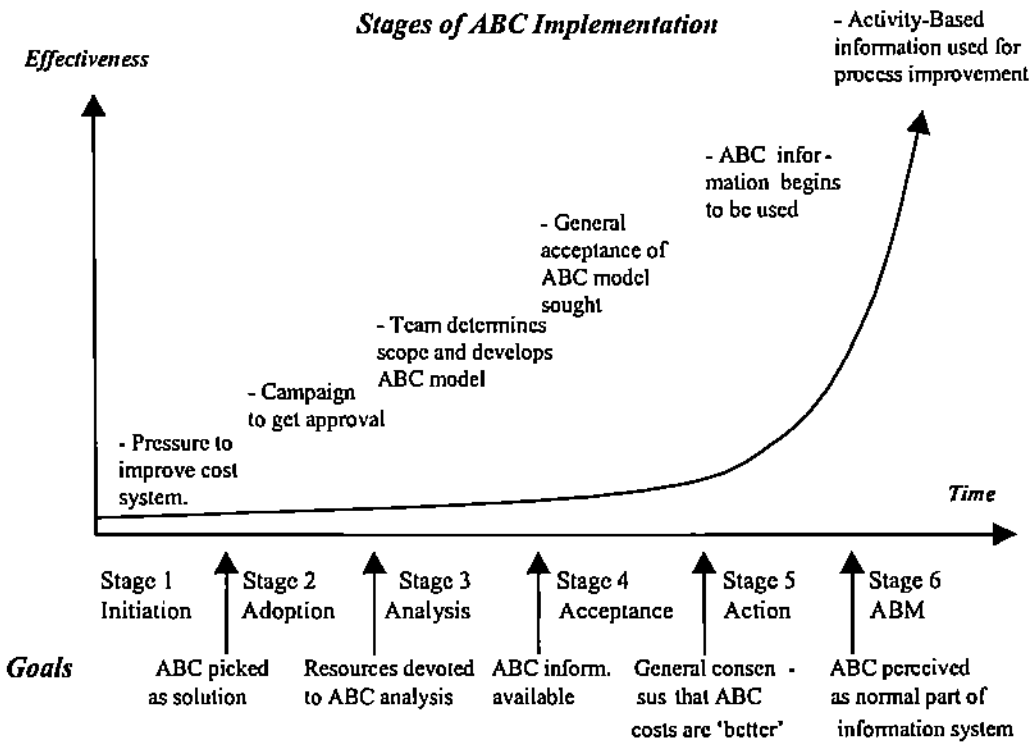

Figure 14. Stages of ABC Implementation process, adapted from Krumwiede and Roth (1997).

Krumwiede and Roth (1997) describe the ABC as a radical IT innovation, which can affect many people in an organization. They found, among other things, that ABC should be linked to some other initiatives (like TQM), the organization should have a clear vision of and goals for the ABC system, the model should not be too complex, and the longer a project takes the less motivated people become. They also found that ABC should not be an accounting project, and that actually, the implementation is associated more with organizational factors than with technical factors. In the implementation models by Kwon and Zmud (1987), Cooper and Zmud (1990), Anderson (1995), and Krumwiede and Roth (1997) the implementation process is presented as including certain steps in a certain order, while Agbejule (2000) found that some of the steps are not relevant in some cases, and that the order of the steps can vary from the ordinary order.

3.2 Problems in implementing ABC

In spite of the benefits and strengths of the ABC construction in theory, many problems have emerged when applying it in practice. For example, Player and Keys (1995a, 1995b, 1995c) wrote three articles on activity-based technique implementation in the Journal of Cost Management[31], focusing on the pitfalls of ABM implementation. Pitfalls in the first article focused on the beginning of the implementation process. The following pitfalls were identified: lack of top management commitment, failure to understand different views of the concept of costs, lack of clear objectives, a financial person as head of the ABM project, lack of employee involvement, lack of funding, lack of training, faults in outside consultants, lack of cost management expertise and no link between ABM and JIT, TQM, BPR, or other management initiatives.

The second article in the research focused on the pitfalls in developing the pilot. The identified pitfalls were: failing to begin with a pilot, too many details, too few details, problems in collecting activity data, inaccurate assignment of costs to activities and to cost objects, unavailability of detailed data, cost assigned to the wrong year, software problems, poor project management and lack of time.

The third article focused on moving from the pilot to the mainstream. The identified pitfalls were: individual resistance to change, departmental resistance to change, resistance to changing beliefs and value systems, environmental barriers to change, no formal plans to act on ABM information, lack of clear, concise, and easily understandable reports, problems with reporting frequency, ABM not implemented in the profit center, company being too profitable for ABM and the ABM system being too costly to maintain.

In practice, the implementation of ABC has proved to be much more complicated[32] than the well-understood theory[33] behind it. For example, many firms have focused on the

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[31] See p. 46.

[32] Difficulties in the implementation process have been researched by Cooper et al. (1992), Norkiewicz (1994), Anderson (1995), Laitinen (1995), Malmi (1997), Shields (1995), Shields and McEwen (1996), Gosselin (1997), McGowan and Klammer (1997), Partanen (1997), Krumwiede (1998), and Anderson and Young (1999).

[33] In this research we assume that the theory behind ABC is well understood, because a great many companies (both globally and locally operated) have carried out an ABC project, and because of the great number of articles and studies that have been written about the ABC during the last 20 years. See also Argyris and Kaplan (1994) regarding the test of internal and external validity of ABC theory.

model architecture and on other technical factors, like technical innovation requirements, and not on the administrative innovation factors, which ABC involves (Shields 1995). Laitinen (1995) reported that half of the companies have had problems in selecting suitable drivers. He also found that the project's time-schedules are often longer than planned.

Shields and McEwen (1996) found in their survey that 25% of the companies, which had introduced ABC, had not gained any financial benefit from it. According to the research the main reasons were the emphasis on the architecture of the system and on program issues. Too little attention was paid on behavioural and organizational issues. The literature on ABC implementation typically focuses on the technical details and gives instructions on them, but the behavioral issues are less covered (Shields 1995).

Clarke et al. (1999) have done an ABC survey study in Ireland: activity-based costing in Ireland: barriers to, and opportunities for, change. They sent a mail-questionnaire to 511 companies and received 208 responses, of which 204 were used in the study[34]. The result was that 12% were implementing ABC, 20% were assessing ABC, 13% assessed, but decided not to use ABC, and 55% had not considered ABC. According to Clarke et al. (1999) the main problems were directed to the cost assignment and to finding suitable cost drivers, see Table 2. The most common problems during the designing and implementation of ABC for companies were in assigning cost to activities (50%), identifying and selecting cost drivers (42%), inadequate computer software (38%), and defining distinct activities (33%). The most common reason for companies not to implement ABC was difficulties in selling it to the managers (42%), and lack of adequate resources (23%).

[34] The mail-questionnaire was sent to 511 manufacturing firms in the Business and Finance (1995) listing of Ireland's top 1000 companies, based on annual sales.

Table 2. The perceived problems in adopting and implementing ABC[35].

	ABC implementation problems for firms using ABC (24 firms)		Reasons ABC was not adopted by firms that rejected ABC (26 firms)	
	(%)	(n)	(%)	(n)
Difficulties in assigning costs to activities that reflect true causality	50	12	n/a	n/a
Difficulties in identifying and selecting cost drivers	42	10	15	4
Inadequate computer software	38	9	8	2
Difficulties in defining distinct activities	33	8	n/a	n/a
Lack of adequate resources	29	7	23	6
Difficulties in selling the concept of ABC to managers/ No commitment from management to ABC	4	1	42	11
Lack of internal expertise	n/a	n/a	11	3
The control over overhead is already adequate	n/a	n/a	69	18

According to Partanen (1997) the problems within the implementation process itself have been a major reason for the failure of the ABC project. Problems were found in the principles of ABC and its structure, defining the activities, identifying the drivers, allocating the costs, collecting the needed data, and in the problems in the IT-systems. The following items have also been mentioned as problems in the interviews with the ABC project members: the updating of the model has been more problematic than expected, utilization of the results has been unclear, the commitment of managers has not been strong enough, it has been difficult to acquire the needed data (drivers and volumes) and to outline the causes which produce these results.

Anderson (1995) studied the implementation of ABC at General Motors (GM) 1986–1993. She described the factors which have affected each of the six stages of implementation positively or negatively, according to Cooper and Zmud's model (1990). She also studied how the five contextual factors mentioned by Kwon and Zmud (1987) have influenced the progress at each stage of implementation. During the adoption stage, some managers at GM found the ABC model to be too complex; it used too old data and the systems were not maintained. During the adoption stage, the ABC project received evidence of GM's wide sponsorship, when GM Chairman and CEO mentioned that ABC could improve the

[35] Clarke et al. (1999). Percentages do not add to 100% due to multiple responses.

existing costing techniques. During the adoption stage, the need of common documents of activities and drivers, and the need to integrate the ABC models with the existing financial system rose up. All pilot projects were done more or less individually, and the discussions about common documents and integration would have meant an agreement between the existing ABC models. They recommend developing ABC further as a stand-alone, PC-based system, because integration would cause too great problems in the short-term. The long run target was to link existing systems with ABC data.

During the adaptation stage at GM, the schedule of the implementation was designed to be more aggressive. This would need the *commonizing* key ABC design. ABC memos were directed toward operational, rather than financial uses of ABC data. They tried to link the ABC model with the traditional financial systems and change the status of *special study* to *integrated*. Problems occurred in linking the traditional concept of fixed and variable costs with the ABC model, as well as in the inventory valuation.

The acceptance stage at the GM was a time period, when most of the project was carried out. GM also changed the focus of the ABC from product cost to activity or process costs, *"while this increased the appeal of ABC at new ABC implementation sites, it was difficult to change the perception of managers from earlier implementations that ABC was a product costing system"* (Anderson 1995: 30). In 1992, only 21 sites of 114 had completed the ABC project. GM developed a quick implementation process called *blitz* implementation. In November 1993 every plant had had an ABC model for some period between 1989 and 1993.

To sum up the GM case, findings reveal that attempts had been made to manage ABC systems and processes in a very mechanistic way. The message behind them is that the knowledge of implementation processes can be gathered in a consciously controlled and systematic fashion. But these efforts are not living up to their expectations. It seems that knowledge is far more elusive and intangible, and therefore it is hard to manage the ABC knowledge and to determine its practical value.

By researching the implementation in another way, the following factors were found to be the most important ones in a successful implementation process: top management support, linkage to competitive strategy, linkage to quality initiatives, and linkage to JIT and speed initiatives, linkage to performance evaluation and compensation and consensus about ABC objectives (Shields & McEvan 1996). Other important factors have been sufficient internal resources, training and non-accounting ownership (Shields & Young 1989). McGowan and

Klammer (1997) studied the causes for satisfaction in ABC/M implementation. They extended the model of Shields and Young (1989) with the correlation between preparers' and users' satisfaction and with technical (quality of output) and situational variables (user involvement). Findings of the study were comparable with those of Shields (1995). Additional findings were that individuals within the same organization might react differently to the implementation. The preparers had higher satisfaction level than the users. Malmi (1997) found that some of the failures of ABC systems might not actually be failures. He argues that some of these failures may merely reflect a limited appreciation of the uses into which traditional accounting systems are put in practice.

3.3 Social aspects of ABC implementation

Some initiatives in the literature have been taken to create a deeper understanding of human processes within the implementation of new technical innovations. For instance, Argyris and Kaplan (1994) describe the series of processes required to implement an innovative technical initiative beyond aligning the interests and incentives of participants. According to them, two aspects have to be fulfilled. Firstly, the technical theory must be demonstrably valid. Secondly, two processes must occur: an educational and sponsorship process, and an internal commitment-creating process (presented below and adapted from Argyris and Kaplan (1994).

- *Education process*: (identify the need for a new costing system)
  - learning and accepting the logic validity of the new technical approach
    - identify the gaps in existing theory and practice
    - articulate a new theory that corrects the gap
    - provide examples of how the new approach benefits the organization
- *Sponsorship process*: (provide a climate whereby initiatives can be undertaken)
  - persuade the key individuals to lead the change process
- *Internal commitment creating process*:
  - identify the need for a new costing system

Argyris and Kaplan (1994) assert that defensive routines create barriers, which have to be overcome. According to them, the individuals' motivation is the key to that. Training and education processes are necessary in order to create learning and accept the logic validity of the new technical approach. Argyris and Kaplan (1994) say that it is important for the

success of those processes to efficiently identify the gaps in the existing theory and practice. After that, it is important to thoroughly articulate all those factors involved in the new theory that can correct the gaps. In motivating people, it is also important to provide examples of how the new approach benefits the organization.

The sponsorship process provides the climate where initiatives can be taken. It is important to find and motivate key individuals in the organization to lead the change process. Someone should attend to the implementation process, as well as other people's commitment to it with true responsibility and interest (Argyris & Kaplan 1994). Both the analysis phase and the action phase (Cooper et al. 1992) require people to function in four distinct roles: 1) as advocates (launching the ABC project), 2) as sponsors (approving the project), 3) as project supporters (project leader/change agent) and 4) as targets (the expected users of the new information, for example individuals with responsibility for operations).

Commitment refers to the amount and type of energy that individuals devote to tasks, and it can be external or internal (Argyris & Kaplan 1994). External commitment is important, because it establishes the organizational rules, but it is not sufficient. Internal commitment means that an individual adopts the new idea also for personal reasons. The best implementations occur, when the individuals involved can take part in creating the conditions that give intrinsic satisfaction and are rewarding.

Argyris and Kaplan (1994) suggest some steps or actions, which support the individuals' commitment to a new technical idea like ABC. First, internal commitment can be supported by thorough identification of the needs for a new costing system. It is important that individuals know, understand and accept the results as advantages. Otherwise they will not commit themselves. The incentive alignment should be appropriate, so that the actions are encouraged and sanctioned by the formal orgnanizational system. If it seems that nobody cares whether an individual adopts the new way of doing things or not, there is only little hope for a successful implementation process. Besides, the new system should be at least partially consistent with norms, long-established ways of doing things and the culture of an organization.

Argyris and Kaplan (1994) recommend in all other roles, except in the target-role, a person who has a background in accounting. They give many examples of projects where the target was not clearly identified. According to them, the analysis phase can be completed without the target being specifically designed. Then the explicit or implicit goal for the

ABC project was to produce more accurate cost information or to reveal the hidden profits and losses.

Current cost accounting systems are often incapable of following the changes in the business environment. Modern business logic requires a change from *managing the numbers* to *managing by commitment to continuous improvement*. Seven Cs is a behavioral model including those variables which must be considered when implementing cost management systems (CMS) successfully (Shields & Young 1989). The seven-Cs model is presented in Figure 15.

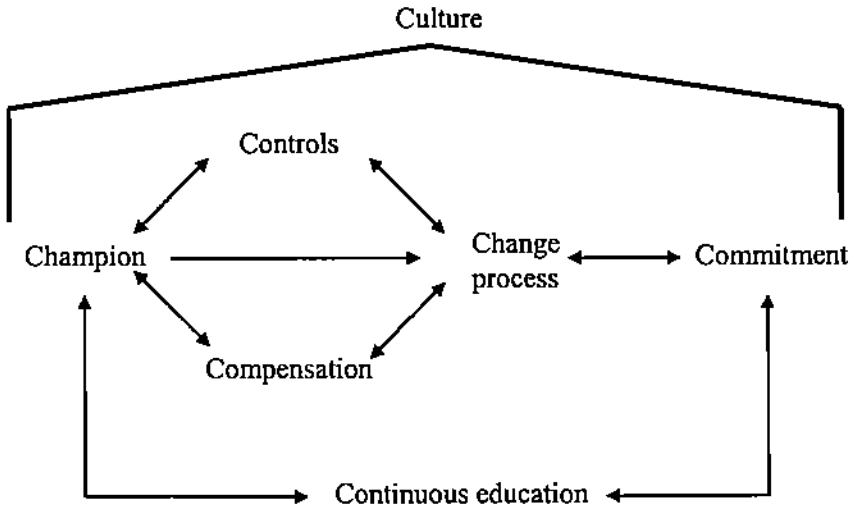

Figure 15. Seven-Cs model: implementing the CAM-I cost management system[36].

The goal of the seven-Cs model is to identify opportunities for continuous improvement and to get all employees to adopt the philosophy. The key issue is to develop a culture which will align the goals by managing successfully the kind of activities and behaviours that cause costs. Goals could not be reached without all employees understanding the impact of their own behaviour on cost and on continuous improvement and rewarding (Shields & Young 1989).

The seven-Cs model assumes that there are different types of cultures (functional, dysfunctional and ill-defined). One of the issues is that by using the model, the

[36] Adapted from Shield and Young (1989).

development of the culture can be taken into account and action to design it in the right direction (strategy) can be planned and made. According to the ABC implementation, this could mean that a company has made a strategic decision to move from a functional and production-focused company into being a process and customer-focused company, and the existing CMSs did not follow the new organizational structure and culture. The key person in the seven-Cs model is the champion. She/He is responsible for the implementation of the new CMS (like ABC/M). The champion is managing the change process and the target is to reach a commitment to continuous improvement[37]. The champion implements the change process through controls, compensation and continuous education. Important elements in some of the Cs are, according to Shields and Young (1989), in the change process: top management support, financial resources, resistance to change, time frame and strategy. Important controls (organizational) are JIT/TQM, organizational structure and teams. Compensation is a tool to control behaviour and motivate employees to increase the rate of continuous improvement. Continuous education should focus on how to make effective decisions based on new information. Continuous education is in a key role in developing and designing the culture of managing by commitment to continuous improvement.

Typically, the barriers that oppose and obstruct the implementation of new ideas and practices in organizations, are framed as resistance at individual, group, intergroup, and organizational levels (Argyris & Kaplan 1994). What individuals choose to believe or to forget, disregard or reject, depends to a large extent on the consistency of the new knowledge and the knowledge already adopted or internalized in individual or organizational practices (Mezirow 1996).

According Partanen (1997) the changes in organizational culture's business environments have lead to preferring certain values more than before: customer satisfaction, customer orientation, quality, cost effectiveness and increased willingness to change. Lukka and Shields (2001) point out that the change in business environment has lead to variety of structures and processes in organizations: flat and horizontal forms, multidimensional matrix structures, networks of real and virtual organizations. Many of these have had a positive relation to the increase of the role of cost accounting and changing the role of the

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[37] Continuous improvement is needed to reach the stage 6 (Krumwiede & Roth 1997) in the ABC implementation process. According to the researcher's own experience, ABC or another new technique can not be adapted in one go. Continuous education, like in the seven-C, assists the change process.

accounting people (Cobb et al. 1995; Cooper 1996; Burns & Vaivio 2001)[38]. This change process is identified and the essential matter has been described as follows management accountant's role is moved from scorekeeper to be a part of value-adding team (Johnson 1995; Kaplan 1995; Anastas 1997). Management accountants have to become more effective members of the management team, they should move from the traditional scorekeeping, and control tasks to ex-ante planning and control, potentially with strategic management accounting techniques like ABC (Järvenpää 1998). In addition, they have less time dealing with financial accounting, auditing and tax issues. Most of their time will be spent in learning about products and processes, operation systems, strategy and the behavioural and organizational issues relating to the implementation of new systems and processes (Kaplan 1995).

Burns and Vaivio (2001) present more questions than answers in their article on change in management accounting. Maybe the reason for this is the unknown process that has occurred. They point out that change in management accounting does not necessarily follow a managed and formal event or process. The logic can also be the opposite. According to them the change is an unmanaged phenomenon that also contains informal elements (see also Abrahamson 1991; Granlund 1994; Malmi 1999). The change can be as a central driven effort, where the top management has a key role, or it can also be regarded as a local reform, where the local actors are the real architects and agents of change (Burns & Vaivio 2001).

Burns et al. (2003) have studied management accounting implementation as a change process, and the behavioural and cultural aspects of it. They argue that:

> *"Selecting the 'right' accounting systems and techniques is undoubtedly very important, as are the technical aspects of the implementation process, but we argue here that change implementation and change management also involves important behavioural and cultural issues, and raises such questions as: does the staff understand the nature and significance of the new systems? Do the new systems 'fit' the established ways of working in the company?, and how will the new systems influence the various factions within the company." (Burns et al. 2003: vii.)*

Burns et al. (2003) observe the implementation process as a management accounting change process. According to them, there exists a relationship between rules and routines,

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[38] Management accountant's changing role has been research by e.g. Burns and Vaivio (2001), Coad (1999), Granlund and Lukka (1997, 1998), Järvenpää (1998, 2002), Friedman and Lyne (1997) and Malmi (1997).

taken-for granted assumptions (i.e. their institutions), and day-to-day actions. The success of an ABC implementation can be measured by how well the company manages to change the existing rules and routines into the new ones. If the rules and routines are more accounting oriented, the likelihood for a change is better, than in the cases where the rules and routines are not.

According to the literature, all technical, behavioural, cultural, organizational, and individual aspects, as well as the implementation process itself, are linked together in some way[39]. All those certainly have an effect on the success of the ABC implementation; the emphasis between them changes according to the organization and the used implementation method. In other words, none of those are inefficient during an ABC implementation process.

Literature on knowledge management distinguishes between data, information and knowledge (Earl 1994; Davis & Botkin 1994; Sveiby 1997; Davenport & Prusak 1997, 1998). Those are included also in the ABC/M implementation process. It is generally argued that we first need data before information can be created, and information before knowledge can emerge. Tuomi (2000) has reversed this hierarchy. According to him the data emerges only after there is information and knowledge available. He points out, that there are no isolated pieces of data, unless someone has created them using his/her knowledge. Thinking of the ABC/M implementation process in this way, gives us an understanding that there is two kinds of knowledge that is critical. Firstly, we need knowledge to understand the technical part of the process, and secondly, we need knowledge to understand the behavioural and cultural part of the process. During the implementation stages, it is important to have enough conversation and interaction with people. Those form the base for the assumption, that learning occurs and knowledge is created (Brown & Duquid 1991; Cook & Yanow 1993; Gherardi & Nicolini 1998; Lave & Wenger 1991; Easterby-Smith, Crossan & Nicolini 2000).

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[39] In this research the technical issues are seen as data, software, and reports; behavioural as behaviour of individual or group of employees in certain circumstances, cultural as shared assumptions for a company, organizational as support, training and role for the system, and individual as knowledge, motivations and involvement.

3.4 Summary of ABC/M implementation

This chapter shows some of the models used in the ABC implementation processes. Some of them are more mechanical and focus more on the technical issues, while others are more focused on the behavioural and cultural issues. This chapter also shows how difficult it is to evaluate the success of an ABC implementation process, or to locate the exact drivers (positive and negative) for such a process. Some of the barriers that oppose and obstruct the implementation of new ideas and practices for managing organizations, are framed as resistance at individual, group, intergroup, and organizational levels (Argyris & Kaplan 1994). ABC apparently attracts the same organizational resistance experienced by other technical initiatives (Argyris & Kaplan 1994). The pitfall can occur when the rest of the organization is skeptical about the ABC results produced by the finance group (Argyris & Kaplan 1994; Kaplan 1991), or vice versa (Burns et al. 2003), or when the model is reporting what has happened but it will not give information about what-if capabilities (Kaplan 1991). According Seven C´s Model, one of the most important issues is to find out the champion, who will lead the change process through: compensation, controls and continuous education. Partanen (1997) also points out the importance of the process itself, while Shield and Young (1989) assert that one of the biggest challenges in implementing a CMS successfully is individual and organizational resistance to change. From this point of view, the action phase is very difficult to carry out, and the problems which occur, are mainly related with the poor change process (Burns et al. 2003).

It has been argued that there was an *accounting lag* i.e. a time lapse between the development of theory and its application in practice from early to mid 1990's (Scapens 1994). Also changes in external and internal environment increased the development of new management accounting systems. This has lead to changes in management accounting and in the roles of accountants (Innes & Mitchell 1990; Cobb et al. 1995; Coad 1999; Burns & Vaivio 2001).

This study focuses on investigating the consequences of developing the technical issues, and the implementation process itself. Selecting the right options for a certain organization helps the implementation of ABC. On the other hand, selecting the wrong options can become a hinder for the ABC implementation, even if ABC would be a suitable method for the organization. Below is a list of issues which should be discussed in the organization before the ABC/M implementation project. Each issue includes some of the main options. These are followed by a summary of those options which are selected in this study.

- suitability for the organization: cultural, strategy, management, other systems (these are taken into account or not)
- building the model: resources, activities, cost objects, drivers (standardized or non-standardized)
- architecture of the model (top-to-bottom or bottom-to-top, functional or process based)
- used software (integrated to the ERP or a separate ABC program)
- implementation project itself (quick start *learning by doing* or focus on the complete model)
- Project leader (an internal *champion* or external project leader)

In this study, the selections are made according to the feedback from the earlier ABC projects in the case companies and from the literature review of implementation. Some selections are also tested in other case companies without any prior ABC knowledge. The constructed mass-tailored ABC method represents a standardized method of building a top-to-bottom process based model, which is programmed into a separate ABC program with linkages to the companies' ERP systems. The used project model is a quick start and lean structure rather than trying to build the final version of the ABC model. Quick start and lean structure in this study means a process based, customer oriented, full cost ABC model at a certain level.

4. MASS-TAILORED ABC, THE NEW CONSTRUCTION

This chapter starts with a discussion about the background and the practical issues that lead to the development work of the mass-tailored ABC concept. The constructed new accounting concept and its structure, as well as the implementation process, are presented.

All the comments and findings presented in this chapter are made from questionnaires, observations, interviews, meetings and informal discussions in all of the ABC-projects.

4.1 Background information

ABB Companies in Finland started to implement their first ABC models at early 1990's. The initiative for those projects came from skilled employees who wanted to test the ABC in their own organizations. During the first years, most of the ABC models covered one specific cost center or a part of the production. Only a very few of those models covered the entire company, including a product profitability analysis or a customer view. The primary aim was to calculate the costs for the selected activities and products, and to benchmark the information with the existing one.

An ABC team at a global level was established to promote the ABC projects in ABB companies in the mid 1990's, when ABC was commanded to become a mandatory management accounting tool globally. Additional ABC workgroups and ABC steering groups were established in the main countries. In Finland, the ABC workgroup and the ABC steering group were established to support the ABC implementations. The ABC projects, results, methods and problems were discussed in both groups. The global ABC implementation process was planned to be carried out in two different stages. The process analysis, process optimization and cost of potential savings of non-value-added work were emphasized in the first stage. The interest to measure profitability analyses (product and customer) later increased in the first stage. The second stage focused on the profitability analyses (product and customer), and on the integration of the ABC model with the ERP system as a final aim for the ABC process.

The timescale of this research focuses firstly on the end of the first stage and the beginning of the second stage of the ABC implementation in Finnish ABB (FIABB) companies in the late 1990's and early 2000's. Secondly, it focuses on examining a longitudinal study of the

usage of ABC as a tool, which is used in searching for the value creators in the company's value chain (essay #3), and also the role of the ABC system is perceived and tested as a link between operational performance and strategic priorities (essay #4). The latter period extends to the early 2004. The case companies are presented in more detail in chapter 5 and in essay #1.

4.2 Practical findings at ABC implementations

From the early 1990's until the late 1990's, ABC-models had increasingly become company-wide and included cost information of activities and processes, and profitability calculations of products and customers. ABC models were built from bottom-to-top and included all single elements according to the first stage ABB ABC manual: accounts, group of accounts, cost centers, resource drivers, employees, tasks, activities, products, cost drivers and customers. It took 4–8 months to build up a new complex model including all above named data of all employees, hundreds of tasks, more than 100 activities, not to mention the numerous products and customers. During that time, many of the Finnish ABB companies had implemented ABC once or twice, but in only few of those, ABC had been a part of the operational or strategic work. The rest of the companies had built the entire model but failed in the usage phase. In spite of the amount of the problems and projects that failed, the companies may have learned something new by taking some issues of their ABC projects. In those cases, the companies did not take ABC as ABC, instead they used the old terms and names in a slightly new way or manner.

There were many reasons for the failures. The problems could be roughly categorized into technical, administrative and cultural. Technical problems occurred when the needed data was searched from different databases or/and when the data was imported or/and exported. The technical problems occurred more often after ABB had selected the new ABC program in mid 1990's as mandatory for all ABB companies[40]. The aim of the new, tiny ABC software company was revising their existing ABC program for ABB. Some of the Finnish ABB companies were complaining about the mandatory ABC PC-program, which was different, compared to the existing ABC program. The users explained that the new program was more complicated to use, the interface was useless, and the input and output

[40] ABB Ltd was a signed deal of the ABC software in 1992 with a tiny software manufacturer that had grown, but in 1996 ABB signed a new agreement again with another tiny ABC software company.

of the data was particularly difficult to do. Also the reports were mentioned to be weak. After the first version of the ABC software, the producer improved the program every year by adding new features into it. A totally new version of it was presented at the end of the 1990's. The new features did resolve some of those technical problems that the users were complaining about, but not the most important ones (mentioned above) from the continuous usage point of view. It was still assessed as being too difficult to use.

The administrative and cultural problems focused on the lack of resources at the implementation process, commitment to the change, and on the failure to convert the ABC-information (data), and the formed ABC knowledge into explicit figures, documents and procedures, so that others could also understand it. Other reported problems were: the costs of the implementation process, lack of sponsorship, lack of support, or the lack of direct benefits of the entire ABC project itself for the companies in certain businesses, compared to their existing systems.

According to Argyris and Kaplan (1994) two aspects have to be fulfilled. In the first aspect, the technical theory must be demonstrably valid. In Finnish ABB companies, the ABC was technically understood and accepted. It had been used for some years and the results of the models were presented to others. The global ABB ABC method that was presented in mid 1990's, focused on activity analysis and searching for potential cost savings, which were different subjects from those on which the existing ABC models at companies were focused. The existing ABC program had to be changed to another one. It was later reported as being worse technically. Also the architecture of the model had to be changed because of the new ABC program[41]. In the second aspect, two processes must occur: an educational and sponsorship process, and an internal commitment-creating process. Generally, in those companies which were familiar with ABC, the new global ABB ABC focus of the first stage was seen as taking some steps back, because it focused on the early phases of an ABC project: to map each of the current processes and to abandon the waste in those, to calculate the costs of activities, and the potential cost savings. During that time, with the new focus and new tool, it was difficult to acquire sponsorship (see Anderson 1995), which, again, was the key to the educational process.

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[41] This had quite a significant negative effect on the implementation. E.g. Shields (1995) has argued that the success of the ABC implementation process is more a behavioural than a technical issue. In this case the new technical theory transformed to be not as competent demonstrably as the prior one. This had a negative impact on the implementation, as Argyris and Kaplan (1994) had stated.

Argyris and Kaplan (1994) argue that defensive routines create barriers, which have to be overcome. Also the motivation of individuals is a key to that.

Player and Keys (1995a) have pointed out the importance of top management's commitment to the success of the implementation. To meet the agreed time-schedule and to get the benefits of the ABC system from the companies' point of view, the Finnish ABB ABC steering group decided to support the development work of the new ABC concept. It should be suitable for the companies, it should support the companies' needs more efficiently, than the previous ones, and it should also have a link to the global ABB ABC project. The new concept was also designed to follow the new perspectives (new applications) of ABC at least on the concept level: value chain analysis (see Porter 1985), process value analysis (see Beischel 1990; Shank & Govindarajan 1992, 1993), and the process and customer orientation, which had become increasingly important both for the practice and for the ABC literature (Hoque 2001)[42], along with the improvement of the structure and implementation process. The possibility to analyse the profitability of products and customers was seen as important for the companies. Also Mariotti (1996) points out its importance. The new concept was first carried out with the ABB ABC software, but later it was changed to the current version of the software, which had been used before in the Finnish ABB companies, as it had many advantages.

As a conclusion of the practical findings, it can be stated that the employees in FIABB companies had many years' experience of ABC. The global approach, which in the mid 1990's was combined with the new ABC PC software, was not seen as a system, which suited the Finnish ABB companies, when considering the needs and expectations of an ABC concept at the end of the 1990's. Anderson (1995) made similar findings from the feedback from managers after the changes in the focus of ABC on GM. The managers who had partaken in earlier ABC implementation processes had difficulties in changing their perceptions according to the new focus if any real benefits could be presented.

[42] Examples of the use of planned new applications are presented in essays # 3 and # 4 in this thesis.

4.3 Development of a mass-tailored ABC concept

The FIABB ABC coordinator[43] and other ABC team members discussed the nature of the new ABC concept. The following aspects were discussed during the development work: both the time and the costs of implementation should be reduced compared to the earlier projects. The time spent in building an ABC model was considered as being too long. The usability of the method should be better. Companies were not satisfied with the output (information, reports and other data) of the ABC system. They could not always understand the logic of the model (technically) or follow the accumulation of the flow of costs. These issues affected the reliability of the model as an information source for decisions.

In mass-tailored ABC the main focus has been on the technical part of the ABC implementation process. This was not seen as the most important or easiest issue. Rather, it was seen as a cultural issue in ABB. At mass-tailorizing ABC the aim was to build harmonized or standardized pre-modules which then would be tailored and used in the projects. According to Lukka (2001: 12) "*the major motivation of standardization is to raise efficiency in conducting certain tasks of the system: if standardization works, one does not have, or is not even allowed, to question the way things should be done concerning the standardized issue.*"

One of the primary aims was to make the technical part of the implementation valid, and also easier to understand and use, compared to the earlier versions. The architecture of the model should be similar for all companies. In larger units it would work as a foundation for all sub-units. With this, the focus of the implementation was meant to be shifted from the technical issues more on the organizational and behavioral issues, because the technical issues were noticed to be an important part of ABB culture. Shields (1995), Shields and McEwen (1996), and Krumwiede and Roth (1997) found in their studies, that ABC should not be an accounting project, and that actually, the implementation is associated more with organizational factors than with technical factors, such as the architecture of the model, and program issues. This research takes the view[44] that there is a relation between

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[43] The author has worked as a FIABB ABC coordinator from 1998. The role of the researcher and the selected constructive research approach is discussed in chapter 6.2 'validity and reliability'.

[44] The view is based on the literature of the different issues and on the experience that the author has from ABC projects in numerous organizations with different culture, behaviour and technical knowledge.

technical, behavioural, and cultural issues, together with the individual and organizational issues, and implementation process itself. Their emphasis differs from organization to organization, and therefore, some of those seem to be more important than others in certain circumstances.

Another reason why FIABB ABC teams decided, that the new ABC concept (mass-tailored ABC) and its implementation process should be much more harmonized/ standardized than previously was the differences in the existing models. Those differences could turn out to be a disadvantage for the continuous improvement and following work. It was, for example, difficult to compare the costs of activities between the companies, or calculate the trends. The updating work of the model could, in principle, be carried out only by the designer of the model. In fact, the models were too dependent on their designers. According to Partanen (1997) updating the model has been more problematic than expected. The mass-tailored ABC concept was planned to be constructed from a module based[45] ABC model with a standardized implementation process. The aim was to be reached by including to the new ABC model the parts of the existing models that were found to be good[46]. Those were integrated into the structure of the model's architecture, and to the activity dictionary within tasks and drivers. Also the implementation process was built so that it had the same base structure for all. As mentioned earlier, one of the primary aims was to simplify the technical part of the implementation process as much as would seem wise. Such technically improved method could be obtained because the investigations on the existing models showed that those models included very similar activities, tasks and drivers, even though the structure of the models and the business of the companies varied.

The behavior and cultural issues were also taken into account during the development work of mass-tailored ABC. The primary aim was that by using the mass-tailored ABC concept, the constructed model would be easily accepted as a new information tool. This means that the users could find it as being more useful in their work. It should more efficiently meet the different expectations of the possible users. Some of those were more concerned with the structural part of the reports, while others were more interested in the

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[45] The mass-tailorizing of the ABC model means that the ABC is built so that it is a 'ready' model from which the company selects all those items which they have in their own operations, and adds or changes only the minor parts of the model.

[46] 'Good' means here that the existing model has been accepted, understood and used in the organization.

numbers. The transparency of the results was an important issue, in order to get the trust. The model should produce a more suitable data for decision-making. The model should focus on giving information about those matters that were pointed out to be important for the users: cost of activities and processes, product and customer profitability, information for pricing and strategic decisions, and data for value chain analysis.

As a summary, the mass-tailored ABC concept was constructed with knowledge from earlier ABC projects: both technical factors (like architecture of the model and feedback from the IT-systems used) and administrative and behavioral factors (like understanding the model, transparency of the model, usability of the information and trust in the model) were included in the construction process. Also the cultural factors were taken into account. As ABB is a company of engineers, the technical part has to be valid. It was a primary part of the development work. The aim of mass-tailored ABC was to achieve: uniformity among ABC models; the possibility for benchmarking, for example, the cost of single activities or profitability drivers; easiness in updating and calculating trends; independence from a key person (because the structure is always the same); harmonization (processes, activities, tasks, drivers, allocations...); reduction of project time-schedule from months to weeks; and emphasis on an overall view, focusing down on a more specific level *only* when needed.

4.4 The mass-tailored ABC concept

The biggest difference from the *traditional* ABC is that the implementation of mass-tailored ABC is always done company-wide by selecting or omitting parts of the *ready* full model for different business types. Any processes, activity groups, activities, tasks or drivers, which do not exist in a company, are omitted from the model. Mass-tailored ABC starts from the broadest level (ABC2000 activities) and focuses down to *smaller* activities and tasks *only* when needed. Sharman (1991) has pointed out that there are two techniques in undertaking ABC: the cost decomposition and the process analysis. According to him it is more important to understand the business and to build an ABC analysis at a high enough level, than to try to get it absolutely correct. In mass-tailored ABC the company is divided into three levels: on the 1st level, the model mapping level, there are typically 30–70 activities (called to ABC2000 activities, each with one cost driver); on the 2nd level, the activity level, there are typically 150–200 activities; on the 3rd level, the task level, there are 300–600 tasks. The second and third levels are mapped only when needed (Figure 16.)

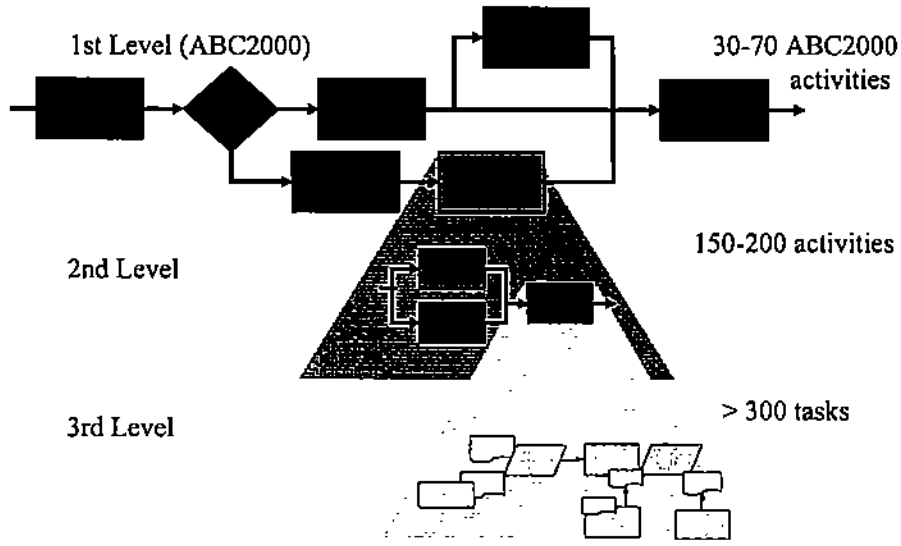

Figure 16. The levels of the company in the mass-tailored ABC method (FIABB/QMS, ABC-material).

Ten years ago Lawson (1994) pointed out that ABC lacks a process orientation, a customer focus, and fails to include an understanding of the cost behaviour function. He argued for the customer-orientation, process based analyses, and importance of flowcharts showing the interrelationship among activities. Due to the development of management accounting and strategic management accounting systems, the situation is different today, also from the ABC/M point of view.

Mass-tailored ABC is designed to use platform thinking, which means that all models should be built from the same basis. Having a common platform helps bigger units in comparing their results between the subunits, in maintaining the models, and in sharing best practices within the organization (Lukka 2001). Central issues in it are: a certain flowchart technique, and the common way to build the ABC model by using an activity dictionary, which is a collection of activity groups, activities, tasks and drivers. These are categorized and named (coded) in accordance with the nature of the activity: material related (MRxxx), manufacturing related (MAxxx), project management related (PRxxx), installation related (IExxx), direct development related (DDxxx), research and development related (DRxxx), marketing and sales related (SRxxx), administration related (ARxxx) and special direct cost related (SDxxx) activities. These categories were identical

with the ABB ABC to save the link to global ABC project. The numbering of activities is similar for all activity categories, but this was not included in the global ABC project. Activities, which number is below 199 (like MR070 or AR110) describe normal operational work. Activities, which number is 2XX describe managerial work, respectively 3XX describes work of quality issues, 4XX service work, 5XX development work, 7XX repair work (reclamations and claims), and 9XX are for financing (capital) issues. An example of the activity dictionary is presented in Table 3.

Table 3. Example of the standardized activity dictionary and the volume of different kind of activities (ABB QMS ABC material).

1st Level	*2nd Level*	*3rd Level*		
MODELLING LEVEL ACTIVITY	*ACTIVITY*	*TASK*	*COST DRIVER SUGGESTION*	*PROCESS*
MR060 Handling purchase invoices	MR061 Handle invoices for unique purchases	A) process invoices for unique purchases - inspect and approve invoices for unique purchases - manage registering and allocation - investigate irregularities	No. of invoices No. of purchased parts in products No. of invoice rows No. of order rows	ORDER TO DELIVERY (LOGISTIC)
	MR062 Handle invoices for repeated purchases	B) enter invoices for unique purchases in the system - register and allocate invoices - enter invoices in the system - check invoices in the system - approve invoices for entry into the system - transfer data to the financial system		
	MR063 Process the bar code invoices (EDI)	Task for MR062 and MR063 as for MR061		

totally	*totally*	*totally*	*type*
58	123	229	Activities in processes
5	11	15	Quality ensuring activities
9	15	28	Development activities
11	13	31	Cost of poor quality activities
6	6	6	Financial (capital) activities
3	3	4	Special direct costs activities
92	171	313	Totally

In addition to the coding, the activities also have different colors: blue is the color for a normal activity, green means development, red refers to rework (waste), and grey marks

those activities for which it is not easy to find drivers, or activities for allocating capital costs. The aim for categorizing, numbering and giving different colors for the activities, is to facilitate users in different analyses, like the amount of development or management activities in the administration process, or the cost of complaints in the manufacturing process.

One of the aims of mass-tailored ABC was that it would be linked to databases and systems, and that it would support the reporting, as well as product cost management and customer profitability analysis. Here, the aim was not to develop a fully integrated ABC system, which is discussed by Mangan (1995). The reason for this was that an integrated cost system, where ABC is linked to other companies' systems like ERP, can easily give wrong information, if operational real-time data is used as base for the strategic decisions, without understanding the differences in their contents (Kaplan & Cooper 1998). The grade of integration which is used in mass-tailored ABC includes the possibility to import and export data from different systems by standardized complete forms, but it is not meant to do this fully automatically, and certainly not as real-time data. According to Kaplan & Cooper (1998) with real-time updating of cost, capacity, and driver information, the activity costs, the driver rate, and the costs of outputs would vary from day-to-day. This could be suitable for a very short time operative work, but not for the purpose that mass-tailored ABC was developed for.

The conditions under the ABC method, which provide relevant cost and other information (Noreen 1991; Roth & Borthick 1991), are taken into account in this study as principles. In all mass-tailored ABC projects the validity of results is always revised with case companies other calculations; also the management's approval is applied.

4.5 The implementation process of mass-tailorized ABC concept

Both Krumwiede and Roth (1997) and Player and Keys (1995a) point out how important it is, that the organization has a clear vision of ABC and goals for the entire system. The mass-tailored ABC was developing to clarify the aim of the project for the case companies' managers. It was designed to give two kinds of information: (1) product and customer profitability, and cost of activities and processes, (2) an overall picture of the company's operation (process map), which again gave a possibility to follow the consequences of the changes. Later the information of value creators and link between operational and strategic

system (new applications) was added to the aims of mass-tailored ABC. Standardization/harmonization of the model's architecture, and the implementation process, were applied so that the building phase and the complete ABC model, would not be too complex, and would not take too long. According to Krumwiede and Roth (1997) the longer a project takes, the less motivated people become, while Player and Keys (1995b) argue that all following issues can become pitfalls: too many details, problems in collecting the activity data, software problems, poor project management or lack of time.

According to mass-tailored ABC concept principles, selecting and omitting parts of the standard full model gathers the map of processes and activities. All those activities that do not exist in the company are left out from the model. Earlier, problems were found in the principles of ABC and its structure, in defining the activities, identifying the drivers, allocating the costs, collecting the needed data, and in the IT-systems. In the mass-tailored ABC the selection of the activities is carried out during the ManKo/Co –day (Management Kick Off / Management Commitment day). During that day, the activity dictionary works as a document of the full model, and also later i.a. as a document of the activities of the company in their quality system. The mass-tailored ABC implementation process always consists of 6 phases (see below) and is scheduled to take 8–12 calendar weeks[47].

1. Preparation for the project (scope, objects, time schedule, team members, process walk)
2. ManKo/Co –day (Management Kick Off / Management Commitment day) (building the ABC-model, processes, activities, drivers, cost objects, reports)
3. Defining the resources and gathering the needed data,
4. Importing the data and making first calculations, preparing the reports
5. Presenting the results, getting the management agreement, and making a plan about follow up
6. Utilization of the ABC information and agreement of the next steps

The implementation starts with preparation work for the project. The aim for the first phase is that the organization should afterwards have a clear vision of and goals for the ABC system: setting the target of the project, what are the benefits ABC can give us; defining the scope of the project: cost centers, divisions, company, group; defining the objects of the project: processes, products, services, customers; collecting information about the

[47] Depending of the organization the implementation time can also be shorter, only some days.

objects, general ledger and organisation; collecting information about earlier ABC projects; defining the project steering group and the team leader, *the champion*; defining the project's time-schedule. The next phase is the ABC model building day, which was briefly discussed earlier. During that day, the activities and processes are omitted/selected for the ABC model and the selection of products and customers are made. The purpose of using a certain level at model building phase is that the model would not be too complex, or the discussion would not go into too small issues. Mass-tailored ACB model includes at the 1st level 30–70 activities, depending of the size, and business area of the case organization. Player and Keys (1995a) found that a financial person as a head of the ABC/M project, and lack of employee involvement, could become pitfalls during the implementation. The participants of the ManKo/Co –day consist of employees from different departments. Typically, there are 6–12 participants with good knowledge of the activities in their own departments. About half of them have been managers.

In the third phase, the nominated employees gather the required data, after the model is constructed. Mass-tailored ABC includes complete forms for importing and exporting the needed data from a company's IT systems. The first calculations are made during the fourth phase. Results are presented, compared to the objects, and discussed with the company's ABC project team or/and the management. Suggested corrections on the model, reports or data, are also made at this phase. The aim is that the participants would understand the model's principles, background for the calculated ABC information, and learn how they can use it.

The fifth phase includes the presentation of final reports. In this phase, companies have made their selections of the reports they want to present, and how often. Also the addressed employees or parts of the organization are selected. The last phase includes discussion and decisions of the next steps (updating the model, responsibilities in the future).

The mass-tailored ABC concept has been implemented in several different kinds of organizations. Some of them have been small organizations, while some of them have been bigger ones and parts of a global concern. The number of case companies where the data was collected was limited to 15 altogether. Some of them were included to more than one part of this study: to the early phases of the development and implementation of mass-tailored ABC (11 cases), on the implementation's follow-up (6 cases), and on showing new application of ABC (2 cases). The case companies are presented in more detail in chapter 5.

4.6 Summary of the mass-tailored ABC concept

As the literature on ABC/M implementation demonstrates, the ABC/M implementation process is very complex (Shields & Young 1989; Argyris & Kaplan 1994; Anderson 1995; Shields 1995; Roberts & Silvester 1996; Gosselin 1997; Freidman & Lyne 1999; Drennan & Kelly 2002), involving technical, organizational, behavioral, cultural and individual factors, together with the implementation process itself. Also the definition of successful ABC system is complex (Malmi 1997; Krumwiede 1998; Drennan & Kelly 2002). Therefore, the evaluation of the ABC implementation cannot focus only on one clear aspect, such as technical or behavioral factors. However, as it is impossible to focus on all aspects during the ABC implementation, the primary aim of mass-tailored ABC is to make some of the mentioned factors easier to handle than before. In this case, the main focus was on technical issues, and on behavioural and organizational issues. These, and the implementation process itself, were seen as forming the foundation for a successful process. From the usage point of view, the main objects were in establishing cost calculations (post and pre), pricelists, product/customer reports, and in the analysis of processes. Later the information of value creators and link between operational and strategic system (new applications) was added to the aims of mass-tailored ABC.

The development work, the background and reasons, together with practical findings, standardized architecture, and the implementation process of mass-tailored ABC method, were presented in this chapter. According to the constructive research process, the following phase examines the scope of the solution's applicability. This is done with empirical tests in the selected case companies.

5. CASES

The external validity of the constructed method should be empirically tested. According to Labro and Tuomela (2003) the weak market test is passed, when a manager is willing to apply the construct to his or her actual decision-making problem. Lukka (2000, 2002), however, asserts that the weak market test should really refer to the actual implementation of the construct, rather than the willingness to implement it. The next level of tests are semi-strong market test and strong market test. The first one is passed if the construct is widely adopted by companies, while the latter requires that the business which is applying the construct systemically produces better results than those that are not using it (Labro & Tuomela 2003). According to Lukka (2000) it is practically impossible to go beyond the weak market test in a constructive case study, because the main issue is whether or not the case company has adopted the constructed new method. In a long-term research the situation is different. A weak market test can be passed and a discussion of semi-strong or a strong market test can be carried out. In this study the implementation of mass-tailored ABC in different kinds of companies is clearly an evidence for the weak market test and also an evidence for the semi-strong market test.

In this study, the case companies were selected from different business areas. Some of the companies have implemented ABC earlier, before the implementation of mass-tailored ABC, while some of them have not.

5.1 Methods and data collection

In this research the data was collected in three different phases. Firstly, during the implementation process (see appendix 1. *a questionnaire*), secondly after the mass-tailored ABC model was built (see appendix 2. *a questionnaire*), and thirdly after the model was used for some months (see appendix 3. *a form for interview*).

During the implementation process, the empirical data was collected mainly by questionnaires (15th June, 1999 – 24th January, 2000) but also by observation that covered a longer period. In this phase, the empirical data was collected from 92 persons who attended the ManKo/Co –day at mass-tailored ABC implementation in eleven (11) companies (Essay #1). The aim for this phase was to compare the mass-tailored ABC with the

traditional ABC. Therefore this phase includes only organizations that have earlier experiences of ABC.

In the cases where the data was collected after the model was built, the empirical data was collected firstly by a questionnaire. Eight people from these organizations were asked to answer the questionnaires (23rd May, 2000 – 10th July, 2000). All of them had an important role in their ABC projects, as project managers, financial directors or managing directors. The questionnaire was sent to two persons in those companies with no prior experience of ABC. In all other companies the questionnaire was sent only to one person. The financial director and managing director from companies with no prior ABC experience had an active role in the project, and were therefore asked to answer the questionnaires. The aim for this phase was to compare the ABC implementation projects between companies with and without prior ABC experience (Essay #1).

In the last phase the empirical data was collected from nine professionals in ABC in six (6) Finnish companies (same companies than in the second phase). All of the eight (8) persons[48] interviewed, were project leaders in their respective ABC implementation projects. In this study, the case companies are referred to as A, B, C, D, E, and F respectively. From companies A and C, two representatives were interviewed, while all the other companies were represented by one person. The companies' business operations are mass production (B, D), customer-focused mass production (A), customer-focused production (C, F), and wholesale trade (E). The revenue of the companies varies from 34 million euros to 123 million euros and their staff from 108 to 680, respectively. Profitability is good or very good in all of them. The ABC projects started in the case companies in 1998 to 2000. The scope of the project was company-wide in all of them.

All of the interviewees in this research were interviewed separately. Primarily, the interest was on the professionals' opinions about their respective ABC projects and did not focus on the differences between the companies. The author was involved in and made observations of all ABC implementation projects, and could therefore compare the given answers in each project. This helped in achieving a realistic comprehension of each project, even though the number of people involved was small.

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[48] Six of the persons (one per each case company) are same than in the second phase. Due to the focus of the research all the persons are not. In the third phase the interviews focused more on those organizations which had a longer experience of ABC, while in the second phase the focus was more on researching the effect of different prior ABC experience.

In the analysis of the empirical data, all companies that did not have prior ABC experience used only the mass-tailored ABC concept together with the ABC software that was used before the new ABB ABC software, while most of the companies with prior ABC experience used the new software due to the order from concern.

The applied questionnaires and the question frameworks are presented in the appendix to the extent they were used in this study.

5.2 Summary of the essays

This thesis includes four (4) different essays. All of them focus on studying the constructed ABC method, its implementation or the use of it in new applications. Next, the aims, methods and data, and the main results of each 4 essays are shortly presented. The essays are presented in their entirety in the end of this thesis.

5.2.1 Management accounting system improvement and implementation: a case study in a mass-tailored ABC Context

Aims

The aim of this research is (1) to evaluate the benefits of the mass-tailored ABC concept[2] as compared with the traditional ABC, which the case companies have implemented before, and (2) to examine and increase knowledge about the different factors involved in ABC implementation. The second aim is related to the implementation of activity-based costing in general.

Many studies have already been conducted to determine which factors lead to successful implementation (Cooper & Zmud 1990; Cobb et al. 1992; Argyris & Kaplan 1994; Anderson 1995; Player & Keys 1995a, 1995b, 1995c; Shields 1995; Gosselin 1997; Krumwiede & Roth 1997; Malmi 1997; McGowan & Klammer 1997; Krumwiede 1998; Anderson & Young 1999; Friedman & Lyne 1999; Anderson et al. 2002; Baird et al. 2004).

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[2] The term concept is used in this research to describe the different versions/generations of an ABC method. The mass-tailored ABC method is like an ABC package for different kinds of business types.

This research focuses on showing how unequally companies with or without prior ABC experience act within the equal ABC implementation process. This kind of research framework is well under research compared to the previous studies.

Method and data

The study was carried out in two stages: the first stage included involvement in eleven mass-tailored ABC projects during the years 1999–2000. During this time period, the research consisted of gathering material from formal discussions in meetings, as well as in informal discussions during the projects. The evaluation questionnaire was used in this first stage in all organizations. Altogether ninety-two individuals answered the questionnaire.

The second stage, which started after the ABC building phase, included applying the questionnaire and interviews in six different organizations. Eight people from these organizations were asked to complete the questionnaires and were also interviewed. All of them had an important role in their ABC projects, as project managers, financial directors or managing directors. The questionnaire was sent to two persons in those companies with no prior experience of ABC. In all other companies the questionnaire was sent only to one person. The financial director and managing director from companies with no prior ABC experience had an active role in the project, and were therefore asked to answer the questionnaires. The results of the questionnaires were analyzed and compared with the author's own documentation and observation.

Results

The feedback from the cases clearly points out the benefits of using the mass-tailored method, as compared to the traditional method: mass-tailored ABC is seen as more user friendly, easier to utilize in the employees' own work, faster to build and more understandable. The mass-tailored method, as developed, shortens the ABC model-building time to one day, namely the ManKo/Co-day. During this particular day individuals from different departments build the ABC-model, selecting appropriate parts from the pre-defined full ABC model: processes, activity groups, activities and drivers. This clear endorsement of the mass-tailored model's benefits points out the importance of future development of the ABC concept.

As the cases in this research demonstrate, the ABC implementation processes are complex. Different kinds of factors can be recognized, but it is difficult to judge the overall success or failure of those. In this research the case companies with / without prior experience of ABC, used the same ABC implementation method. This was perceived as a good, fast and easy way to undertake the implementation process in all of the case companies. However, the data revealed that the companies with prior ABC experience concentrated more on individual targets, while the beginners focused more on the learning side of ABC. The cases also showed that companies act differently due to the different level of prior ABC knowledge. In this research the management's motivation and support was stronger, there was more training, and the ABC model was more unanimously understood in companies without any ABC experience. On the other hand, the companies with earlier experience were more aware of the role of the ABC system. They reported somewhat more often that the ABC system is used in reporting, and in pre- and post calculation.

The empirical data proved that the following issues had a correlation with the reported scores of how well the targets were achieved; ABC system is linked to performance measurement system, it help to fulfill strategy and its targets, people have been trained sufficiently, and people believe that ABC benefits their and the organization. These findings are similar to what Argyris and Kaplan (1994) and Shields and McEvan (1996) have founded.

In addition to that this research pointed out two new aspects for the literature on ABC. One is the mass-tailored ABC concept, and the other is an examination of ABC implementation in companies with different background knowledge and experiences of ABC. Both of those aspects introduced interesting results and suggested the need for future research.

5.2.2 The creation of a management accounting system – a demanding learning process: a case study in an ABC context

Aims

The aims of this field study were to evaluate four (4) ABC model revision processes and two (2) ABC first time implementation processes through the model of SECI (Socialization, Externalization, Combination and Internalization) based on Nonaka's (1994) theoretical frame of organizational learning. The ABC implementation process is technically similar in all of the cases. The aim of this paper is to evaluate learning

processes in an organization when implementing and revising the ABC system. The focus and the features of organizational learning in the ABC processes will be demonstrated with empirical evidence.

Method and data

An appropriate frame was needed in order to study the aims of this study. Therefore, the main elements in organizational learning were introduced, and 13 features were defined for a successful learning process. They are developed on the basis of five conditions, described by Nonaka and Takeuchi (1995) and some other criteria introduced in the literature on organizational learning and ABC implementation.

The main empirical data was collected by interviews[49]. One of the authors of this research made observations and documentations in all of the ABC implementation projects, and additionally, a follow-up period of approximately one year per case. In order to deepen the analysis, the results of the observations are included in the analysis part. The interviewees were the project leaders and also key persons of the ABC projects. In two of the case companies, two representatives were interviewed, while the other companies were represented by one person. Each of the interviews took place in the interviewees' offices and lasted from 1.5 to 2 hours.

The main interest in the discussions with the interviewees was to find out how the project and the process of the ABC implementation took place and how it succeeded, and for what kinds of reasons. The interviews focused on the process of ABC-implementation or revision, in order to get as genuine story of the process as possible. The defined 13 features for a successful learning, basing on the literature on organizational learning and ABC implementation, served primarily as a frame for analyzing, thus they were not used as direct questions in the interviews. Researchers wanted to avoid asking directly opinions about the features, as their content could easily lead to misunderstandings and diverse interpretations. The applied interview process consists of broad and open discussions, concerning all the phases of the learning process. By observation it was possible to compare, and to some extent also clarify, the learning processes in each ABC project.

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[49] All interviews were carried out by a third person who was not included in ABC projects, so as to achieve a neutral atmosphere in all meetings.

The tape-recorded data was written into a text. The analysis of the data is based on data coding, as suggested in Miles and Huberman (1994). A fixed structure was used to interpret the data and to find out the critical aspects in learning processes of ABC-projects in the study. Both of the researchers read the written interviews several times and made respective preliminary interpretations. After that, the interpretations were communicated, compared and discussed, in order to be able to make a mutual interpretation of the data.

Results

According to made observations, when it comes to organizational learning, the ABC projects in the case companies were not managed effectively. There was no conscious understanding of the ABC projects as demanding learning processes. In most of the cases, there were serious problems with each stage of the new knowledge creation processes. The cases are evaluated according to the criteria (13 features). The evaluation of the learning process is based on the empirical data of interviews and observations. The scale that was applied is a five-grade scale, which consists of five evaluative words: weak, tolerable, moderate, good, excellent.

According to the volume and contents of the comments, the most problematic areas seem to be the socialization and internalization phases for the companies, which revised their ABC models, and, for the first time ABC implementation case companies, the internalization phase.

All the case companies experienced internalization as being the most challenging phase. The difficulties related to it are widely known in literature and practice. For example, in a research by Ruggles (1998), the study participants were asked to name the biggest difficulties in managing knowledge in organizations, and 56 percent of them cited changing people's behaviour. The combination phase was discussed explicitly in the interviews, especially its technical problems, which the interviewees saw, after all, as principally soluble matters.

Furthermore, the observations revealed that the two groups of case companies were acting very differently during the combination phase. The first time ABC implementation companies had a clear object and wide motivation for their ABC project, while the other companies lacked these. The attitude towards the ABC model and its use had changed after the first (and second) time implementation. It is obvious that the key people had learned to think differently and to make more specific questions. On the other hand, it seems that

their holistic view on things may have had suffered and they may have started to perceive the work at the implementation process as a merely technical routine. As a consequence, the possibility to learn from experience was not recognized.

5.2.3 In search of value creating activities: an empirical study

Aims

This study investigates the impact of the case organization's activities on the value creation. The analysis is carried out in two phases. Firstly, the case organization's value chain is analyzed in order to locate the value creating and non-value creating activities. The aim is to find those activities, which are generating the value (profit) for the organization. Secondly, the found activities or groups of activities (clusters) are analyzed more deeply. The aim is to find drivers for the value creating and non-value creating activities, which are currently latent in the organization. This is performed in the discussion part by analyzing relations between activities, produced products, ABC cost drivers and product/customer profits.

This study is limited to the organization's value chain between two separate manufacturing units and an administrative office, and to the financial and volume data from suppliers and customers.

Method and data

In this study, the causal modelling approach Partial Least Squares (PLS) is used in searching for the value creating activities. PLS is closely connected to models that contain latent variables, which cannot be observed directly (Cassel, Hackl & Westlund 2000). The PLS is a one step process, there is no separate regression steps, and the main idea of PLS is to get as much concentrated information as possible into the first few loading vectors. In the literature on management accounting, there are only few researches, in which this method has been used (Anderson et al. 2002). PLS is more popular for dealing with highly nonlinear correlated data between process variables and quality variables (Song, Jang, Cho & Jun 2002).

The used data is a very detailed ABC model which supports analysis of processes and product/customer profitability calculations.

Results

According to the results of the PLS analysis, two activity clusters could be found. The first one #1 has only negative loadings, while the second one #2 had only positive loadings. All the eleven (11) groups of ABC activities (AGs) in which activity cluster #1 has loadings, are emphasized more in less profitable product families. It has loadings in AGs that are named according to value activities by Porter (1985); operations, service, outbound logistic, and firm infrastructure. The negative sign indicates that this activity cluster is a group of non-value creating activities for the case organization.

Respectively, activity cluster #2 has loadings to AGs that are named according to Porter's (1985) value activities; technology development, operations, service and firm infrastructure. The positive sign (even highly positive in some AGs) indicates that this activity cluster is a group of value creating activities for the case organization.

The 'latent' driver in the first activity cluster has a connection with the less profitable product families. The loadings are placed either to the manufacturing or to the more overall work (service, outbound logistic and firm infrastructure). According to the results the use of certain activities would decreases the profit of product families, and in the longer run, the value of the company. A closer analysis of the data is needed, in order to find out the possible drivers. In this case, this is done by examining i.a. what the ABC cost drivers are that define the allocation of the company's resources to produced products.

The possible 'latent' drivers for the second activity cluster #2 differ from the cluster discussed above. This cluster #2 includes the activities that are mainly linked to special products, while the first cluster was more linked to the standard products. Special products include work which is more personal, and consists of different kinds of operations than standard products. The 'latent' drivers seem to have a linkage to good technology development, together with a unique and smart way of working, which is suitable for the production process (scheduling and machines). Otherwise, with the exception of the previous activity cluster, the activities in this cluster are probably performed more efficiently, when compared to the competitors, and can therefore be named as value creating activities.

5.2.4 Management accounting in the new economy: from "tangible and production-focused" to "intangible and knowledge-driven" MAS by integrating BSC and IC

Aims

The purpose of this paper was to present a new application of the ABC method, which is linked to tangible and intangible measurements, and which could be used in the value development of a company. The object of such a measurement framework can be either external comparison, or supporting internal management behaviour (Shulver 2000). In this paper, the main focus was on internal operations which also worked as links to the ABC system. It was assumed that the value of the company increases more from internal operations, than from external promises in the long run.

The main research questions were:

1. Is it possible to use a homogenous *structure* for the intangible measurement system?
2. Is it possible to use ABC system as *a connection* between tangible and intangible management systems?
3. What would be the *benefits* of such a combined model?

Method and data

This research can be seen as a study that present a new application of ABC method according to the evaluation of the theory. Goal is to present how an ABC system can be linked to other concept to analyse company's tangible and intangible resources. In this study the chosen concepts are BSC and IC. Those were integrated to the evaluated BSC^{IC} model. The challenge is to find instances of innovation approaches, responsive to the changing and new environment of business practice.

The aims of this research paper were studied by using the existing literature. It is the outcome of collecting, analysing, comparing and synthesizing theoretical knowledge from BSC and IC models. The latter part of this research includes also a short empirical part. The applied data is taken from the case company's ABC system, and it includes a one

year's period. The object with the case data is to show a practical example of how the developed model can be used.

Results

The management of activities should be seen as a tool to be employed in the creation of value for customers, shareholders and employees (McConnachie 1997). It involves identifying activities, assessing their links with the present and future value of the company, measuring their value, discovering intangible activities and finally being able to efficiently manage those activities (Sánchez, Chaminade & Olea 2000).

The BSC^{IC} model included two separate BSC models: one for valuing, measuring and managing the tangible resources and the other for valuing, measuring and managing the intangible resources. Instead of having one main target, the BSC^{IC} includes two different main targets. The *tangible side* (1) shows the strategic targets, critical success factors and measures needed to increase the targets in its perspective, and the *intangible side* (2) shows the strategic targets, critical success factors and measures needed to increase the targets in another perspective.

The market value calculations were not seen as the primary target of the BSC^{IC}. The structure of the model was focused more on measuring and managing the internal individual components. Some of them can be valued, but the structure is not suitable for overall valuation.

6. CONCLUSIONS AND CONTRIBUTION OF THE STUDY

6.1 Conclusions

According to Keating (1995), the researcher should address the fundamental question; what is learned about management accounting from this case study? He points out that at a minimum; the author should identify key findings, connect the outputs to the research objectives and discuss how the case study has advanced the state of theory.

In the beginning of this study the researcher mentioned that there is a clear lack in the MA literature of constructive studies[50], in which the focus is on developing a special management accounting method for a certain demand (like mass-tailored ABC), and in which the implementation process of such systems in different kinds of organizations is observed and studied. Also the areas of new applications that could be found from the ABC theory evolution were one of the aims of this thesis. Now, after the work is performed, the researcher is able to answer the following, clearly under-researched questions: (wider answers can be found from the essays)

- What is a mass-tailored ABC concept?
    - The evolution of activity-based costing/management is presented in chapter 2. The development work of a mass-tailored ABC concept followed the evolvement, case company's objects and author's experience of earlier ABC projects. The mass-tailored ABC concept is presented in chapter 4 and in essay #1. Three main improvements could be named: implementation process, model architecture and activity dictionary. The entire implementation process (6 phase) is following a standardized structure and specific material including the activity dictionary. The mass-tailorization means that the implementation is done by omitted/selected items from a business area based full model that support the process and customer focus. It is developed so as to work more like a system that supports the

[50] Examples of the applications of constructive research approach in management accounting are the licentiate theses by Puolamäki (1998) and by Tuomela (2000), and the doctoral dissertation by Puolamäki (2004).

integration of management accounting and strategy than the traditional ABC. It is designed to give information of organizational effectiveness with a process- and customer orientation, which in turn can be used in evaluating the accomplishment of strategic goals, key success factors, value creation and performance.

- What kind of influence does the mass-tailorizing have on the ABC implementation process?

    - All case companies reported to be more satisfied with the mass-tailored ABC concept compared with the earlier ABC concept. It was reported to give more information, be more user-friendly, easier to utilize, faster to build and easier to understand. Mass-tailored ABC had a positive effect on the implementation process (essay #1).

- How does the ABC implementation process differ between the companies with prior ABC implementation knowledge and those without any prior ABC knowledge?

    - According to the observations, all companies had some problems in their implementation process from the perspective of organizational learning. For those companies, which revised their ABC system, the socialization and internalization phases (of SECI model) seemed to be the most problematic areas, while for the companies, which were performing their first time ABC implementation, the internalization seemed to be the most problematic area (essay #2).

- Is it possible to locate the value creators from an ABC model in a value chain analysis?

    - All activities could be located to the case company's value chain from the case company's data. From all activities two activity clusters were selected for further analysis. One of those included only value creating activities which were mostly related to the special products, while the other cluster included only non-value creating activities which were mostly related to standard products. The drivers for the value creating activities proved to be

related with the assortments, volumes, capacity utilization and technology (essay #3).

- How the data of the mass-tailored ABC system can be used in an intangible and knowledge driven management accounting system?

    - A framework for new strategic management accounting system that used ABC model data and worked as a link between operational performance and strategic priorities was presented. The *tangible* BSC^{IC} *side* of the model showed the critical factors needed to reach the targets in the monetary and physical resources, and the *intangible* BSC^{IC} *side* shows the critical factors needed to reach the targets in the human, organizational and relational resources. The model will integrate the activities (from an ABC model) in a stronger way into the key success factors and measures. This can lead to a more understandable knowledge of the entire operations. The structure of the developed BSC^{IC} model is focused on identification, measuring and managing the internal individual components (essay #4).

One of the main tasks of this study was to obtain a general and comprehensive understanding of the topic. This was done by involving to tens of ABC implementation projects, and by investigating the evolution of ABC/M together with the existing literature on ABC implementation. All of those indicated the directions for the development work of mass-tailored ABC. After that, the constructed method was empirically tested in case companies with different background of ABC. All essays in this research present their results.

As a summary of the findings, it can be stated that the mass-tailorization of the ABC method seemed to increase the acceptance of the method in many different ways. Most of those were totally new or understudied. Thus, this study makes a clear contribution to the theory of ABC.

The used method (same method, same implementation process but different background of ABC) gave a possibility to investigate the ABC implementation from an unexplored perspective. The cases proved that from the organizational learning point of view the companies acted differently. Companies with prior ABC experience focused much more on the technical issues, than those without any ABC experience. The latter group of companies focused much more on the discussions about ABC and its objects, compared

with companies with ABC knowledge. This part of the study makes a clear contribution to the implementation of the ABC/M, especially from the learning process point of view.

Another understudied area in the management accounting is searching for the company's value creators from its value chain by using the ABC data. This study clearly showed that it is possible to execute though the process and model is not completed. The value and non-value creators could be located. Also the drivers for those were discussed. Additionally, this study proved that even if the data is very detailed, the analysis of the results is not unambiguous.

The last contribution relates to the development of ABC in strategic management accounting issues, by presenting a framework in which the relationship between strategic priorities and tangible and intangible resources is presented. In that framework the mass-tailored ABC was linked to a BSC^{IC} model. The framework showed how the strategic objective was related to critical success factors and their association to key performance measures.

The latter part of this study makes a clear contribution to the new applications of ABC. Applications that were presented in this study were founded from the evolution of the theory of ABC/M.

6.2 Validity and reliability

A case study research is certainly one method for accounting researchers to develop an in-time, contextually sensitive knowledge of actual management practices (Keating 1995). Ferreira and Merchant (1992) argue that one of the weakest elements in the case study research is the failure to explicate the theoretical contribution the case study makes to the literature. The validity of the study can be tested with three different criteria: (1) construct validity, (2) internal validity, and (3) external validity. With the first criteria, it is possible to judge the used operational process of the study, compared to the methods or concepts studied. The second criterion is focusing on the established causal relationships within the studied issues. It focuses on judging how certain conditions seem to lead to other conditions. The last criterion is more focused on the findings of the study and how well these findings can be generalized, and linked to the existing literature.

This study aims to improve the validity by well-considered selection of the research methodology, framework and used procedures. The researcher's many years' experience of and familiarity with the research phenomenon has helped in many different phases of the research, for example, in understanding the discovered practical problem, the topic (ABC/M) and its empirical/theoretical strengths and weaknesses, in gathering the necessary literature, in planning the data collection and interviews, in observation, in analyzing the cases, in interpreting the findings, and in drawing the conclusions.

Reliability, instead, estimates whether the operations of a study can be repeated with the same results. In other words, it judges the degree to which the findings are independent of accidental circumstances (Yin 1989).

The researcher visited several times the case companies during their mass-tailored ABC projects. Due to the nature of the study (longitudinal) and the role of researcher, also unofficial contacts could be used to verify the gathered information by questionnaires and interviews. The researcher was involved in the process of developing all questionnaires and interview frameworks, which were applied in data gathering. In the interviews, the researcher is likely to have some influence on the reliability of the data (Huberman & Miles 1994). Therefore, the interviews were performed by a person who was not involved in the case organizations' ABC implementation processes, so as to ensure that the answers were as objective as possible[51]. All interviews were tape-recorded, which helped the researcher to backup the results when needed.

It was necessary to have several respondents to each studied topic, as otherwise the answers would have been too biased. About one hundred people in total were officially asked to give feedback or interviewed during the case companies' mass-tailored ABC implementations. Furthermore, more than a hundred people, both with an academic and a practical background, were unofficially interviewed and discussed with, during the time period (1998–2004) of this study.

With the selections made in this study, the final target was to make the research process and the results as valid and reliable as possible.

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[51] The person who made all interviews worked as a temporary employee for the ABB Corporate Research Center (CRC/PTO).

6.3 Suggestions for future research

The aim of this study was to construct and implement a process and customers focused mass-tailored ABC concept, with empirical evidences identify and analyse the theoretical and practical benefits of it, and to present a conceptual model of how to integrate ABC to other strategic management accounting approaches to gain a comprehensive system for analysis of value (tangible and intangible) creation.

The objective of this research was to make a contribution to the theory of ABC, to the use and implementation of ABC, especially from the learning process point of view, and to present new applications.

The results showed that ABC/M is used and can be used together with many other techniques and methods. A suggestion for future research is to construct more combinations of ABC and some other techniques or methods. The business models have become increasingly important in aiming for the competitive advantage. This study demonstrated that ABC could be used in searching for the value creators. That is only one example, and hopefully works as an example for the future researchers.

The constructive research approach has been a very educational way to operate between the academics and practitioners. It has not been an easy process, but from the learning point of view, it certainly is one of the best. Therefore, I would encourage tomorrow's researchers to do more studies with a constructive research approach.

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APPENDICES

Appendix 1.

ManKo/Co -day: feedback -form

(This form is translated into English from the original one and includes only those questions which are used in this research)

Name / Duty: _____ date : _____

Organization : _____

Organization's main operating type (circle the correct answer)

1) Customer focused **2)** Mass production, **3)** Service, **4)** Project-oriented

Standardization of ABC2000:

How satisfied are you with the standardization of ABC2000, (5= very satisfied and 1= dissatisfied)

1) Handling of processes	5	4	3	2	1
2) Activity dictionary	5	4	3	2	1
3) The concept of process mapping	5	4	3	2	1
4) Activity cards	5	4	3	2	1
5) Driver cards	5	4	3	2	1
6) Handling of cost objects	5	4	3	2	1

Feedback about the ManKo/Co –day :

1) What did you like in the ManKo/Co –day (positive things):

_____

_____

2) What did you not like in the ManKo/Co –day (negative things):

_____

_____

Comparison between the ABC2000 and 'traditional' ABC approach

(Compare ABC2000 and the 'traditional' ABC approach. 2 indicates that ABC2000 is much better, 1 means that ABC2000 is better, 0 means that those are equal, -1 means that 'traditional' ABC approach is better, and –2 means that 'traditional' ABC approach is much better)

	ABC2000				*'traditional' ABC*
1) Gives more information	2	1	0	-1	-2
2) More user-friendly	2	1	0	-1	-2
3) Easier to utilize	2	1	0	-1	-2
4) Faster to build	2	1	0	-1	-2
5) Easier to understand	2	1	0	-1	-2

Appendix 2.

ABC2000 project feedback -form

(This form is translated into English from the original one and includes only those questions which are used in this research)

1. Respondent's contact information

Name: _____

Duty: _____

Tel. number: _____

e-mail address: _____

2. Organization: _____

3. Revenue :_____

4. Profitability:

1) weak **2)** moderate **3)** good **4)** excellent

5. Number of full time employees : _____

6. Organizations main operating type (circle the correct answer)

1) mass production **2)** service **3)** project-oriented **4)** customer oriented **5)** wholesale trade

7. Position of competitiveness (circle the correct answer)

1) low **2)** moderate **3)** hard

8. Number of ongoing development projects (circle the correct answer)

1) no other projects **2)** 1–3 projects **3)** 4–7 projects **4)** 8–12 projects **5)** over 12 projects

Management and organization: (circle the correct answer)

1 = not correct, 2 = slightly correct, 3 = I do not know, 4 = correct, 5 = definitely correct

1.	Management was committed to the ABC-project	1	2	3	4	5
2.	Management gave support for the ABC-project	1	2	3	4	5
3.	Management showed interest in the ABC-project	1	2	3	4	5
4.	Management actively wanted feedback from the ABC-project	1	2	3	4	5
5.	Management responded to the feedback	1	2	3	4	5
6.	Management understood the importance of the negative feedback	1	2	3	4	5
7.	Management knew the objectives of the ABC-project	1	2	3	4	5
8.	Management wanted to reach the targets	1	2	3	4	5
9.	Management style was open concerning the information and discussions	1	2	3	4	5
10.	Management understood the importance of continuous development	1	2	3	4	5
11.	Management was encouraged by the benefits of ABC	1	2	3	4	5
12.	Management felt that the ABC project will help them in their own work	1	2	3	4	5

Strategy and objectives: (circle the correct answer)

1 = not correct, 2 = slightly correct, 3 = I do not know, 4 = correct, 5 = definitely correct

1.	The ABC model is linked to the strategy of competition	1	2	3	4	5
2.	Targets to be reached with the ABC model are well defined	1	2	3	4	5
3.	The ABC model is linked to the reward system	1	2	3	4	5
4.	The ABC model helps to fulfill the strategy and its targets	1	2	3	4	5
5.	The use of the ABC model is considered when defining the targets	1	2	3	4	5
6.	The ABC model is used in budgeting	1	2	3	4	5
7.	The ABC model is used in pre calculation	1	2	3	4	5
8.	The ABC model is used in post calculation	1	2	3	4	5
9.	The ABC model is used in reporting	1	2	3	4	5
10.	The ABC model is linked to the performance measurement system	1	2	3	4	5

Attitude and learning of the organization in an ABC project: (circle the correct answer)

1 = not correct, 2 = slightly correct, 3 = I do not know, 4 = correct, 5 = definitely correct

1.	The targets of the ABC model are unanimously understood	1	2	3	4	5
2.	People have been sufficiently trained to use ABC	1	2	3	4	5
3.	The organization has been stable enough during the ABC project	1	2	3	4	5
4.	Key persons have left the company during the ABC project	1	2	3	4	5
5.	People believe that ABC will benefit them and the organization	1	2	3	4	5
6.	People have been sufficiently motivated for ABC	1	2	3	4	5
7.	People feel that they have learned from the ABC project	1	2	3	4	5
8.	There is a positive attitude towards ABC in the organization	1	2	3	4	5
9.	There is a belief that ABC might be a threat in the organization	1	2	3	4	5
10.	There is a general attitude that ABC is an external rather than an integrated part of the internal cost calculation	1	2	3	4	5
11.	ABC is perceived as being an operative part of the department	1	2	3	4	5

9. Evaluate, how well the project has succeeded compared to targets (circle the correct answer)

1) too early to evaluate **2)** very badly **3)** badly **4)** moderately **5)** well **6)** excellently

Appendix 3.

Interview form (ABC2000)

(This form is translated into English from the original one and includes only titles of the original which are used in this research)

I Background

1. Person, (name, age, education, position in the organization, duties, earlier duties)
2. Organization (type of operation, main products, size, profitability, structure of the organization, scenarios of near future)

II Earlier ABC-projects

1. When did you first participate in an ABC project?
2. How many ABC projects have been done?
3. What have been the change drivers for the prior ABC projects?
4. Who was involved in the ABC projects?
5. Organization's attitude towards ABC?
6. Organization's competence
7. Strategy, objectives and ABC
8. ABC implementation

III Mass-tailored ABC2000 project

1. When did you start the ABC2000 project?
2. What was the change driver for the ABC2000 project?
3. Who was involved in the ABC2000 project?
4. Organization's attitude towards ABC2000?
5. Organization's competence
6. Linkages between strategy, objectives and ABC2000
7. ABC2000 implementation

Appendix 4.

MANCO-DAY's (ABC model building date), (companies and persons are anonymous), all of them have participated in an ABC project earlier.

15th June, 1999, 8 evaluation forms,

9th August, 1999, 11 evaluation forms

10th August, 1999, 4 evaluation forms

10th August, 1999, 4 evaluation forms

19th August, 1999, 8 evaluation forms

24th June, 1999, 7 evaluation forms

28th September, 1999, 15 evaluation forms

11th October, 1999, 10 evaluation forms

28th October, 1999, 9 evaluation forms

12th November, 1999, 10 evaluation forms

1st January, 2000, 6 evaluation forms

Appendix 5.

Questionnaires of ABC2000 projects, (companies and persons are anonymous)

Days when received

23rd May, 2000, ABC project manager, business controller, case company A.

2nd June, 2000, ABC project manager, controller, case company D.

5th June, 2000, ABC project manager, controller, case company C.

8th June, 2000, general manager, case company E.

8th June, 2000, ABC project manager, controller, case company B.

10th June, 2000, ABC project manager, financial manager, case company E.

16th June, 2000, financial manager, case company F.

10th July, 2000, ABC project manager, controller, case company F.

Appendix 6.

Interviews in case companies: (companies and persons are anonymous)

3rd June, 2000, from 9.10 to 11.22, ABC project manager, case company A.

15th June, 2000, from 15.00 to 16.25, ABC project manager, case company B.

20th June, 2000 from 9.00 to 9.50, ABC project manager, case company E.

27th June, 2000 from 10.45 to 11.40, ABC project manager, case company D.

27th June, 2000 from 9.25 to 10.30, ABC project manager, case company D.

5th July, 2000 from 12.50 to 14.30, member of ABC project, case company C.

5th July, 2000 from 9.30 to 10.38, ABC project manager, case company C.

6th July, 2000 from 12.08 to 13.22, member of ABC project, case company A

24th October, 2000 from 7.45 to 9.10, ABC project manager, case company F

Management accounting system improvement and implementation: a case study in a mass-tailored ABC context*

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ABSTRACT

This paper investigates how companies with different ABC backgrounds experience a mass-tailored Activity-Based Costing (ABC) concept. Some of the case companies from three different corporations have implemented ABC systems before, while the others have no prior experience. The empirical feedback supported the expected benefits of the ABC concept's mass-tailorization, when compared with the traditional ABC. Afterwards, the implementation process was analyzed. The results proved that the focus and the way of operating differ among the companies in relation to earlier ABC experience. Therefore, it should be taken into account as a factor when planning and implementing ABC, and also later when its success is being evaluated.

Key words: management accounting system, implementation, activity-based costing, mass-tailorization.

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1. INTRODUCTION

Every now and then the question of whether ABC is too complicated presents itself. Kaplan and Anderson (2004) have recently pointed out two things about the traditional ABC; firstly "*it is difficult to implement and maintain*", and secondly "*it has to be simplified*". Another ABC developer has presented the following claim *"...ABC systems are very complex and accounting data may not be easily collected in a manner consistent with maintaining activity information"* (Brimson 1998: 6). Both of these ABC developers have presented an alternative approach to ABC; time-driven ABC (Kaplan & Anderson 2004) and feature costing (Brimson 1998). This research simplifies the traditional[1] ABC by mass-tailoring it.

The aim of this research is (1) to evaluate the benefits of the mass-tailored ABC concept[2] as compared with the traditional ABC, which the case companies have implemented before, and (2) to examine and increase knowledge about the different factors involved in ABC implementation. The second aim is related to the implementation of activity-based costing in general. Many studies have already been conducted to determine which factors lead to successful implementation (Cooper & Zmud 1990; Cobb, Innes & Mitchell 1992; Argyris & Kaplan 1994; Anderson 1995; Player & Keys 1995a, 1995b, 1995c; Shields 1995; Shields & McEwen 1996; Gosselin 1997; Krumwiede & Roth 1997; Malmi 1997; McGowan & Klammer 1997; Krumwiede 1998; Anderson & Young 1999; Friedman & Lyne 1999; Anderson, Hesford & Young 2002, Baird, Harrison & Reeve 2004). This research focuses on showing how unequally companies with or without prior ABC experience act within the equal ABC implementation process. This kind of research framework is well under- researched compared to the previous studies.

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[1] In this research the traditional ABC and its implementation is defined as a method, which typically starts without any predefined information. The traditional ABC model is built stepwise, starting usually from micro-level operations (bottom-up approach) (Kaplan & Cooper, 1998). It consists of 'sub models' from each department, which gather the employees' operational work (tasks), grouping them into bigger units (activities), and finally grouping similar activities from different departments into even larger activities (activity groups or cost pools). The procedure has been the same in the cost-object section, starting from the components of products and combining those to products, and finally products to product families.

[2] The term concept is used in this research to describe the different versions/generations of an ABC method. The mass-tailored ABC method, which is known as ABC2000, is like an ABC package for different kinds of business types.

The mass-tailored ABC concept was developed in 1999 in ABB corporate research center. It was developed by examining the experiences from earlier ABC projects, as well as the existing literature. The main targets were to avoid all possible previously known difficulties with the implementation process, to support both process- and customer-based operations, to shorten the implementation process, and to make the ABC model itself much simpler. Another important issue was the organizational level on which the model was to be placed. Prior ABC models included too detailed information. The mass-tailored ABC was developed to act more as a link between management accounting and strategy.

Since its development, the mass-tailored ABC concept has been tested in a number of projects in different organizations. In this research, the feedback focuses on the model-building stage (the first aim of this research) and on the stage when the model has been used for some months (the second aim of this research).

This paper is organized as follows. The introductory section briefly presents the background and objectives of the research. The second section describes the mass-tailored ABC method, while the research methodology is discussed in the third section. The fourth section contains empirical evidence, namely feedback on the implementation process of the mass-tailored ABC method, presentation of the factors which have an effect on the implementation processes, and the discussion. Conclusion and suggestions for future research are presented in the last section.

2. THE MASS-TAILORED ABC METHOD

The pilot version of the mass-tailored ABC was developed in 1999 in ABB corporate research center (CRC/PTO) in Finland. The method was constructed with knowledge from earlier ABC projects; both technical factors (such as the architecture of the model and feedback from the applied IT-systems) and administrative and behavioral factors (such as education on the ABC method, the employees' comprehension of the usability of the information, the transparency of the model, and the level of trust that the employees have towards the model) were included in the construction process. During that time, organizations were moving towards process and customer orientation. This change affected and gave the base for the structure of the mass-tailored ABC. The prior ABC systems at the case companies were built more according to the functional organization structures. Lawson (1994) has pointed out that ABC lacks a process orientation, a customer focus, and fails to include an understanding of the cost behaviour function. He argues for the

customer-orientation, process based analyses, and the importance of flowcharts showing the interrelationship among activities. Lebas (1999) has also pointed out the importance of understanding the causalities instead of single costs. These and many other arguments that were directed to the architecture of the model were taken into account during the development phase of the mass-tailored ABC method.

The mass-tailored ABC was to achieve: uniformity among ABC models; the possibility for benchmarking (rates and resources) e.g. cost or used resources of single activities; ease in updating and calculation of trends; independence from key persons (because the structure of the system follows the same principles); architectural harmonization (processes, activities, tasks, drivers, allocations); reduction of project schedule time from months to weeks; and an emphasis on an overall view, focusing down to more detailed level (tasks) when needed. Furthermore, one of the main aims required the model to support strategic decision making.

Three main improvements could be recognized as summing up the development process. Firstly, the implementation of the mass-tailored ABC involves selecting or omitting parts of the 'example' ABC model by using an activity dictionary. Any processes, activity groups, activities, tasks or drivers which do not exist in a company are omitted from the mass-tailored 'example' model. This improvement followed the prevailing improvement of ABC. The use of different dictionaries started during the 1990's.

> *"Initially, when ABC systems were first introduced in the mid- to late 1980s, ABC projects teams had to invent activity dictionaries virtually from scratch. Now,...companies and consulting organizations have developed standard activity dictionaries that provide a template for selecting the appropriate activities to be used in any particular application." (Kaplan & Cooper 1998: 85.)*

Even today, the effect and use of these dictionaries is a poorly researched area. Typically, the dictionary is a list of processes and activities without any other information (see Kaplan & Cooper 1998; p. 108–110) or a clear linkage to the implementation process itself.

The central issues in the implementation of the mass-tailored ABC are: a certain flowchart technique, and the common two-way method of building the ABC model by using the dictionary. In the dictionary, the activities are categorized and named (coded) according to their nature:

- material related activities (MRxxx),
- manufacturing related activities (MAxxx),
- project management related activities (PRxxx),
- installation related activities (IExxx),
- direct development related activities (DDxxx),
- research and development related activities (DRxxx),
- marketing and sales related activities (SRxxx),
- administration related activities (ARxxx)
- special direct cost related activities (SDxxx).

The xxx's above describe numbers. Those activities which have a number below 199 (e.g. MR070 or AR110) are activities concerning normal operational work. Activities which have the number 2xx describe managerial work, respectively 3xx describes the quality issues work, 4xx service work, 5xx development work, 7xx repair work (reclamations and claims), and 9xx refers to financing (capital) issues. In addition to the coding and numbering, the activities have also different colors: blue is the color for a normal activity, green means development, red refers to rework (waste), and grey marks those activities for which it is difficult to find drivers, or activities for allocating capital costs.

The purpose of categorizing, numbering and giving different colors for the activities, is to facilitate users in different analyses, such as the amount of development or management activities in the administration process, or the cost of complaints in the manufacturing process. An example of an activity dictionary is presented in Table 1.

The activity dictionary includes in total 92 ABC-modelling level activities, 171 smaller activities and 313 tasks. Volumes per different type of activities are also presented. In addition to the information of activities and task, the dictionary includes a suggestion for cost driver and process.

Table 1. An example of a mass-tailored activity dictionary and the volumes of different kinds of activities and tasks (ABB Oy, QMS ABC material).

1st Level	*2nd Level*	*3rd Level*		
MODELLING LEVEL ACTIVITY	*ACTIVITY*	*TASK*	*COST DRIVER SUGGESTION*	*PROCESS*
MR060 Handling purchase invoices	MR061 Handle invoices for unique purchases	C) process invoices for unique purchases - inspect and approve invoices for unique purchases - manage registering and allocation - investigate irregularities	No. of invoices No. of purchased parts in products No. of invoice rows No. of order rows	ORDER TO DELIVERY (LOGISTIC)
	MR062 Handle invoices for repeated purchases	D) enter invoices for unique purchases in the system - register and allocate invoices - enter invoices in the system - check invoices in the system - approve invoices for entry into the system		
	MR063 Process the bar code invoices (EDI)	- transfer data to the financial system		
		Task for MR062 and MR063 as for MR061		

totally	*totally*	*Totally*	*type*
58	123	229	Activities in processes
5	11	15	Quality ensuring activities
9	15	28	Development activities
11	13	31	Cost of poor quality activities
6	6	6	Financial (capital) activities
3	3	4	Special direct costs activities
92	171	313	Totally

The second main improvement is the principle of building the model and the way the allocation of costs is conducted. In a mass-tailored ABC system the costs of activities are allocated to groups of cost objects that have a common structure (like the product groups in Table 2), and not to a single cost object. E.g. two of the case companies in this research had approximately 5000 different products. Those could be categorized into 100 and 50 product families (groups of cost objects). This helped significantly in allocating the costs of activities to cost objects and to follow the causalities. It clarified the analysis of customer-product profitability, and simplified the architecture of the model. According to Kaplan and Anderson (2004) the high volume of cost objects is one of the main reasons to increase the complexity of models.

Table 2. Example of the product-customer analysis.

		Customer 1	*Customer N*	*Product –profit*
Product Group: A_{1-n}	Revenue	70,000	7,000	12,000
	Production costs	60,000	5,000	(16%)
Product Group: N_{1-n}	Revenue	5,000	50,000	6,000
	Production costs	4,000	45,000	(11%)
	Sales and marketing costs	8,000	3,000	
	Customer – product profit	3,000 (4%)	4,000 (7%)	

As mentioned earlier, the model is based on processes and customer orientation. The customer orientation means e.g. the possibility to analyse separately the cost and profitability of products, and the cost of customer relationship and their influence on customer-product costs and profitability (Table 2.). The process orientation means that the manufacturing process can be analysed in a more detailed way, so as to find the reasons for i.e. high cost or use of resources. However, it is useless to model the task level before there is a good reason to do so, because it complicates the model and the gathering of the needed information.

The third improvement was the implementation process itself, together with the linkage to the activity dictionary, where the company is divided into three levels. The 1st level, the ABC model mapping level, includes typically 30–70 activities, and the 2nd and 3rd levels are mapped only when needed. The implementation process of the mass-tailored ABC is always the same. The process includes six stages:

1. Preparation for the project (scope, objects, time schedule, team members, process walk).
2. ManKo/Co –day (Management Kick Off / Management Commitment day) (building the ABC-model, processes, activities, drivers, cost objects, reports).
3. Defining the resources and gathering the needed data.
4. Importing the data and making first calculations, preparing the reports.
5. Presenting the results, achieving the management agreement, and making a plan about follow-up.
6. Utilizing the ABC information and reaching an agreement of the next steps.

The first aim of this research focuses on the ABC model-building day, in other words the ManKo/Co –day. During that day, the activities and processes are omitted / selected for the ABC model and the selection of products and customers are made. The purpose of using a certain level during the model building stage is to prevent the model from becoming too complex, and to ensure that the discussion will not concentrate on too small issues. The mass-tailored model includes at the 1^{sl} level 30–70 activities, depending on the size and business area of the case organization. The participants of the ManKo/Co –day consist of employees from different departments. Typically, there are 6–12 participants with good knowledge of the activities within their own departments. About half of them have been managers.

Besides the above-presented goals for the structure and implementation process, the nature and the role of the mass-tailored ABC system can be summarized as follows. It is developed so as to work more like a system that supports the integration of management accounting and strategy than the traditional ABC. It is designed to give information of organizational effectiveness with a process- and customer orientation, which in turn can be used in evaluating the accomplishment of strategic goals, key success factors, value creation and performance.

3. RESEARCH METHODOLOGY

This research has two aims, and the empirical material for those aims was gathered separately. The first aim is to evaluate the mass-tailored ABC concept in companies which have earlier experiences of ABC. The aim is chronologically limited into comparing the mass-tailored ABC system with traditional ABC during the model-building stage. The second aim focuses on analysing the ABC implementation processes after the project has been conducted in companies with different backgrounds. This analysis differs from earlier studies, as the ABC implementation process was equal in all six cases from three different corporations. The author was involved in and made observations of all ABC implementation projects, and could therefore compare the given answers in each project. This helped in achieving a realistic comprehension of each project, even though the number of people involved was small.

During the first phase (15th June, 1999 – 24th January, 2000) the research consisted of gathering material from formal discussions in meetings, as well as in informal discussions during the projects. The evaluation questionnaire was used in this first phase in eleven (11)

different organizations from one corporation. The empirical data was collected from 92 persons who attended the ManKo/Co –day during the mass-tailored ABC model-building day. The business types of the case companies were: customer-focused operation (four companies), project- or service focused operation (three companies), mass-production (three companies).

The second phase, which commenced after the ABC systems were built, included presenting the questionnaire for six different organizations from three different corporations. Eight people from these organizations were asked to answer the questionnaires (23rd May, 2000 – 10th July, 2000). All of them had an important role in their ABC projects, as project managers, financial directors or managing directors. The questionnaire was sent to two persons in those companies with no prior experience of ABC. In all other companies the questionnaire was sent only to one person. The financial director and managing director from companies with no prior ABC experience had an active role in the project, and were therefore asked to answer the questionnaires. The results of the questionnaires were analyzed and compared with the author's own documentation. Below (Table 3.) is the background information of each case company which was analysed during the second stage of this research.

Table 3. The background information of six case companies.

Company / person	*A1*	*B1*	*C1*	*D1*	*E1 & E2*	*F1 & F2*
Earlier ABC projects	1994, 1996	1997	1993, 1996	1998	Non	Non
ABC project started	1999	1999	1998	1999	1999	2000
Revenue, m€	124	62	106	72	34	43
Competitive position	Hard	moderate	Hard	Moderate	hard	Hard
# of employees	674	320	702	230	108	326
Business operations	customer focused mass production	mass production	customer-focused production	mass production	wholesale trade	customer-focused production

The ABC implementation process is very complex. Each case company's experience with ABC implementation is different, and therefore, the evaluation of success and failure may vary, as they are made from different perspectives (Friedman & Lyne 1999; Drennan & Kelly 2002). The second aim of this research; to examine and increase knowledge about

the different factors that are involved in the ABC implementation, is partly accomplished by evaluating the results of questionnaires with Shields and Young's model (1989, 1994) (Shields 1995: 150). It identifies seven behavioural and organizational variables as being important for the implementation of cost management systems: (1) top management support, (2) linkage of the cost management system to competitive strategies, particularly quality and speed strategies, (3) linkage of the cost management system to performance evaluation and compensation, (4) sufficient internal resources, (5) training in designing, implementing and using the cost management systems, (6) non-accounting ownership, (7) consensus about and clarity of the objectives of the cost management systems. Furthermore, Shields (1995: 163) found that almost the same variables were the drivers for successful implementation.

The aim of this research is not to prioritise the cases, but rather, to take the above mentioned variables into account when analyzing the empirical data. Furthermore, the unique research framework gives a possibility to compare the companies' ABC implementation processes. The equal implementation process promotes the comparison of the companies which have different ABC knowledge and experience.

4. EMPIRICAL EVIDENCE FROM THE CASES

Evaluation of the ABC system's mass-tailorizing.

In each instance, after the ManKo/Co–day, the participants were asked to complete a questionnaire in order to evaluate the day. Feedback on the right side (max +2) of Figure 1 indicates that the mass-tailored ABC was perceived as much better, while a negative answer shown on the leftt side (max –2), indicates that the traditional ABC method was regarded as being much better. The mean value of all the responses is shown in Figure 1. The mass-tailored ABC provides more information, is more user friendly, easier to utilize in the employees' own work, takes a much shorter time to build, and provides a more understandable outcome, than the traditional ABC method (Figure 1).

The empirical evidence clearly indicates that the traditional ABC implementation process can be improved by using a mass-tailored method. According to the feedback from the questionnaires, it is in many ways better than the traditional ABC method; for example, it shortens the model building time to one day, the ManKo/Co-day, whereas it could

formerly take weeks to build the model (processes, activities, drivers, products and customers).

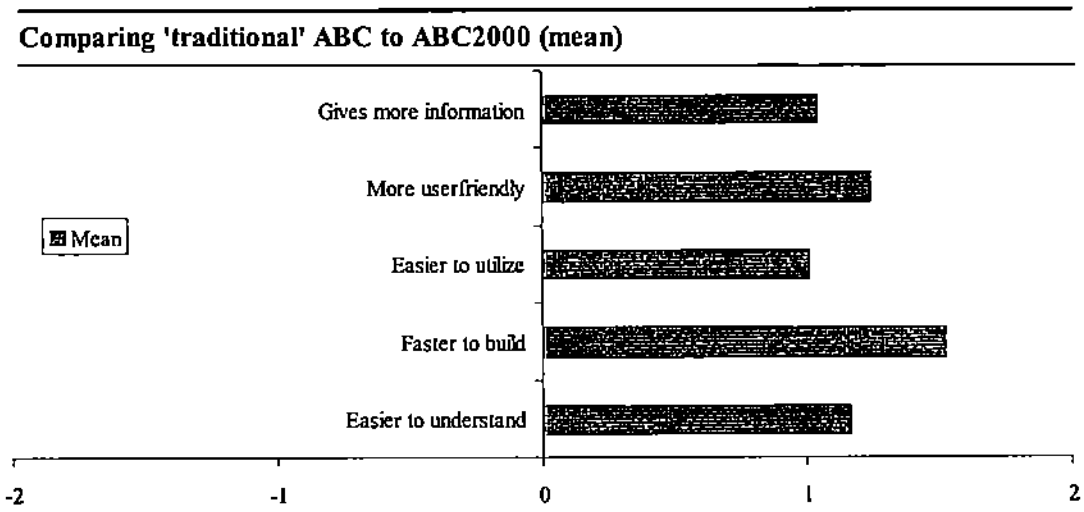

Figure 1. Feedback from 11 ManKo/Co–days (the mean value of all answers).

Figure 2 below groups the answers according to the nature of the organization's business activities, namely customer focused mass-production and project- or service-oriented companies. All ninety-two individuals from eleven different ABC implementation projects who completed the evaluation questionnaires felt that the mass-tailored ABC was in many ways much better than the traditional ABC method.

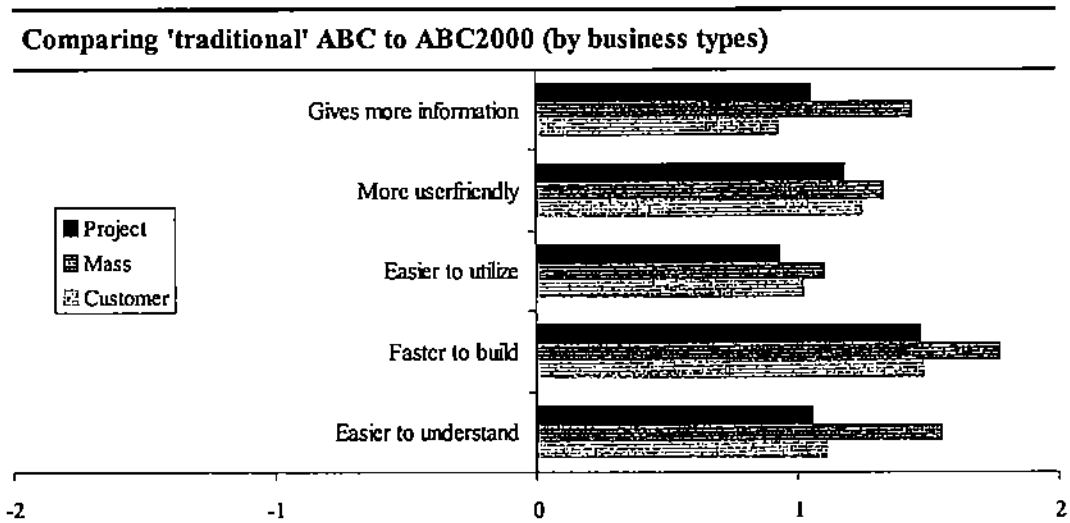

Figure 2. Feedback from 11 ManKo/Co–days (by business types).

There are slight differences among business types (Figure 2). Participants from mass-production companies were the most satisfied with the mass-tailored ABC concept, measured across all factors. The largest differences emerged in factors having to do with information, building and understanding. Other participants from project-oriented and customer-focused companies were almost equally satisfied across all factors.

The first aim of this research was to evaluate the model-building stage. The mass-tailored structure and implementation stages worked here as planned. Since the mass-tailored structure was regarded as much better in all respects, we can say that mass-tailorizing has a positive effect on the ABC implementation process, discussed more profoundly below. The results were similar for all business areas (Figures 1 and 2). The feedback strongly suggests that it is possible to build a mass-tailored ABC model from the 'predefined full model' and that it can be done very quickly. Some of the open feedbacks from the various model-building days (ManKo/Co-days) are presented below:

- *The participants achieved a very clear understanding about the objectives of ABC, and it was perceived as an easier method (Business Controller)*
- *The ManKo/Co-day is intensive and short enough, and it is well-defined. It is faster, easier and a more participative method (Profit Center Manager)*
- *A useful concept so that we do not always have to develop the whole process again. Mapping processes and activities in one picture made the employees think about development issues (Controller)*
- *An easy way to illustrate the way the company is operating and the basis of the ABC calculation (Division Manager)*
- *It is a practically-oriented approach (Sales Manager)*
- *ABC has been developed (Foreman for the workers)*
- *Good speed to proceed, no struggling with the details (Process Development Manager)*
- *The process map was built quickly (Production Manager)*
- *The wide picture was outlined effectively, the people were involved (Division Manager)*
- *The day ended with a clear output (Business Controller)*
- *A practical approach (Sales Manager)*

Participants were also asked to give feedback about their disappointments during the ManKo/Co-days.

- *There were no disappointments (Business Controller)*

- *The 'real' reasons for ABC implementation were not highlighted (Logistic Manager)*
- *There was not enough time (Area Manager)*
- *Marketing was not handled well enough (Product Manager)*
- *I did not feel disappointed (Controller)*
- *No disappointments (Manager)*
- *The suppliers were not handled well enough (Supply Manager)*

The purpose of the ManKo/Co-day is to be very practical and well structured with respect to the implementation process. The comments above suggest that its objectives were achieved. The few negative comments mostly pointed to the time schedule, or to a single part of the day, such as not devoting enough attention to the supply chain process or to marketing. However, in mass-tailored ABC the target is to stay on a certain level until a more detailed analysis is needed. Focusing on the more detailed issues occurs after deciding how to develop the company's output (products, revenue or profit). The wider picture must be established first; otherwise there is the possibility of focusing down on incorrect areas (sub-optimization).

The ninety-two participants were also asked to answer questions relating to the mass-tailorizing of the material and to the stages used in the ABC implementation process. The results are shown in Figure 3, using the following scale: If the participant was dissatisfied he/she selected (1); if very satisfied, he/she chose (5). As can be seen from Figure 3, the participants were satisfied with standardization of certain parts during the model building stage. 'Handling of processes' includes the procedure where the company's processes are identified and named. The 'activity dictionary' is a collection of activity groups, activities, tasks and drivers. These are categorized and named (coded) in accordance with the nature of the activity. In addition, the numbering of activities is similar for all activity categories. Categorizing and numbering the activities helps the company in different analyses. Participants were satisfied with the above presented activity dictionary and with the activity- and driver-cards which are used on the ManKo/Co-day.

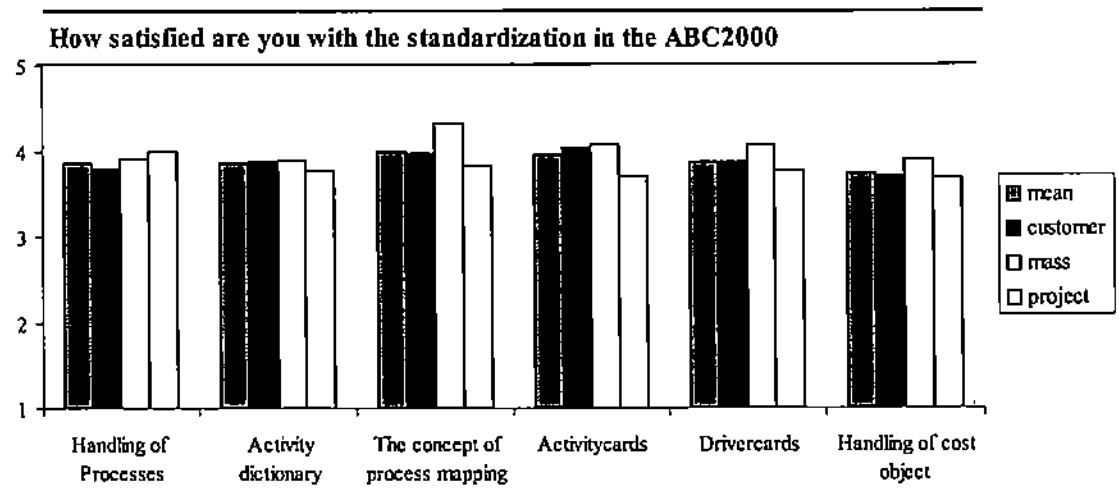

Figure 3. Feedback from 11 ManKo/Co –days (standardization).

According to Figure 3 above, there are very slight differences among the companies. The results demonstrate that participants from mass production companies are the most satisfied with the mass-tailored concept. Persons from other companies are generally slightly less satisfied but also they have indicated, on average, almost 4 for each area.

5. BACKGROUND VARIABLES IN RELATION TO ABC IMPLEMENTATION

Questionnaires

The other aim of this research was to study the differences in the implementation processes between organizations with / without prior experience of ABC. The case companies' key personnel were asked to complete the questionnaires about their ABC implementation projects.

The questionnaire was divided into groups according to the subject matter. Although links to the Shields and Young's model (1989, 1994) (Shields 1995: 150) were not the target in this research, links can, however, be found within all variables, except non-accounting ownership (variable #6), as in all of the case companies the research projects were managed by a manager from the accounting department. Figures 4, 5 and 6 present the results relating to the following subjects: management and organization (Figure 4, covering variables #1 and #7 of Shields and Young's model), strategy and objectives (Figure 5,

covering variables #2 and #3), and the attitude and learning of the organization in relation to the ABC project (Figure 6, covering variables #4 and #5).

The questions and scales used in the questionnaires are presented in the respective Figures 4, 5 and 6. The first four bars from the left represent four ABC project managers from companies with prior ABC experience, while the next four bars represent two ABC project managers and two other managers from two companies without prior ABC experience. All eight persons from the six companies were asked about their opinions on the topics in question.

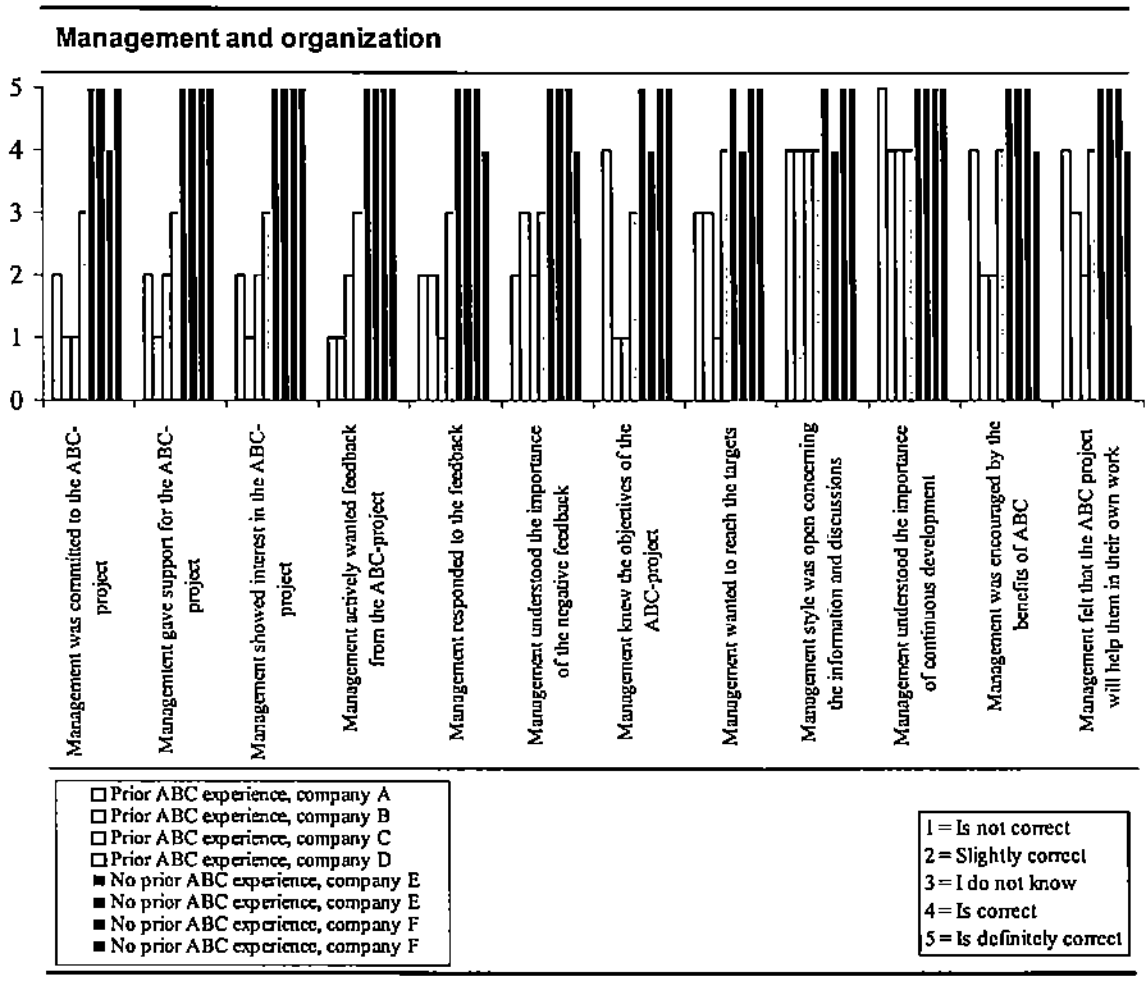

Figure 4. Feedback from six case companies (management and organization).

There is a clear difference between companies with and without prior ABC experience in terms of management and organization (Figure 4). Managers in the companies without prior ABC experience were more interested in, more supportive of and more committed to their ABC projects. By contrast, managers in the companies with prior ABC experience were less motivated to reach the targets, and had less understanding about the objectives of the project. On the other hand, all the companies studied had an open management style, and the management in each company understood the importance of continuous development. Also two companies with prior ABC experience reported that the managers felt that the ABC project will help them in their own work, and that they were encouraged by the benefits of ABC. There are surely several reasons for the managers' different kinds of participation and behavior. Some of them have years of experience of it and are therefore well aware of its benefits and limitations.

Besides the topics on the questionnaire, ABC project managers were asked to evaluate how well the targets were achieved[3]. The used scale was; 1= too early to evaluate, 2=very badly, 3=badly, 4=moderately, 5=well, and 6=excellently. Case companies with prior ABC experience (A, B, C and D) reported much lower scores on topics in relation to management and organization (Figure 4.). However, they achieved the targets almost equally with other case companies (A=4, B=5, C=5, D=3, E=6, F=3). Companies without prior ABC experience reported very equal scores in Figure 4, but the evaluation of how well the targets were achieved differed quite radically. There are certainly several reasons for this. Some of the reasons are discussed later in this research (Figures 5 and 6).

Generally, the empirical results address the importance of knowing how prior experience effects the management of an organization. In this research its effects manifested in less visible commitment, support and participation during the ABC implementation. One critical goal for the ABC system in the long run is that it should be embedded in the organization's structure, procedures or practice (Friedman & Lyne 1999). This can be analyzed in the next Figure "strategy and objectives" (variables #2 and #3 at Shields and Young's model).

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[3] In this research the case companies had different targets for their ABC system. Generally, companies with earlier experience of ABC had more detailed targets than others. Those companies' targets without prior ABC experience were roughly similar, while others had much more dissimilar targets.

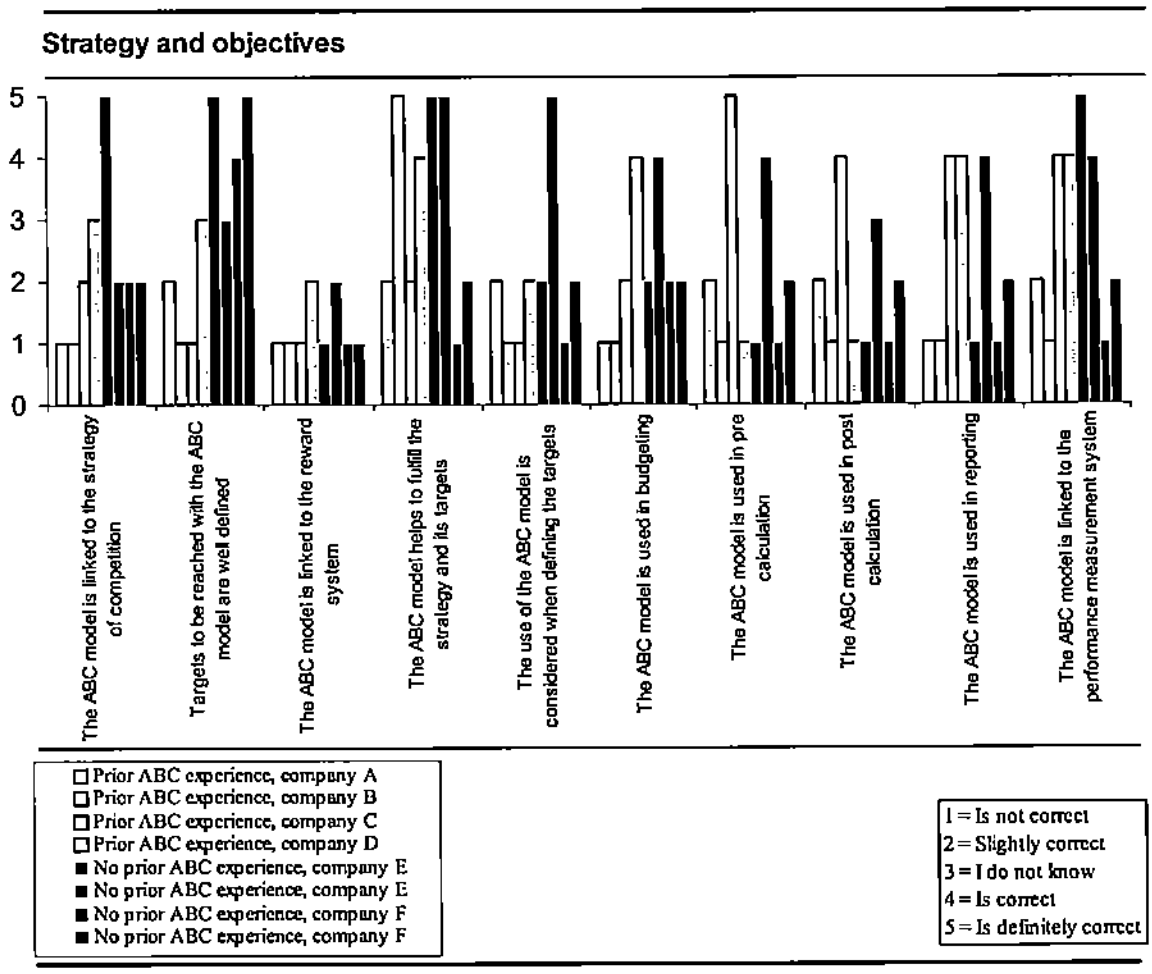

Figure 5. Feedback from six case companies (strategy and objects).

The way in which ABC is linked to strategy and the company's objectives is shown in Figure 5, above. The links between the ABC model and the company's strategy of competition are not well defined. Only the project manager of one case company without prior ABC experience reported that the ABC model is definitely linked to strategy of competition, while the same company's managing director reported that it is only slightly the case. However, two of the companies with prior ABC experience and one company without any prior experiences reported that the ABC model is linked to the performance measurement system, and that it helps to fulfill the strategy and its targets. This result

supported the intended role of the ABC system in the case companies. Half of the companies with earlier ABC experience reported that they use ABC in reporting[4].

One case company without prior ABC experience reported that the use of the ABC model was taken into consideration when targets were defined; other companies reported that there is some consideration towards the model. For all others, this can lead to problems which are later perceived as technical, as, for example, when the model does not support performance measurement, in which case the users can become unnecessarily frustrated with the ABC model, as they do not realize the real source of the problem.

Two of the case companies reported that the ABC system was to some extent linked to the reward system. Some people reported that the ABC model was used in budgeting, and in pre- and post- calculation. The above results from "strategy and objective" suggest that even though the management of those companies with prior ABC experience did not show high score in interest and support, the ABC system was linked to the company's performance measurement system, and the information from it was used to reach the strategy and its targets. This result is interesting and it supports the discussion about the difficulty to decide if the project is a success or failure (Friedman & Lyne 1999; Drennan & Kelly 2002). It also addresses the importance of identifying the characteristics of a process that most likely leads to a successful implementation (McGowan & Klammer 1997). In the topics of Figure 5 the main differences between case companies without earlier ABC experience are on the following two issues; the ABC model helps to fulfill the strategy and its targets, and the ABC model is linked to the performance measurement system. Those case companies, which felt that the targets were better achieved, reported also higher scores on the above mentioned issues.

The last evaluation of this research focuses on the organization's attitude and learning (Figure 6).

[4] Reporting does not refer to any specific reports but, rather, to general, ad-hoc reports.

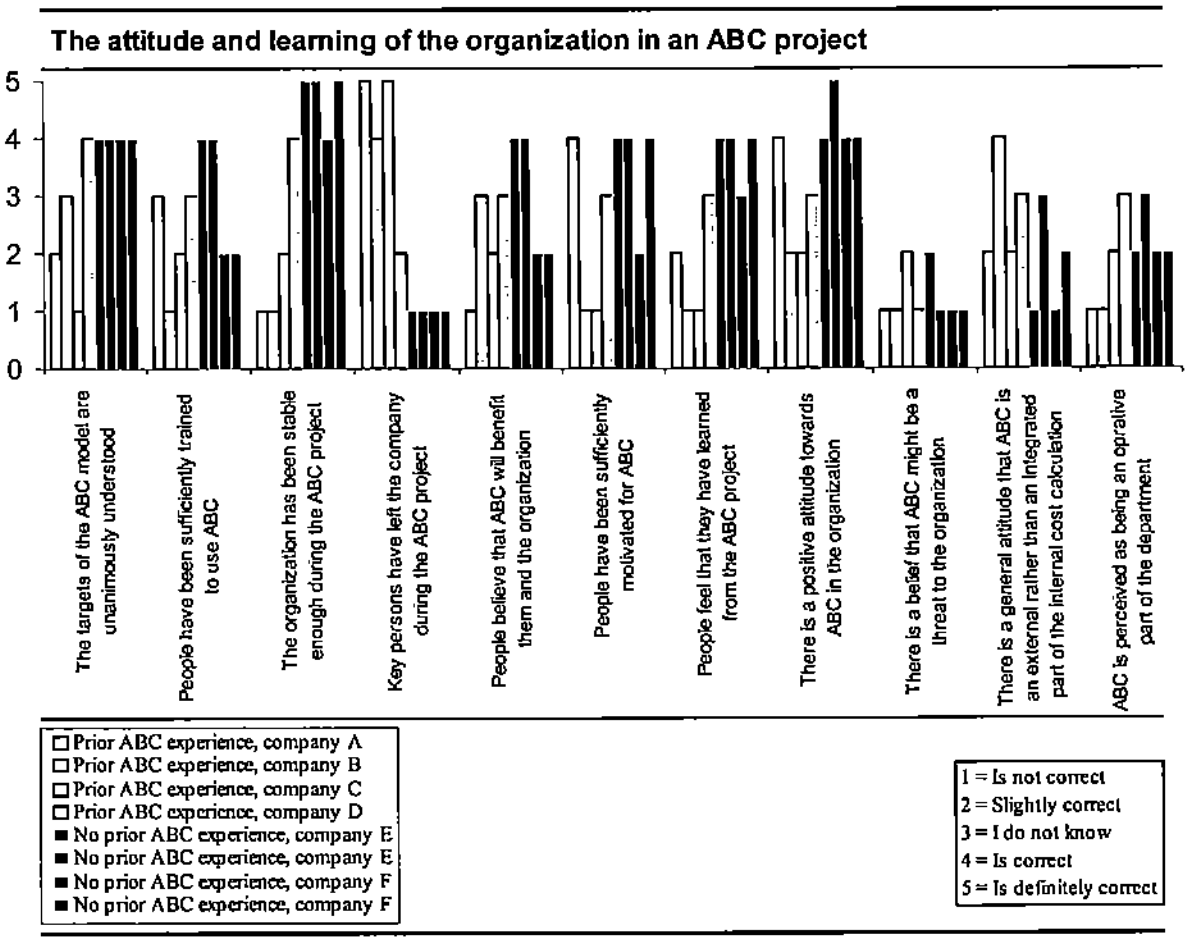

Figure 6. Feedback from six case companies (attitude and learning of the organization in an ABC project).

There was a better understanding of the targets for the ABC model in companies without prior experience. One case company with prior ABC experience reported that there was no unanimous understanding of the targets for the model. The same company also reported that the organization was not stable and that the key persons from earlier ABC implementations had left the company before this project. These factors could, to some degree, help to explain the poor understanding of the targets.

There was a more positive attitude towards ABC, and the motivation to succeed with ABC was better in companies without prior ABC experience; also individuals in these companies felt that they learned more during the implementation process. Training to use ABC was perceived as more sufficient in companies without prior ABC experience. This

could, to some extent, be explained with the different level of prior ABC knowledge. Some of the companies were involved with the project for the first time and invested to training, while the others had prior knowledge and did not see further training as an important aspect when implementing the model again.

Two of the companies reported that ABC was perceived as a minor threat for them, while others reported that ABC was not a threat. In companies with prior experience, ABC was regarded more as an external, rather than an integrated part of the internal cost calculation. The reason for this can be partly explained with the established role of the ABC in companies with prior experience. In them, the ABC system has always been an external system along with the company's ERP systems, while in the companies without the ABC experience, the role was still unformed. They had an assumption about the kind of role ABC could have, but it was not yet established.

In Figure 6 the main differences between the companies without prior ABC experience were the following two issues: people have been sufficiently trained about the use of ABC, and people believe that ABC benefits them and the organization. Again, those case companies, which felt that the targets were better achieved, reported also higher scores on the above mentioned issues. Between companies with earlier ABC experiences, the scores in figures 4, 5 and 6 did not correlate with their feelings on how well targets were achieved.

According to Malmi (1997) and McGowan and Klammer (1997) employees in different organizational levels can perceive the results of the project differently. In this research the answers of two persons from companies without prior ABC experience supported this statement to some degree. In Figures 4 and 6 "management and organization" and "attitude and learning of the organization in an ABC project" the answers were similar or close to each other within each issue. The biggest differences could be found in Figure 5 "strategy and objectives". The ABC project manager of company E reported that it is definitely correct that the ABC model is linked to the strategy of competition, and that it is only correct to some degree that the use of the model was taken into consideration when the targets were defined, while the manager of the company held a completely opposite view. On the other hand, both of them reported that it is definitely correct that the ABC model helps to fulfil the strategy and its targets.

6. CONCLUSION

The mass-tailored method, as developed, shortens the ABC model-building time to one day, namely the ManKo/Co-day. During this particular day individuals from different departments build the ABC-model, by selecting appropriate parts from the pre-defined full ABC model: processes, activity groups, activities and drivers. The feedback from the cases clearly points out the benefits of using the mass-tailored method, as compared to the traditional method: mass-tailored ABC is seen as more user friendly, easier to utilize in the employees' own work, faster to build and more understandable. This clear endorsement of the mass-tailored model's benefits points out the importance of future development of the ABC concept.

As the cases in this research demonstrate, the ABC implementation processes are complex. Different kinds of factors can be recognized, but it is difficult to judge the overall success or failure of those. In this research the case companies with / without prior experience of ABC used the same ABC implementation method. This was perceived as a good, fast and easy way to undertake the implementation process in all of the case companies. However, the data revealed that the companies with prior ABC experience concentrated more on individual targets, while the beginners focused more on the learning side of ABC. The cases also showed that companies act differently due to the different level of prior ABC knowledge. In this research the management's motivation and support was stronger, there was more training, and the ABC model was more unanimously understood in companies without any ABC experience. On the other hand, the companies with earlier experience were more aware of the role of the ABC system. They reported somewhat more often that the ABC system is used in reporting, and in pre- and post calculation.

The empirical data proved that the following issues had a correlation with the reported scores of how well the targets were achieved; ABC system is linked to performance measurement system, it helps to fulfill strategy and its targets, people have been sufficiently trained, and people believe that ABC benefits them and the organization.

This research pointed out two new aspects for the literature on ABC. One is the mass-tailored ABC concept, and the other is an examination of ABC implementation in companies with different background knowledge and experiences of ABC. Both of those aspects introduced interesting results and suggested the need for future research.

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The creation of a management accounting system – a demanding learning process: a case study in an ABC context*

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ABSTRACT

The creation and implementation of a management control system is a demanding learning process for individuals, groups and the organization as a whole. It is often organized as a project and managed with a technical emphasis. We claim that the results of the project are mainly dependable on the quality of the learning process within it. This essay aims to describe the first time ABC implementation and ABC model -revision processes of a management information system from the perspective of learning. Six companies were chosen as the empirical context for our analysis. The SECI model based on Nonaka's (1994) theory of new knowledge creation was used as the main theoretical tool when evaluating the success of the projects. The results proved that the learning process was incomplete, especially in four ABC model revision projects. Their focus was on combination phase, while reflection and communication were insufficient across functions and groups within the organization. The organizational learning was more efficient and accurate in the other two ABC first time implementation cases.

Key words: management accounting systems, activity-based costing, implementation, organizational learning, knowledge management.

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* A shortened version of this essay has been accepted to be published in the *Journal of Workplace Learning*.

1. INTRODUCTION

Activity-Based Costing (ABC) has been one of the most popular management information systems during the last 15 years. It is used in many organizations to increase the knowledge of processes, activities and the profitability of different cost objects, like products, customers, projects and services (Driver 2001). It represents a modern management information system well: it gathers information widely in an organization; connects information from different processes and functions; it is computer-based; it is nearly a real-time system; it is designed to be a practical tool for decision making at different levels (operative, tactical and strategic) and it is created on the basis of specific needs of an organization.

In spite of ABC's various and widely known theoretical benefits, its implementation has often proved problematic (Cooper, Kaplan, Maisel, Morrissey & Oehn 1992; Norkiewicz 1994; Anderson 1995; Shields 1995; Shields & McEwen 1996; Gosselin 1997; McGowan & Klammer 1997; Partanen 1997; Krumwiede 1998; Anderson & Young 1999; Anderson, Hesford & Young 2002; Bhimani 2003). Prior ABC studies suggest various factors affecting the success of the ABC implementation. Yet, there is some evidence that significant problems follow from human processes of learning (Argyris & Kaplan 1994).

The purpose of this research is to evaluate four (4) ABC model revision processes and two (2) ABC first time implementation processes through the model of SECI (Socialization, Externalization, Combination and Internalization) based on Nonaka's (1994) theoretical frame of organizational learning. The ABC implementation process is technically similar in all of the cases. The aim of this paper is to evaluate learning processes in an organization when implementing and revising the ABC system. The focus and features of organizational learning in the ABC processes will be demonstrated with empirical evidence.

The paper is divided into four parts. The first part is a brief overview of literature on the implementation process of MA, the focus being the ABC context. In the second part, the theory of organizational knowledge creation and learning process is described. On the basis of the theoretical viewpoints, we introduce some criteria for evaluating a learning process within ABC-projects. In the third part, there is a compilation of case companies, used methodology, and an analysis of the data gathered in the case companies. As a conclusion, we summarize the findings and compare them with the features of successful learning process, and discuss the results and future research areas.

The empirical evidence includes eight (8) interviews from six (6) companies. The study follows the interpretative tradition to the extent, that the data is gathered from interviews, and through observation.

2. LITERATURE ON THE IMPLEMENTATION PROCESS OF MA, FOCUSING ON ABC CONTEXT

Changes in business environments have recently increased the emphasis of certain values in business organizations: customer satisfaction, customer orientation, quality, cost effectiveness and the willingness to change (Partanen 1997). Many of these changes challenge the tools, systems and techniques in cost accounting (Cooper 1996). Today's organizations have numerous management accounting systems (MAS).

Both the implementation of MAS and the changes in them have been popular research topics during the last decade. Some of the studies address the change in an organizational and social context, focusing on power and knowledge relations (Hopwood 1990; Ezzamel 1994), while others address the change in an institutional context, focusing on the rules, routines and practices of organizational processes (Scapens 1994; Burns, Ezzamel & Scapens 1999; Burns & Scapens 2000). Furthermore, the significance of culture is addressed as a research area of MAS studies (Innes & Mitchell 1990; Takatera & Yamamoto 1989; Mouritsen 1989; Cobb, Helliar & Innes 1995; Shields 1995; Partanen 1997, 2001; Birnberg 1998, 2000; Bhimani 2003).

In literature, the ABC implementation process has been identified as an administrative innovation (Shields 1995), as a technical and administrative innovation (Gosselin 1997), as an IT innovation (Krumwiede & Roth 1997) or as a purely technical innovation (Kaplan 1990; Cooper et al. 1992). The phases of implementation processes have more or less been copied from IT contexts (Cooper & Zmud 1990; Krumwiede & Roth 1997).

While the literature on the implementation of ABC typically focuses on the technical details and provides instructions concerning those, the behavioural aspect is less studied (Shields 1995). However, some initiatives to create a deeper understanding of human processes within the implementation can be found in the literature (Argyris & Kaplan 1994; Shields & Young 1989). Compared with the traditional factor studies, Argyris and Kaplan (1994) present an alternative way of explaining the success of the implementation of ABC. They describe the series of processes required to implement an innovative

technical initiative, beyond aligning the interests and incentives of the participants. According to them, there are two crucial aspects. Firstly, the technical theory must be demonstrably valid. Secondly, two processes must occur: an educational and sponsorship process, as well as an internal commitment-creating process. According to Argyris and Kaplan (1994), defensive routines create barriers which must be overcome. For individuals, motivation is the key factor in overcoming these barriers. Typically, the barriers that oppose and obstruct the implementation of new ideas and practices in organizations are framed as resistance at the individual, group, inter-group, and the organizational levels (Argyris & Kaplan 1994). What individuals choose to believe or to forget, disregard or to reject, depends to a large extent on the consistency of the new knowledge and on the knowledge already adopted or internalised in individual or organizational practice (Argyris & Schön 1978; Innes & Mitchell 1990; Cobb et al. 1995; Mezirow 1996).

The critical change barriers which may hinder, delay, or even prevent the process of MA change are: inadequate education and sponsorship process (Argyris & Kaplan 1994), behavioural and organizational implementation variables (Shields 1995), organizational structures (Roberts & Silvester 1996), organizational culture, and inadequate agreement on the organization's goals and the technology required for achieving them (Markus & Pfeffer 1983), cultural infrastructure (Brooks & Bate 1994), failure in securing the legitimacy of a new system, and inability to find a workable relationship between the languages of production and accounting (Scapens & Roberts 1993) and different views of change (Strebel 1996; Kasurinen 2002).

According to Partanen (2001) the implementation process itself may be more important than the concrete results of it. The process has a key role in the organizational learning, as it enhances the interaction between the functions (Partanen 2001) and challenges the existing roles and routines (Argyris 1992; Burns & Scapens 2000).

In spite of the massive academic discussions of organizational learning, learning organization and knowledge management during the last decades (e.g. Argyris & Schön 1978; Fiol & Lyles 1985; Senge 1990; Pedler, Burgoyne & Boydell 1991; Huber 1991; Nonaka 1991; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Garvin 1993; Redding & Catalanello 1994; Coates 1999; Zack 1999), not much attention has been paid on the perspective of learning in research on MAS (Partanen 2001). However, the need to understand the implementation processes as learning processes, has been pointed out in the literature (Argyris & Kaplan 1994; Partanen 2001). Driver (2001:96) acknowledges one

more perspective to ABC from learning's point of view: *"..it (ABC) makes so many critical aspects of organizational performance so transparent that ABC may lend itself so well to becoming a tool for organizational learning"*.

ABC implementation process has been described as a process which creates new knowledge from the existing data in a company (Driver 2001) and implements new knowledge (Argyris & Kaplan 1994). Organizational knowledge is a key component of organizational learning (Huber 1991). According to Davenport, De Long and Beers' (1998) and Ruggles' (1998) evaluation, knowledge management has generally shown a lack of attention to social factors. It has been argued, that this may be the cause that impairs the effectiveness of MAS implementations (Easterby-Smith, Crossan & Nicolini 2000).

3. NEW KNOWLEDGE CREATION AS AN ORGANIZATIONAL LEARNING PROCESS

The aim of this study is to describe the ABC implementation process from the perspective of learning, by using the SECI model (Nonaka & Takeuchi 1995) as the main theoretical tool. Furthermore, the aim is to assess the learning processes. In order to do this, we need an appropriate frame. Therefore, we introduce in this section the main elements in organizational learning, and define 13 features for a successful learning process. They are developed on the basis of five conditions described by Nonaka and Takeuchi (1995) and some other criteria introduced in literature on organizational learning and ABC implementation. The 13 features are listed in the text, and the link to prior literature is offered. In the next chapters we evaluate all cases according to the SECI –model and the 13 features.

Organizational learning processes have been seen as specifically concerned with the growth of and changes to knowledge (Argyris 1976; Huber 1991; Garvin 1993; Andrews & Delahaye 2000). Literature on knowledge management distinguishes between data, information and knowledge (Earl 1994; Davis & Botkin 1994; Davenport & Prusak 1997; Sveiby 1997; Davenport & Prusak 1998; Bhatt 2001). Data is assumed to be simple isolated facts. Information has meaning: in it, facts are in a context and combined within a structure. Knowledge is the subjective storage of aggregate information, it is relative and transformable and historically transient. It can be theoretical, practical, social, explicit, tacit, individual and collective in nature (Kautz & Thaysen 2001). It is generally argued

that we first need data before information can be created, and information before knowledge can emerge. Tuomi (2000) has reversed this hierarchy. According to him the data emerges only after there is information and knowledge available. He points out, that there are no isolated pieces of data, unless someone has created them using his/her knowledge.

Any changes in an organization, for example an ABC innovation process, are connected with learning processes, which occur on three levels - organizational, group and individual – and the integrative processes between them (Lippitt 1982; Huber 1991; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Crossan, White & Lane 1999). Because of its multilevel nature, the phenomenon is not easy to comprehend.

There is a tension between the ideas of organizational learning and knowledge management (Andrews & Delahaye 2000). Nonaka, as one of the key people in popularizing the idea, formulated a holistic picture of learning in an organization. The Dynamic Theory of Organizational Knowledge Creation (Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998) integrated the levels of organizational, individual and group level learning in the same frame when taking the different forms of knowledge into consideration. On its basis Nonaka and Konno (1998) developed the SECI-model which illustrates four conversion patterns in organizational learning process. The model offers a simple frame of reference, which can be applied in the context of learning the models in use, the systems, structures and processes, for example, a system like ABC. However, Nonaka's theory has been criticised because of its ignorance of the relationship between action and knowledge (Easterby-Smith et al. 2000) and inadequate integration with individual learning (Akbar 2003). Lippitt (1982), Huber (1991), Crossan et al. (1999) and Akbar (2003) have launched some competing or complementing models. The SECI model is chosen here as an analysing tool for two reasons: firstly, although it is just an outline for knowledge creation, it offers an overall picture, and is thus practical in analysing the whole development project; and secondly, the visualisation of the model is comprehensible and descriptive.

The model is in harmony with the social constructivist theory of learning, which bases on the assumption that learning occurs and knowledge is created mainly through conversations and interactions between people (Brown & Duguid 1991; Cook & Yanow 1993; Gherardi & Nicolini 1998; Lave & Wenger 1991; Easterby-Smith et al. 2000; Bhatt 2001). The outcomes of learning are captured in organizational memory (Hedberg 1981;

Shrivastava 1983; Olivera 2000), which also serves as the basis for individual and group-level learning.

According to Nonaka and Takeuchi, five conditions (intention, autonomy, fluctuation and creative chaos, redundancy, and requisite variety) are critical in promoting the learning process. They represent the most important features in successful learning processes.

Intention is defined as an organization's aspiration towards its goals, which forms a basis for judging the value of information or knowledge perceived or created. It is often expressed by organizational standards or visions. *Autonomy* refers to a situation, where people are allowed to act autonomously, for example in self-organizing teams. It enhances the possibility that individuals will motivate themselves to create new knowledge. *Fluctuation and creative chaos* stimulate interaction between the organization and the external environment, and make its members face a "breakdown" of routines, habits, or cognitive frameworks. This offers an opportunity to reconsider fundamental perspectives and basic attitudes. This contrasts the paradigm, where a problem is simply given and a solution found through a process of combining relevant information based upon a present algorithm (Argyris & Schön 1978). The benefits of "creative chaos" are realized only when people are able to reflect upon their actions, and to become researchers in the practice context (Nonaka & Takeuchi 1995; Mezirow 1996). *Redundancy* is the existence of information that goes beyond the immediate operational requirements of organizational members, for example, as a result of strategic rotation of people. Sharing redundant information promotes the sharing of tacit knowledge and helps people to understand the business from multiple perspectives. This makes knowledge fluid, thus easier to put into practice. Redundancy is important in the concept development phase, when it is critical to articulate tacit knowledge. *Requisite variety* can be enhanced by combining information differently, flexibly, and quickly and by providing equal access to information throughout the organization. When information differentials exist within the organization, its members cannot interact on equal teams, which hinder the search of different interpretations of new information.

Nonaka (1994), Nonaka and Takeuchi (1995), and Nonaka and Konno (1998) introduced a cyclical model of organizational knowledge creation, which adopts Polanyi's (1966) idea of tacit and explicit knowledge. According to them, knowledge creation is a process involving four conversion/transmission phases: from tacit to tacit (socialization), from tacit to explicit (externalization), from explicit to explicit (combination), and from explicit to tacit (internalization). The two types of knowledge are inter-dependent rather than "either-

or" (Kautz & Thaysen 2001; Akbar 2003). Explicit knowledge has been described as hard, codified data (Nonaka 1991), structured and formal knowledge (Kim 1993) and stored in organization's systems, routines and procedures (Nonaka 1991; Leroy & Ramanantsoa 1997). Tacit knowledge refers to subjective insights and intuitions (Nonaka 1991), experiences and accumulated skills (Leroy & Ramanantsoa 1997), which are person-embodied (Howells 1996) and difficult to formalize (Kim 1993).

In the SECI model, the process of creating tacit knowledge through shared experience is called **socialization**. It is exchanged through joint activities in social contexts like workplace (Nonaka 1991). Ideas of experiential learning (Kolb 1984), learning by observing (Bandura 1977) and socialization into organization's culture (Schein 1993) form a basis for understanding learning processes in this phase. Openness, trust and physical face-to-face experiences are important here (Nonaka & Takeuchi 1995). Important features for a successful socialization phase are:

1. *Shared intention behind the project* (Shields & Young 1989; Senge 1990; Nonaka 1991, 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Argyris & Kaplan 1994; Player & Keys 1995a, 1995b, 1995c; Shields & McEwen 1996; Partanen 1997; Krumwiede & Roth 1997; Krumwiede 1998).

2. *Availability of the necessary, tacit information, well gathered during the process* (Nonaka 1991, 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Herschel, Nemati & Steiger 2001).

Externalization refers to the translation of tacit knowledge into comprehensible forms that can be understood by others. This can be achieved through articulation, which should resemble a dialogue, rather than a discussion[1] (Senge 1990; Nonaka & Takeuchi 1995; Nonaka & Konno 1998). This requires selecting people with right mix of specific knowledge (Nonaka & Takeuchi 1995), and the commitment of individuals to share their experiences genuinely, and to confront their interpretative mental models with each other (Argyris & Schön 1978; Nonaka & Takeuchi 1995; Nonaka & Konno 1998). Important features for a successful externalization phase are:

[1] In this research the dialogue is used as a conversation between two or more persons. Discussion can also be used in the same manner, but the outcome is more strongly an argument or a debate, with a view to elicit the truth or establish a point, compared to dialogue.

3. *Availability of high-level and diversified knowledge in the autonomous project team* (Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; partly Shields & Young 1989; Player & Keys 1995a, 1995b, 1995c; Shields & McEwen 1996; Scapens 1994; Agbejule 2000).

4. *The capability of the team-members to reconsider their fundamental thinking* (Nonaka 1991, 1994; Nonaka & Takeuchi 1995; Player & Keys 1995a, 1995b, 1995c; Partanen 1997; Nonaka & Konno 1998).

5. *The capability of the team-members/people in the project to handle redundant information* (Nonaka & Takeuchi 1995; partly Shields & Young 1989; partly Argyris & Kaplan 1994; Bhatt 2000).

6. *Open and creative dialogue in a project team* (Senge 1990; Nonaka 1994; Nonaka & Takeuchi 1995, 1998; partly Shields & Young 1989; partly Argyris & Kaplan 1994; Kautz & Thaysen 2001).

Combination refers to "reconfiguring of existing information through the sorting, adding, re-categorizing, and re-contextualizing of explicit knowledge" (Nonaka & Konno 1998). Learning is stored in the systems, structures and procedures of the organization (Hedberg 1981; Shrivastava 1983), called memory systems, where the defining elements are content, structure and collection, maintenance and access processes (Olivera 2000). Members come and go, but organization's memories, just as information systems, preserve certain behaviours, mental maps, norms and values over time (Hedberg 1981). They affect individual learning (Fiol & Lyles 1985), construct "pipelines" for information processing in an organization (Zack 1999) and combine knowledge from different parts of an organization (Nonaka 1991; Nonaka & Takeuchi 1995; Nonaka & Konno 1998). Collaborative environment, which utilizes information technology, supports efficiently the combination of knowledge (Nonaka & Konno 1998). Important features for a successful combination phase are:

7. *Once explicit concepts are created, they can be modelled well* (Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Bhatt 2000).

8. *New models and knowledge are combined with other systems in the organization* (Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998).

9. *There is equal access to new information for all those who can benefit from it* (Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Bhatt 2000).

10. *The users have continually been partners in developing the process* (Shields & Young 1989; Senge 1990; Nonaka 1991, 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Shields & McEwen 1996; Krumwiede & Roth 1997; Krumwiede 1998).

The results made in the combination phase are put into practice in **internalization**, during which the individuals adopt the new knowledge and change their activities (Nonaka 1991, Nonaka & Takeuchi 1995; Nonaka & Konno 1998). Influencing factors in internalisation are former experiences and the interpreted meanings of the new knowledge and its effects (Mezirow 1996), individual resources available for learning (Lehtinen & Jokinen 1996) and even personal factors like motivation, self-esteem and self-efficacy (Bandura 1977). In internalisation, unlearning (Hedberg 1981) is often necessary when adopting new knowledge. The ways to support internalisation are training, tutoring, mentoring, learning-by-doing, exercising, evaluating, simulations and leadership (Nonaka & Takeuchi 1995; Nonaka & Konno 1998). Important features for a successful internalization phase are:

11. *The users are well oriented to use the new information* (Shields & Young 1989; Senge 1990; Nonaka 1991, 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998; Player & Keys 1995a, 1995b, 1995c; Shields & McEwen 1996; Partanen 1997; Krumwiede & Roth 1997; Krumwiede 1998).

12. *The new model is evaluated and the project discussed* (Argyris & Schön 1978; Senge 1990; Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998, Bhatt 2000).

13. *The developing of the system is a continual, reflective learning process, rather than a project* (Argyris & Schön 1978; Senge 1990; Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998). This means that the process continues as a cyclical learning process after the internalization phase.

4. EMPIRICAL STUDY

The context

The empirical study was carried out, in order to describe the first time ABC implementation and ABC model revision processes of a management information system, from the perspective of learning and knowledge sharing. This study is part of the longitudinal research of ABC development, implementation, revision and its use. The empirical data consists of eight (8) reports about ABC projects in six (6) companies, which are called A, B, C, D, E and F respectively (Table 1). The ABC projects evaluated in this study started in the case companies in 1998 and lasted until 2000, and the scope of the project was company-wide in all of them.

Table 1. The case companies.

Company	*A*	*B*	*C*	*D*	*E*	*F*
Earlier ABC projects	1994, 1996	1997	1993, 1996	1998	Non	Non
ABC project started	1999	1999	1998	1999	1999	2000
Revenue, m€	124	62	106	72	34	43
Competitive position	Hard	moderate	hard	moderate	hard	Hard
# of employees	674	320	702	230	108	326
Business operations	Customer focused mass production	mass production	customer-focused production	mass production	wholesale trade	customer-focused production
# of ongoing development projects	over 13	4–7	over 13	8–12	1–3	4–7
ABC project managers' evaluation on how well the project succeeded compared to targets for the project 1= too early to evaluate, 2=very badly, 3=badly, 4=moderately, 5=well, 6=excellently	4	5	5	3	6	3

Methodology

The main empirical data was collected by interviews. One of the authors made observations and documentations in all of the ABC Implementation projects, and additionally a follow-up period approximately one year per case. In order to deepen the

analysis, the results of the observations are included in the analysis part. The interviewees were the project leaders and also key persons of the ABC projects. In companies A and C two representatives were interviewed, while the other companies were represented by one person. Each of the interviews took place in the interviewees' offices and lasted from 1.5 to 2 hours.

The main interest in the discussions with the interviewees was to find out how the project and the process of the ABC implementation took place and how it succeeded, and for what kind of reasons. The interviews focused on the process of ABC-implementation or revision, in order to get as genuine story of the process as possible. Earlier in this study we defined 13 features for a successful learning on the basis of the literature on organizational learning and ABC implementation. These features serve primarily as a frame for analyzing, thus they were not used as direct questions in the interviews. We wanted to avoid asking directly opinions about the features, as their content could easily lead to misunderstandings and diverse interpretations. The applied interview process consists of broad and open discussions, concerning all the phases of the learning process. By observation we could compare, and to some extent also clarify, the learning processes in each ABC project.

The discussion of learning processes includes several questions, which were categorized into three groups. The interviews dealt first (1) with *the history, resources and results of the prior and the latest ABC projects* with questions concerning things like: when were the prior ABC projects done, how had they succeeded and why; what factors had started the implementation projects; who had made the first initiatives and why; who were involved and in what way; what kind of attitude they and the other people in the organization had; what had the process been like; who were informed during the process and how; how successful the project was from a technical point of view; what were the resources and capabilities available for the project. The second (2) part of the interviews contained questions *concerning the organization and the people's competences*, such as; had the management been actively involved and how, was reporting done regularly, how often was ABC on agenda, how was the feedback collected, had ABC met its targets, did people feel that ABC was important, could people utilize ABC, what kind of targets had been set for ABC, what was the role of ABC, had people been trained to understand ABC, how was the ABC feedback handled, did people experience ABC as a threat. The third (3) and last part of the interviews contained questions *concerning the use and future of ABC*, such as; how does the ABC model work presently, what benefits has the model offered, to what extent

do people use it, how is the data handled and planned, what would you change if you applied it again from the beginning, what do you see as the next steps.

The tape-recorded data was written into a text. The analysis of the data is based on data coding, as suggested in Miles & Huberman (1994). A fixed structure was used to interpret the data and to find out the critical aspects in learning processes of ABC-projects in the study. Both of the researchers read the written interviews several times and made respective preliminary interpretations. After that, the interpretations were communicated, compared and discussed in order to be able to make a mutual interpretation of the data.

5. RESULTS AND INTERPRETATION

The empirical data is processed into four entities according to the phases of SECI model (socialization, externalization, combination and internalization). During the interviews, the case companies were on different ABC knowledge levels, and therefore we have divided the empirical data into two groups. Both groups include cases on the same ABC knowledge level: (group 1) the case companies which revised the existing ABC model, and (group 2) the case companies which implemented ABC for the first time. This enabled us to follow the learning process at different levels. We could also compare the status of learning and the implementation focus between the companies according to the SECI model. In the summary chapter we have compared the empirical data to the 13 features and evaluated each case with five-grade scale: weak, tolerable, moderate, good and excellent.

Socialization

According to the SECI model, all the relevant tacit knowledge is worth utilizing, when starting the implementation process. Ideas, experiences and feelings should be expressed as widely as possible, also in order to create a practical solution, and to minimize emotional resistance and problems in practice. In our ABC cases, the background discussions were remote. Open questioning, such as "what do we need and what are we capable of, or ready for", was mostly lacking.

The socialization phase had similarities in the up-dating companies A, B, C and D, which differed distinctively from cases E and F, which were implementing ABC for the first time. In A–D, the key-persons had prior experience of the implementation of ABC, and had participated on ABC-training before. The aim of their project was to revise the existing

ABC model (cost structures, activities, drivers and cost objects). The project-managers in companies A, B, C and D followed the top-management's requirements and certain time schedules made in headquarters.

> *"... well, I think we had to (introduce the ABC system). But maybe at the same time we were searching for background information, which would convince us about the need for such a thing...Then, all of a sudden, it's the Top Management's Team's opinion, you see, that we need one. You see, it's hard to see where the real need comes from..." (B)*

The overall finding was that tacit knowledge was exploited very narrowly in the companies' ABC projects. Usually, only the ideas and knowledge of the accounting personnel were taken into consideration, when planning and managing the ABC model revision projects. They had defined objects for the ABC projects building phase and the using phase, but the linkage to other systems and procedures seemed to be unclear and weakly planned. This is in contrast with the criteria concerning the effective new knowledge creation process.

Two of the case companies (E and F) differed from the others. They were implementing ABC for the first time, and thus did not have prior experience about the ABC implementation. They all believed strongly that they need the system, and that they will benefit from it. An accountant manager in one of the companies made the convergent opinions visible by using a great deal of words likes "we", "us" and "all". This example expresses the shared meaning well:

> *"... of course we follow intensively what's going on in the world... We read quite a lot, buy all kinds of books. And, of course, in the group, we have all kinds of development days, so that you get new ideas that way, too. But everybody has thought that ABC is all right...You can see that everything is not OK, there are problems with the margin. However, you don't know how to explain to the person in charge: "do this or that" or "take this thing or these things into account". It involves such an amount of calculation that you miss the point. I mean, in fact, the interest started from a desire to see precisely how much everything costs." (E)*

In this analysis, the first time implementation cases can be seen as good examples from the organizational learning point of view. They were characterised by a stronger emphasis on discussion on the needs, before the decision in favour of ABC, than in other companies. In these companies, people from different functions took part in the discussion and the managers had a very active role in it. Moreover, the initiators were not accountants: in one company (E), the initiator was the manager in logistics; in the other (F), the initiator was

the development manager. The demand for the ABC was commonly acknowledged. Furthermore, an overall communicative culture was distinctive in both companies.

The observation and documentation were in accordance with the interpretation of the interviews. The ABC teams in two "first time implementation" projects acted differently from others. In these cases the team members participated more actively in the meetings, than in the four revision projects, and they also shared their opinions more openly. In the revision projects the key-persons concentrated more routinely and techically on the model, and they usually did not wish to disturb the rest of the organization to a great extent. In all cases, both the project leaders and the managers, who had made the local decision to do the ABC project, had a strong effect also on the learning process by their own behaviours and their own motivations to act in the project.

In general, managers gave their support for the ABC project in all case companies. In cases E and F, ABC was something new for all, which obviously motivated managers to participate actively in discussions and meetings. In cases A–D ABC was "an old story", as this was their second or third bigger revision project. Many of the key people from the earlier projects were still present in the companies. They knew the system and had a lot of experience, but could not sufficiently share their tacit knowledge with other people, and vice versa. The need for open and reflective discussion and learning was no longer recognized. Also the status of the project had decreased.

Externalization

The people in the ABC project team are the crucial element for its success. They should have adequate knowledge and capability to create the ABC system. Diversity is important, as it enhances the creativeness in the group, and broadens the commitment of the organization. Equally important is the people's capability to create dialogue within the project group and also with other interest groups in the organization. They should be capable of expressing their mental models clearly, of reflecting and analysing them openly, and finally, of creating new common models. Furthermore, having a common and a clear target is important.

Again, the stories could be grouped into two. In the companies, which were making revision processes, most of the interviewees felt that the target was fuzzy and heterogeneous. One of the professionals expressed the common feeling among the interviewees this way:

Question: Has the ABC system met the Management's expectations?

"Well, you see, I don't know what the Management's expectations are. As I told you, the problem with this was that we didn't have explicit and officially recorded goals. I suppose everyone had some on their mind and I guess we discussed them at some point in the beginning. But they were forgotten during the process; it was not clear that these were the things we were supposed to achieve... I suppose we never even wrote down what we were searching for with it." (D1)

According to the stories in our data, usually the implementation project was a "one man's show", or involved, at the most, two or three active people. In all cases, the key person was an accountant, and usually his partner was an IT specialist. In our cases, the knowledge base in the ABC projects was usually very narrow, being based only on accounting and on IT knowledge. The views of other interest groups were taken into consideration only superficially, as there was a lack of open and intensive discussion. The mandatory meetings with managers were more or less unhelpful for the key persons in their hard row to hoe. A very common feeling among the key personnel was that they had been deserted. They felt that the manager and the other people were not really interested, because there were too many projects going on in the company, fighting for limited time resources.

Question: Was the organisation largely involved in the project from the beginning?

"I'm the only one interested in ABC. And my boss is interested in ABC in general. And there are also other people interested in it, but its actual use... I don't think interests anyone." (B)

"Well, broadly speaking, you can say yes, but eagerness was questionable. Those people did remember vaguely what it was all about. And what kind of drag we were faced with." (A2)

"At least in the beginning, the Management was sincerely interested. Maybe this thing has suffered from inflation along the way...Yes, It has been lost a bit, you can say that. You have bloody many issues and projects like this going on at the moment...which kind of control the operations...it's completely natural that you forget a single one like this." (A1)

On the other hand, many of the interviewees seemed themselves partly responsible for the lack of genuine interest of the other interest groups. Most of them were very keen on the project on a personal and a professional level. They saw the project as a challenge and as an opportunity to broaden their own professional capacity. They had the opportunity to keep the project tight in their own hands, and they used it. Probably because of this, and for the lack of resources in the company, the projects became very vulnerable. In four out of the six case companies studied, the project suffered essentially or was interrupted for some time, after the key person had left the company or changed his job within the company.

Question: How did the development work go on in a project team?

"...Well, it was something like this: I planned this issue and asked the financial manager if we should do like this...and the financial manager told me: "Why not, let's do it. There was no need to consult anyone else." (A1)

"The challenge is how to pass the pattern in cases of replacement in such a narrow organisation as this. At this moment, we are in such a situation that when the business controller changed jobs...the passing of the knowledge to the successor still remains open. It's worrying right now." (C1)

Externalization in the ABC first time implementation processes (cases E and F) differed from the others. The factor that started the ABC project was a need which was commonly acknowledged, not only in the accounting department.

Question: Do you think the underlying reason for launching the ABC project was a necessity interest or a need the company had become conscious of?

" a need the company had become conscious of... we wanted to improve the pricing of our products or to be sure that we were right ...the group has followed us with interest, because we've been one of the first units to implement ABC." (F)

Question: What was the attitude of the top managers in the project like?

"In the ABC project group, two people belonging to the management group and the managing director followed the project with a huge interest and made questions all the time. The management had really big expectations." (F)

In one of the implementation cases, one of the initiators was exceptionally a manager on logistics. In this diverse project group, they had a great deal of open discussion of the needs and contents of the project. The key person of the project felt that they had succeeded with the project, which is in contrast to those from the companies which revised the ABC model. She expressed the starting point in the following way:

"When we started, we informed all employees about it and of course those 12 people, who were involved actively in the project...the rest of the organization has been informed at department meetings and in intern magazine, of what the project is about and that it will be done during the spring....Yes, there were 12 of us working there. We took them, for political reasons. We can do things...we have carried out very many, I have led five IT projects in our company, so, you see, you become familiar with things like that, you know. You have to master the entire process of the company in order to know what you're doing now. I mean, we could have been able to do it by ourselves but we chose to take doers for that task from all the departments of the company and

they liked it a lot. ...it was very illustrative to see how the work was interlocked...we've made IT projects, and so we were able to ask questions like "What do you think, should it be like this or like that?" although you knew some answers yourself. I mean, it went quite smoothly like that." (E)

According to the observations, the companies A–D defined their processes, activities, drivers and cost objects together with people from different functions, as a part of the translation of tacit knowledge into comprehensive forms. The participants' felt that the new ABC model gave more information, was more usable and the results were more understandable, than in the prior ABC model. However, they did not have discussions afterwards with the larger team. As soon as the frames (activities, drivers, cost objects) had been defined, the project leader (controller) started to collect the needed data together with the IT specialist. Consequently, the thorough discussions and the co-operation ended principally there. Some big changes in the organization's structure complicated the project leader's work in collecting and understanding the data. Too often the project leader collected data, which was too meticulous in its nature, and disregarded the wider perspective.

Combination

At the **combination phase,** learning is stored in the systems, structures and procedures of the organization (Hedberg 1981; Shrivastava 1983). The specialists construct the system incrementally and evaluate it with other interest groups reciprocally. The more accurate the documentation and the integration with other systems and structures is in an organization, the more efficient the process is, and the more consistent the solution is with existing structures.

Again, the data can be grouped into two separated sets of stories: the companies (A, B, C and D), which revised the model and those, which implemented it for the first time (E and F). A common problem for the four companies, which revised the ABC model, was that they lacked a common understanding of how the new ABC system would be properly integrated with other steering and management systems. Three of them (A, B and C) had used the ABC, while one of them (D) had not used the ABC information. Two out of the four (B and C) told that the ABC is linked to the performance measurement system in some way, while the rest of them told that this is not the case in their ABC system. Only one (C) reported that their ABC system is used to fulfil the targets and the strategy of the company.

Question: how is the ABC system connected with other systems in your company?

"It is disconnected...in fact it's not a part of the system. These processes are in a mess at the ABC level too, so that it's not worthwhile making them fixed. Under no circumstances."(C2)

"The production control and accounting systems in use don't support this one, but when you revise the system, that data must be extracted, as by force. This makes it more like a disconnected lump rather than a clear, integrated part of accounting." (A2)

In the companies (E and F) with first time implementation processes, the link to the other control or management systems did not have as big a role so far, as in the earlier four cases. The role of the ABC system was not clear, even after they had discussed about it, and decided that they needed it. In both case companies, the object of the ABC was to elicit certain information. Company E wanted to have more explicit information about costs of the products and customer profitability, while company F had its focus on information for pricing.

Question: Has this (ABC) helped other projects or systems or vice versa?

"Not really...Maybe in that when we have thought about our customer strategies during the last year...this (ABC) has clarified the understanding, that we definitely need to get out of these small customers and focus on the bigger ones"(E)

"Pricing is...or how should I say...it is so difficult and that is why we tried to get an improvement to it." (F)

Internalization

In the internalization phase, the ABC system should be put into practice. It demands individual and collective learning, and usually also unlearning. Those who are supposed to utilize the new system often need support, for example tutoring and practicing. Evaluation and rewarding are also crucial during the internalization phase.

In this phase, as in earlier phases, the companies differed from each other. They could again be divided into two groups: first time implementing and those, who revised. The latter stories revealed that this phase was the most frustrating one. In all companies, the interviewees felt that people were not ready to adopt the ABC system. They explained that this was due to the lack of interest, understanding, managers' support, and information. Even the efforts to inform the personnel had been frustrating. In their replies, they

expressed at the same time disappointment towards attitudes of the interest group, and disbelief towards their capability to understand the system properly.

Question: What kind of attitude do the people in your company have towards ABC now?

"I make a guess that maybe 10 per cent are able to tell you that they think they heard something in the autumn but that they haven't heard anything more ever since. This might be the answer. But it's OK if they haven't heard about it...it's no use going around making a fuss of ABC and charging people who don't need these things." (B)

"We still have problems with it that must be solved. The first one is the regular distribution of that information to the correct target group; it still requires some work. Secondly, the information should reach the right people at the right moment, and when it does, the people should understand what it means. That's the second one. And it still involves a lot of work, I think." (C1)

Question: If you went, let's say, to the marketing department and picked up a person at random and asked him or her about ABC, do you think he or she could be able to answer your question?

"...talking with the sales and marketing people...every now and then there appears needs to be able to follow the customer profitability and to think about more interesting and more profitable customer groups...if you go and ask someone from sales or marketing, production... they do not know about this project" (D)

Question: Do you have a method for the systematic training of the employees to use and understand the ABC calculation?

"Well, ABC calculation, I think that they do not have to use ABC...they do not even have to understand it, it is enough that they understand the results, the basis of it." (B)

"We made a real "road show" for the people here. We took practically all our employees to the auditorium during one day. We informed them of this issue. But now when I think about it, I must admit, it was of no use. I thought: "What the heck are they doing there?" I've seen no working model in which the employees would be involved in any way, I mean, doing the real thing. It's rather hard to understand what it (ABC) is all about, I mean, in that sense, maybe it rather caused confusion because they'd never seen anything like that before, that we would have gathered them and informed them about something...In my opinion, it's enough if you inform them through some newspapers or notice boards, or something else. But you can make a summary about it, which those, who are interested, can read if they want." (A1)

In general, all the interviewees from these cases were very critical in their comments concerning the using and the noticed benefits of ABC. They also saw positive things in the

process *(this was the best ABC implementation that I have seen, D)*, but typically highlighted the negative ones. As a result, in all these cases the ABC system was revised and the typical product-customer calculations (costs and profitability) were made. The main problem seemed to be the weak discussion about the role of the ABC in the decision making in the companies. Functions in companies had learned from the prior ABC project during the years, they had experience, suspicions and expectations, but they never expressed them. It is clear that confusion prevailed on both sides.

The two first time case companies (E and F) differed from the other in their expectations of the ABC model. One reason for this may have been the lack of individual and organizational knowledge about what to expect. Both cases had one clear object at the beginning of the implementation. They were consciously concentrating on learning during the process, and reconsidering their expectations and focusing on the right aspects.

> ***Question: What do people think of the ABC?***
>
> *"We have not listened the organization yet, but the meaning is to get the organization to become inspired of ABC"(E)*
>
> ***Question: How do you feel now about the process?***
>
> *"...it was like very good to broaden the mind...It gave evidence for our opinions." (E)*
>
> *"...the idea is that...we have now done the first round and we are thinking together what kind of actions we should do, and with time...when we have data to compare with, then we will do the second round...the target is to build it into a tool for continuous work." (E)*

The observations also revealed that the weakest point in all the case companies was the handling of the internalization phase. This can be understood, especially in the first time implementation companies, as also the key-people themselves were actually learning for the first time. But the fact is that the dialogue in this phase was also weak at the companies, which revised the ABC model. This is obviously one reason to unsuccessful management of organizational learning process within the ABC project.

6. SUMMARY

According to our observations, when it comes to organizational learning, the ABC projects in the case companies were not managed effectively. There was no conscious understanding of the ABC projects as demanding learning processes. In most of the cases,

there were serious problems with each stage of the new knowledge creation processes. The cases are evaluated according to the criteria (13 features) in the Table 2. The evaluation of the learning process is based on the empirical data of interviews and observations. The scale we have applied is a five-grade scale that consists of five evaluative words: weak, tolerable, moderate, good, excellent.

Table 2. Evaluation of ABC-projects learning processes.

	The case companies, which revised ABC-model				*The ABC first time implementation case Companies*	
Features	A	B	C	D	E	F
Socialization						
1	tolerable	tolerable	moderate	weak	Excellent	Good
2	weak	weak	tolerable	weak	Excellent	Good
Externalization						
3	tolerable	tolerable	moderate	tolerable	Good	Good
4	tolerable	weak	moderate	weak	Excellent	Moderate
5	weak	tolerable	tolerable	weak	Good	Tolerable
6	moderate	moderate	moderate	moderate	Excellent	Moderate
Combination						
7	moderate	moderate	good	moderate	Excellent	Good
8	tolerable	tolerable	moderate	weak	Moderate	Moderate
9	moderate	moderate	moderate	tolerable	Good	Moderate
10	tolerable	tolerable	good	weak	Excellent	Good
Internalization						
11	weak	tolerable	good	weak	good	Moderate
12	weak	tolerable	moderate	weak	Moderate	Moderate
13	weak	tolerable	moderate	weak	Good	Moderate

According to the volume and contents of the comments, the most problematic areas seem to be the socialization and internalization phases for the companies, which revised their ABC models and the internalization phase for the first time ABC implementation case companies.

All the case companies experienced internalization as the most challenging phase. The difficulties related to it are widely known in literature and practice. For example, in a research by Ruggles (1998), the study participants were asked to name the biggest difficulties in managing knowledge in organizations, and 56 percent of them cited "changing people's behaviour". The combination phase was discussed explicitly in the

interviews, especially its technical problems, which the interviewees saw, after all, as principally solvable matters.

Furthermore, the observation revealed that the two groups of case companies were acting very differently during the combination phase. The first time ABC implementation companies had a clear object and wide motivation for their ABC project[2], while the other companies lacked these. The people in those companies told that the attitude toward the ABC model and its use had changed after the first (and second) time implementation. It is obvious that the key people had learned to think differently and to make more specific questions. On the other hand, it seems that their holistic view on things may have had suffered and they may have started to perceive the work at the implementation process as a merely technical routine. As a consequence, the possibility to learn from experience was lost.

7. DISCUSSION AND CONCLUSIONS

The organizational learning process is an incremental process, which produces conversion from tacit to explicit knowledge and vice versa. This requires evaluative conversations with those who wish to adopt and use ABC in practice. This is a participative process, needed not only at the first time. People tend to be more open towards new innovations, which they themselves have been able to influence (House & Baetz 1990). The stories in our data showed that communication with the other parts of the organization was not efficient enough to increase the organizational learning in the companies, which revised their ABC models. The needs and the requirements were investigated, but participative co-operation in developing a better tool for decision-making was not achieved. However, it is not correct to claim that only the key-persons would have been responsible for that.

We claim that the basic problem in our cases was that the people involved with the ABC projects did not understand the target of the project in such a way that would have supported a true learning process. Most of them saw a technical system as the target of the project. The focus was not equal in all phases. Companies accentuate more some of the phases in a learning process (see Table 2.). In our case companies, the groups of experts

[2] A clear object refers to the established targets that were discussed and accepted in project groups. Those targets had a relationship to the operational effectiveness, strategic choices, products or customers. Wide motivation is a consequence of shared opinions and involvement in needed discussions.

with mainly technical and accountant backgrounds, met for a period of time in order to draw up a project, and created their own discursive community (Easterby-Smith et al. 2000), which enabled them to compare different perspectives, but which also made them remain isolated and non-communicating. In the two first time implementation stories, the situation was somewhat different. A new way of thinking and managing costs was seen as the target. They saw the ABC system as a tool, which could help them in attaining and presenting explicitly the information needed.

The narrow or even distorted interpretation of the target resulted in many problems in the case companies, which revised their ABC models. One of the problems was that the new system did not achieve a true role in the organization, which can become a barrier to change (Burns et al. 1999; Burns & Scapens 2000), and was not present in the action of people. The role of the project manager was to concentrate on technical matters, and not to act as a process owner of the learning process, which is even more important (see Partanen 2001).

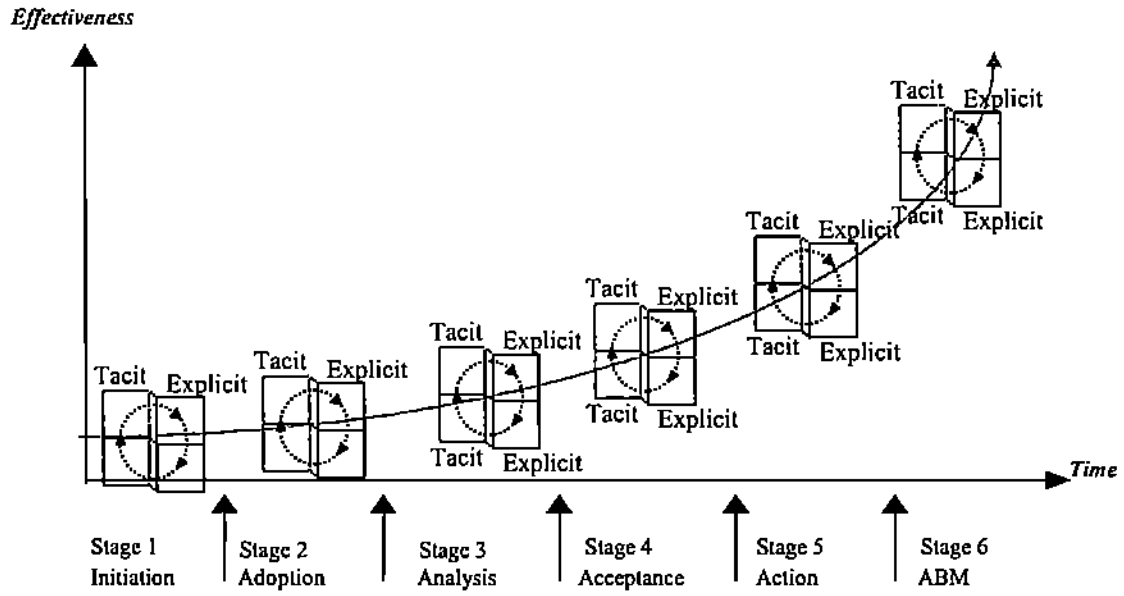

Figure 1. Stages of ABC Implementation (Krumwiede & Roth 1997) linked with the cyclical model of organizational knowledge creation (Nonaka 1994; Nonaka & Takeuchi 1995; Nonaka & Konno 1998).

Learning processes need repetition, evaluation and encouraging. Learning requires time and care. Additionally, different strategies to organize knowledge are needed in different

phases of learning (Bhatt 2000). The SECI-model is one possible tool, which may help in understanding the ABC-project as a learning process (Figure 1). The whole implementation process from initiation to ABM can be interpreted as a cycle from socialization via externalization and combination phases to internalization and finally back to socialization. In a successful ABC implementation process the cycle is observed and consciously taken care of, also concerning all individual phases as illustrated in the Figure 1.

Like all development processes, the two models – ABC implementation model and SECI model - describe an incremental and expansive evolution. ABC-process is always a learning process, humane in nature, as well as a technical or systemic improvement. The combining of the two models entailed several advantages in understanding the ABC implementation process:

- The SECI-model gives a systematized picture of the learning process, which occurs during the ABC implementation process. The model deepens the understanding of this process.
- The SECI-model specifies the different levels of learning processes and the integration between those levels in the ABC implementation process. Consequently, it acts as a tool when analyzing the ABC-projects.
- The SECI-model helps in finding the bottlenecks in the ABC implementation processes from the perspective of learning. Thus, the resources can be concentrated on critical matters.

We demonstrated with empirical evidence why ABC implementation can be felt as a good project for its own sake, but actually it failed from the perspective of organizational learning (cases A, B and C). That gives a new perspective to understand poor exploiting of the new system in practice. The stories in companies, which revised their ABC models, conveyed quite an unfavourable picture of the ABC projects. In short, too few benefits were achieved with too frail efforts and resources. Collective learning had been poor in the companies. The first time implementation stories gave quite a different picture. In them, the deeper collective learning had taken place and, according to the interviewees, also the results of learning and knowledge sharing were more satisfying. The most distinctive features in their processes were: orientation to learn, shared meaning behind the project, and broad discussions in a group of people with a variety of backgrounds.

As a practical conclusion, we suggest that ABC practitioners should see themselves as resources for the ABC model users in their learning processes, as well as architects in the system building. According to our stories, this is hardly the situation now. Another practical recommendation on the basis of the data is that if there is no time available for a genuine learning process to occur, organizations should not start an ABC project.

From an academic viewpoint, more studies are definitely needed on how the learning takes place in the ABC implementation projects, how the learning processes have been carried out, especially in the ABC model revision projects, to ensure both a continuous technical development and a continuous organizational learning development in the future ABC projects.

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In search of value creating activities: an empirical study*

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ABSTRACT

The Value Chain (VC) method (Porter 1985) was introduced approximately 20 years ago, yet even today there is only a limited amount of studies with empirical data. Today, in turbulent and unpredictable business conditions, it is essential for companies to recognize their value creating activities and drivers for those. This paper examines value creation in view of the activities' effect on the profitability of the company. With the presented method, it is possible to divide the case organization's most important value creating activities into two clusters. The first cluster includes activities, which have only negative effects on the company's profitability, while the other activity cluster has only positive effects. The drivers for positive or negative value creation (profitability) are discussed together with the practical suggestions at the end of this paper.

Key words: activity-based costing, value chain analysis, management accounting, value creating activities.

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1. INTRODUCTION

In a company or in a group of companies (network) the activities in the value chain are the crucial nodes where the resources, capabilities and knowledge, as well as the management of the firm come together. However, value creating activities and their combinations, as well as the drivers for those, are more or less latent. Typically, companies only have a cumulative measure over the value chain from raw material to product and finally to customers, such as costs, profit or contribution margin.

The objective of this study is to search for value creating activities within the case organization's value chain. This is carried out with a method based on value chain analysis (VCA) and activity-based costing (ABC) technique. The VCA was developed by Porter (1985) to analyze the value chain for strategic improvement. It has been further developed by Shank (1989), and Shank and Govindarajan (1992, 1993). According to Bjørnenak and Mitchell (2002) ABC/M has popularly been linked with other current trends. ABC/M has been claimed to be a management practice, which is most commonly associated with value chain analysis, balanced scorecard, quality practices and benchmarking (Krumwiede & Leikam 2002).

This study investigates the impact of the case organization's activities on value creation. The analysis is executed in two phases. Firstly, the case organization's value chain is analyzed, so as to be able to locate the value creating and non-value creating activities. The aim is to locate those activities, which generate value (profit) for the organization. The Partial Least Squares (PLS) method is used during the empirical analysis. Secondly, the discovered activities or groups of activities (clusters) are analyzed more profoundly. The aim is to find drivers for value creating and non-value creating activities, which are currently latent in the organization. This is carried out in the discussion part by analyzing relations between activities, produced products, ABC cost drivers and product/customer profits.

The paper is organized as follows: the introductory section briefly presents the background and objectives of the study. The second section includes a literature review on the applied methods. The third section presents the research method, background for the study, and the research framework. The case organization is presented in the fourth section, and the results of empirical analysis, as well as discussion about them, are presented in the fifth and sixth section. The last section includes the conclusions, discussion, and suggestions for future research areas.

2. LITERATURE ON THE METHODS USED: VALUE CHAIN ANALYSIS AND ACTIVITY-BASED COSTING

Porter (1985) has criticised the traditional accounting systems, because they do not support the VCA. According to Hergert and Morris (1989) it is difficult to obtain reliable and accurate cost and value data for VCA and one of the reasons is that the architecture and data of traditional accounting system are most often not supporting VCA (Stabell & Fjeldstad 1998). More recently, various management accounting innovations have been introduced, such as ABC. Several authors have accepted the use of an ABC data as a basis for performing a VCA (Shank & Govindarajan 1992, 1993; Mecimore & Bell 1995; Dekker 2003), or have mentioned it as a suitable method in VC (Partridge & Perren 1994b; Kulmala, Paranko & Uusi-Rauva 2002). Hoque (2001) has pointed out that ABM is a systematic-wide integrated approach that focuses management's attention on activities with the objective of improving customer value and the organization's profit.

Competitive advantage stems from the many discrete activities a company performs in different functions. Each of them can contribute to a company's relative cost position and create a basis for differentiation. It is important to systematically analyse all the activities, in order to find the sources for competitive advantage (Porter 1985). The VC by Porter (1985) divides the company into nine (9) generic categories. Generic categories consist of (a) support 'value' activities, which cover the firm's infrastructure, human resource management, technology development, and procurement, and of (b) primary 'value' activities, which cover inbound logistics, operations, outbound logistics, marketing and sales, and services[1].

During the last decade, there has been an increasing interest to study networks economy (Partridge & Perren 1994a, 1994b; Cooper & Slagmulder 1998a, 1998b; Kulmala et al. 2002) and interfirm relationships from different viewpoints (Booth 1997; Cullen, Berry, Seal & Dunlop 1999). One of the views has focused on the VC. The VCA divides a company into discrete 'value' activities, which it performs in designing, producing, marketing, and distributing its products. It can be used as a basic tool for diagnosing competitive advantage and finding ways to enhance it (Porter 1985). Hoque (2001) describes the VC as a linked set of value-creating functions, which are required to bring the

[1] Later in this study, all Porter's nine 'value' activities are called value activities, so as to distinguish them from the activities used in the ABC model.

product or service to the customer. Partridge & Perren (1994a) have asserted that VC can be used in auditing the organization's current activities, as well as in developing improvements for the future. Stabell and Fjeldstad (1998) have distinguished three generic value configuration models required to understand and analyze firm-level value creation logic: value chain, value shop and value network. According to them the value chain model is a model where the value is created by transforming inputs into products. Stabell and Fjeldstad (1998) are divided the analysis into two. First-order analysis includes the allocation of costs and assets to each activity and the relevant benchmarks to competitors, while the second-order analysis is a closer look at the structural drivers of activity cost and value behaviour.

The main part of VCA's development has been conceptual and anecdotal from an intrafirm perspective (Dekker 2003). Shank and Govindarajan (1993) stress that VCA should be carried out between companies, while Porter (1985) suggests that the aim of VCA is to find linkages between value creating activities, which may be within the company, or between the company and its suppliers, channels and customers. Shank and Govindarajan (1993) criticize the intrafirm perspective; they claim that it is too narrow and connect it to the value added method (selling price less than the cost of the purchased material). Value added method has sometimes been used for cost analysis, as it has been viewed as the area in which a company can control costs (Porter 1985). It, however, lacks the most important aspect: the possibility to analyse, at the operational level, the results of strategic decisions and the financial consequences of those. This has been claimed to be the first demand when moving towards a network cost management (Kulmala et al. 2002). The other two demands for a network cost management are: a company should share a part of the cost information with co-operating companies, while a part of the information flow should be open to all the companies in the network (Kulmala et al. 2002). Another critique is that VCA is often limited to the identification and discussion of strengths and weaknesses in terms of critical value activities (Hax & Majluf 1992)

In today's turbulent and unpredictable business conditions, it is essential for profit-oriented organizations to know the value creating activities in their value chain, and recognize the possible drivers for those (Figure 1). This improves the organization's ability to analyse the consequences of the development work, both at interfirm and intrafirm value chain level. Yoshikawa, Innes and Mitchell (1994) are presenting three different approaches to identify the value added activities: value-added analysis, core/support/diversionary analysis, and

business process mapping. The method presented in this research has features from value-added analysis and business process mapping.

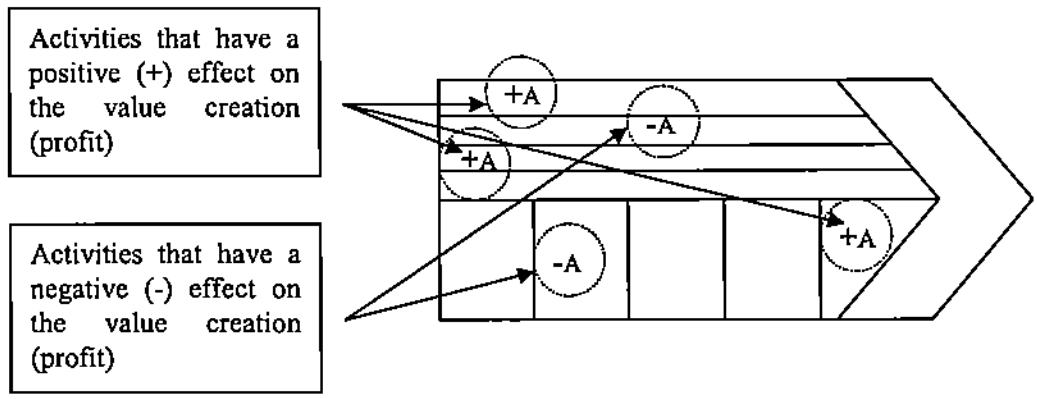

Figure 1. An example of the VC, where the main value creating activities (+A) and non-value creating activities (-A) are located. The model is adapted from Porter's (1985) value chain diagram.

According to ABC theory, the definition of what constitutes a value creating activity varies considerably, but often it is defined as (1) an activity that adds value in the eyes of the customer, or (2) that is being performed as efficiently as possible, or (3) that supports the primary objective of producing outputs (Kaplan & Cooper 1998), or that the ABC approach does not distinguish between value-added and non-value-added activities (Ostrenga & Probst 1992). According to the MA literature, categorizing the activities into value-added and non-value-added activities is not an easy task, as the definition changes depending on the perspective. Hoque (2001) divides the activities into (1) activities that are required to comply with legal mandates, and (2) to discretionary activities; those that add value. From a cost perspective Hoque (2001) refers to the non-value added activities as non-value added costs. According to Kaplan and Cooper (1998) non-value-added activities refer to activities, whose operation is inefficient compared to competitors, or activities, which the customer should not pay for, or which an organization should not execute. Respectively, the value-added activities represent activities, which bring profit and, in the long run, value for the company.

As it can be noticed, the activities can be categorized to value added or non-value added activities from several bases and perspectives. In this research, the value-added and non-

value-added activities are referred to as value creating and non-value creating activities, so as to clarify the combination of VCA and ABC, and to distinguish them from the earlier mentioned value added method. In this research, value creation is studied through an activity's effect on the case company's product/customer profitability. The cost or demand of an activity is not the main issue. The activity can be unnecessary from the customer's perspective or it can cost more than competitors. The key issue is first to locate the value creating activities and after that to analyse if those can be improved e.g. improving efficiency or decreasing costs. The applied research method also supports the use of the term value creating, instead of value-added.

In terms of value creation, an organization has two options in gaining competitive advantage over competitors. It can determine areas, where costs can be minimized (cost leadership strategy) or where customer value can be enhanced (product differentiation strategy) (Porter 1985). The former suggests that the buyer value is comparable, but the activities are performed more efficiently when compared to competitors. The latter means that the activities are performed in a unique way, which creates greater buyer value and thus allows a higher price.

Ten years after Porter presented the VCA, its usage was very slight, according to Lord (1996), or it was not used at all, as Shank and Govindarajan (1993) maintain. Twenty years after the presentation of VCA, the number of users is still low (Dekker 2003). Also the VCA researchers are few. One reason for this could be that techniques like supply chain management (SCM)[2], process value analysis (PVA)[3] and activity-based costing/management (ABC/M)[4] have been more popular than VCA, and therefore, the studies have not been referred to as VCA studies. All of them have a close connection to the VCA; the first one especially in the interfirm context, and the last two especially in the intrafirm context. Examples of these are analyses about make-or-buy, partnership, outsourcing and inter-organizational cost managements. All of them can be carried out with the above presented management accounting tools (SCM, PVA, ABC/M and VCA).

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[2] In literature on management accounting and strategic management accounting, the value chain analysis is described as a technique which can play an important role in the management of supply chain relationships (Dekker 2003).

[3] In literature on PVA, the ABC is used to acquire the necessary data (Hoque 2001; Beischel 1990; Ostrenga & Probst 1992).

[4] In literature on VCA, the ABC is used to acquire the necessary data (Shank & Govindarajan 1993).

Another reason for the low number of researches in this field could be the lack of existing empirical frameworks and valid data for VCA, which would clearly show its benefits and/or weaknesses like Hergert and Morris (1989) and Stabell and Fjeldstad (1998) have pointed out.

3. RESEARCH METHOD

The purpose of this study is to help the case company's management with the analysis of value creation and product/customer profitability. More specifically, the aim is to investigate the company's value chain and even more profoundly company's activities as a source of the value creation. The case company has used the same ABC system for some years, and is thus aware of its general profitability. However, the product/customer profit, and especially the kind of connections it has to the value chain, is less acknowledged. With this analysis, the members of the ABC projects group[5] of the case company aspire to have a better understanding about what kind of activities in the value chain create value for the company and why.

In its academic and practical aims, the nature of this study is more empirical than theoretical. It is important to obtain a general and comprehensive understanding of the topic, so as to reach the aims. The methodological task of this study is to present a new application and test it with empirical data. This study is part of a wider research which belongs to the category of constructive research. The constructive research approach (CRA) was introduced by Kasanen, Lukka and Siitonen (1993) as a specific approach to be used in studies designed for problem solving through the construction of organizational procedures or models. According to Kasanen et al. (1993) a theoretical analysis, thinking, etc., plays an important role in leading to the creation of a new entity in the constructive research approach.

The constructive approach always entails an attempt to explicitly demonstrate the practical usability of the constructed solution. It is hoped that during that process, the researcher him/herself is able to understand the problem, and also develop the understanding of others (Gray 2004).

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[5] During the years the case company's ABC project group has consist of people from different departments but mainly from finance, production, R&D, IT and sales.

The constructive research approach has been explicitly developed in the field of business administration and especially in accounting (Kasanen et al. 1993; Lukka 2000). Phases in the constructive research approach are presented by Kasanen et al. (1993), Lukka (2000, 2002), and an example of its use is presented by Labro and Tuomela (2003).

In this study, the role of the researcher is quite interventionist, which is typical within the constructive approach (Lukka 2002). The researcher has had a longitudinal relationship with the case organization. He has been involved in the ABC project from the beginning, and advised the company in its implementation. The researcher has developed the method, according to which this study searches for the value creating activities.

In short, the overall goal of this study is to present a new application for a practical problem (value creators), test it with empirical evidences and present theoretical and practical contributions. The aim is to search for *Value Creating Activities* through the data from a wide and very detailed ABC model, which supports analysis of processes and product/customer profitability calculations. This study is limited to the organization's value chain between two separate manufacturing units and an administrative office. The research framework, structure of analysed value chain and the data range is presented in Figure 2.

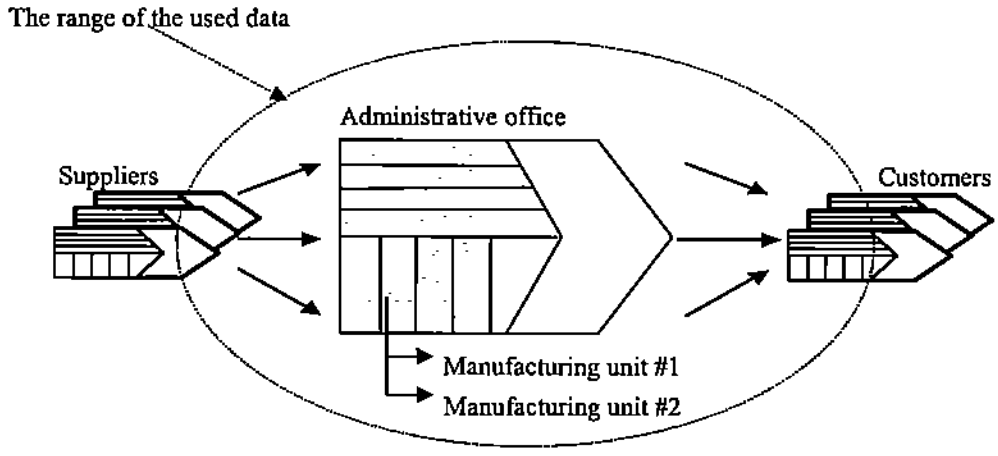


Figure 2. The framework of the study and the range of the used data. The model is adapted from Porter's (1985) value chain diagram.

In this study, the causal modelling approach Partial Least Squares (PLS) is used when searching for the value creating activities. PLS has been applied in monitoring and

controlling industrial processes. It is closely connected to models that contain latent variables, which cannot be observed directly (Cassel, Hackl & Westlund 2000). The PLS algorithms are iterative procedures that generate the measurement and the structural parameters of a causal model. It is a one step process, as there are no separate regression steps, and the main idea of PLS is to get as much concentrated information as possible into the first few loading vectors. PLS is not a common method in management accounting, mainly because it is still evolving as a statistical modelling technique. In literature on management accounting, there are only few researches, in which this method has been used (Anderson, Hesford & Young 2002). PLS is more popular in dealing with highly nonlinear correlated data between process variables and quality variables (Song, Jang, Cho & Jun 2002).

In the PLS analysis, the ABC driver volumes of each activity group per product family are used as predictors, and the customer profit per product family is used as responses. The aim is to find out whether the product families' positive or negative profitability could be explained by the use of the company's activities (resources). In this study, the ABC driver volumes work as a link between the company's activities (resources) and produced products, and are therefore used as predictors. With this selection, it is possible to analyse the case organization's value chain from two different causalities:

- costs <-> resources <-> activities <-> product/customer profit <-> value creation (money view)
- costs <-> resources <-> activities <-> products <-> customers (volume view)

In this study, the 'money view' is used in PLS analysis, while in the discussion of results both of the views are present.

4. CASE ORGANIZATION

The case organization of this research is currently a part of an international consortium. It was originally established over 100 years ago. The organization's success is based on its expertise, on the quality of its products and services, customer-oriented thinking, as well as on a diversified range of products and services. The product range of the company includes high-quality products and systems, including totally around five thousand (5000) different products. In the company's ABC model, all products are grouped into 48 different product families, according to the nature of the products' base structure. The company sells more

than 65% of all products to its main domestic customers, while the foreign customers represent 30% of the total amount. Total revenue is around 30 M€ (2004).

The applied ABC model data includes information about customer profit per each product family. An example of the used data is presented in Table 1. It is taken from a case company's mass-tailored ABC system. The analysis is made in 2004 and it includes data from 1st Jan. 2003 to 31st Dec. 2003. Totally 48 product families (PF), 27 groups of activities, a matrix of product family/customer profit, and an ABC cost driver volume per group of activities of each product family are included in the data. A group of activities consists of those activities that have the same ABC cost driver. For example, the activity group 1 (Table 1) consists of three ABC activities. Two of those are related to direct development, while the third one to maintain the product information (structure, cost, and codes) in ERP system. All above mentioned activities have the same cost driver, and in this study they are grouped into one activity group (AG #1).

Table 1. The structure of the applied data (taken from case company's ABC model data).

#	*Product Family (PF)*	*Customer Profit*	*Driver volume/PF Activity Group 1*	*Driver volume/PF Activity Group 2*	*Driver volume/PF Activity Group 3*	*Driver volume/PF Activity Group 27*
1	*Blue*	Negative	22	71	25968	49204
2	*Green*	Positive	59	1	11562	5520
3	*Yellow*	Negative	120	115	19358	106925
4	*Black*	High negative	67	373	24544	270261
5	*White*	High positive	36	27	9728	12621
48	*Brown*	Negative	119	159	43354	81896
	TOTAL DRIVER VOLUME		*2641*	*2951*	*1176836*	*3892519*

Originally, the ABC model includes 70 activities. The volume of the cost driver shows the use of each product family per activity group (Table 1). For example, the product family Blue uses 0.8 % (22/2641) of all resources of activity group #1.

The case company has its own manufacturing, which is divided into two independent units (referred to as MF1 and MF2 later in this research, see Table 4 and 5.)

It is essential for the case company to know the consequences of the development work from a value creation perspective, as its activities in the value chain are the crucial nodes where the resources, capabilities and knowledge, as well as the management come together.

5. RESULTS

In search of the value creating activities

The empirical data includes information of the case organization's ABC model. The data is analysed from the value creation (profitability) point of view. Firstly, the results of the PLS analysis are presented. The aim of the PLS analysis is to locate the case organization's value and non-value creating activities. These are distinguished from totally 27 groups of activities. Each of those have a different second stage ABC cost driver. Activity groups with respective drivers are referred to as AG1…AG27 later on in this research. Each AG is placed to a single 'value' activity in accordance with Porter's (1985) value chain (see Table 3). The discovered PLS factors are called 'activity clusters'. In this study, an activity cluster consists of a number of activity groups, which represent the PLS factors. Those PLS factors that have a loading over [0,25] are included in the analysis. A causal modeling approach PLS was applied, when the empirical data was analysed. By default, the PLS procedure extracts at most 15 factors. The procedure lists the amount of variation accounted for each of these factors, both individual and cumulative; this listing is shown in Table 2.

Table 2. The results of PLS analysis.

Percent variation accounted for predictor (use of activities) and response (profitability) variation by partial least squares factors

Number of Extracted Factors	Model Effects Current	Model Effects Total	Dependent Variables Current	Dependent Variables Total
1	30,9106	30,9106	28,0965	28,0965
2	14,6088	45,5194	22,6547	50,7512
3	4,8303	50,3497	11,6796	62,4308
4	4,3173	54,6670	4,3082	66,7390
5	6,8013	61,4682	1,7025	68,4415
6	3,9046	65,3729	2,8905	71,3320
7	5,9045	71,2774	0,8731	72,2050
8	4,3687	75,6461	0,6045	72,8096
9	3,1561	78,8022	0,7381	73,5477
10	3,5879	82,3901	0,5694	74,1171
11	2,4988	84,8888	0,6124	74,7295
12	2,1491	87,0379	0,3972	75,1267
13	1,8676	88,9055	0,3488	75,4755
14	2,3838	91,2892	0,2632	75,7387
15	2,3623	93,6516	0,1996	75,9383

The PLS analysis with 15 extracted factors explains totally 94% of the predictor variation (use of activities) and 76% of the response variation (profitability). To meet the requirements of a PLS model, the number of factors has to be chosen. The determination of significant PLS factors are carried out by using cross validation method (Table 3).

Table 3. The cross validation for the number of PLS factors.

Random Subset Validation for the Number of Extracted Factors

Number of Extracted Factors	Root Mean PRESS	Prob > PRESS
0	1.263574	<.0001
1	1.041343	0.0170
2	0.853284	1.0000
3	0.861363	0.3290

Minimum root mean PRESS 0.8533
Minimizing number of factors 2

Basing on the results, two PLS factors (activity clusters) were selected for further analysis (Table 3). By this determination, the first two activity clusters explain totally 46% of the predictor variation and 51% of the response variation (Table 2).

According to the results of PLS analysis, the activity cluster #1 has only negative loadings and activity cluster #2 only positive loadings (Table 4). All the 11 AGs (4, 11, 12, 13, 14, 22, 23, 24, 25, 26 and 27) in which activity cluster #1 has loadings are emphasized more in less profitable product families (Table 4). It has loadings in AGs that are named according to value activities by Porter (1985); operations (AG4, AG11, AG12, AG13 and AG14), service (AG22), outbound logistic (AG23, AG24 and AG25), and firm infrastructure (AG26 and AG27). In this research, the activity cluster #1 is referred to as *operation and management* due to the content of the loaded AGs. The negative sign indicates that this activity cluster is a group of non-value creating activities for the case organization.

Respectively, activity cluster #2 has loadings on AGs that are named after Porter's (1985) value activities; technology development (AG1), operations (AG7 and AG15), service (AG22) and firm infrastructure (AG26 and AG27). Activity cluster #2 is called activity cluster for *special products process*. The positive sign (even highly positive in AG1, AG7 and AG15) indicates that this activity cluster is a group of value creating activities for the case organization.

Table 4. PLS loadings on the first two selected activity clusters

Influence on Customer Profit (€)

	Activity Group definition by Porter (1985)	Profit of Produced Products in respective Activity Group*	Activity Cluster #1	Activity Cluster #2
AG1	Technology Development	High Positive		0,451
AG2	Technology Development	High Negative		
AG3	Inbound Logistic	Negative		
AG4	Operations (MF1: 1 Standard)	High Negative	-0,270	
AG5	Operations (MF1: 1 Special)	High Negative		
AG6	Operations (MF1: 2 Standard)	Negative		
AG7	Operations (MF1: 2 Special)	High Positive		0,310
AG8	Operations (MF1: 3 Standard)	Positive		
AG9	Operations (MF1: 3 Special)	High Negative		
AG10	Operations (MF1: 4 Standard)	Negative		
AG11	Operations (MF1: 4 Special)	High Negative	-0,262	
AG12	Operations (MF1: 5 Standard)	High Negative	-0,253	
AG13	Operations (MF1: 5 Special)	High Negative	-0,257	
AG14	Operations (MF1& MF2 : 6 Standard)	Positive	-0,273	
AG15	Operations (MF1& MF2 : 6 Special)	High Positive		0,409
AG16	Operations (MF2: 7 Standard)	Positive		
AG17	Operations (MF2: 7 Special)	High Positive		
AG18	Operations (MF2: 8 Standard)	Positive		
AG19	Operations (MF2: 8 Special)	High Positive		
AG20	Operations (MF2: 9 Standard)	Negative		
AG21	Operations (MF2: 9 Special)	High Positive		
AG22	Service	Positive	-0,253	0,277
AG23	Inbound Logistic	Negative	-0,300	
AG24	Outbound Logistic	Negative	-0,290	
AG25	Outbound Logistic	Negative	-0,252	
AG26	Firm Infrasrtucture	Negative	-0,260	0,256
AG27	Firm Infrasrtucture	Negative	-0,264	0,261

PLS method
Model effect loadings

*Profit of Produced Products in respective Activity Group is calculated by multiple the total profit of the product family with the ratio of the volume of product family driver of the total volume

The results of PLS analysis showing value and non-value creating activities, can also be located in the case organizations value chain (Figure 3).

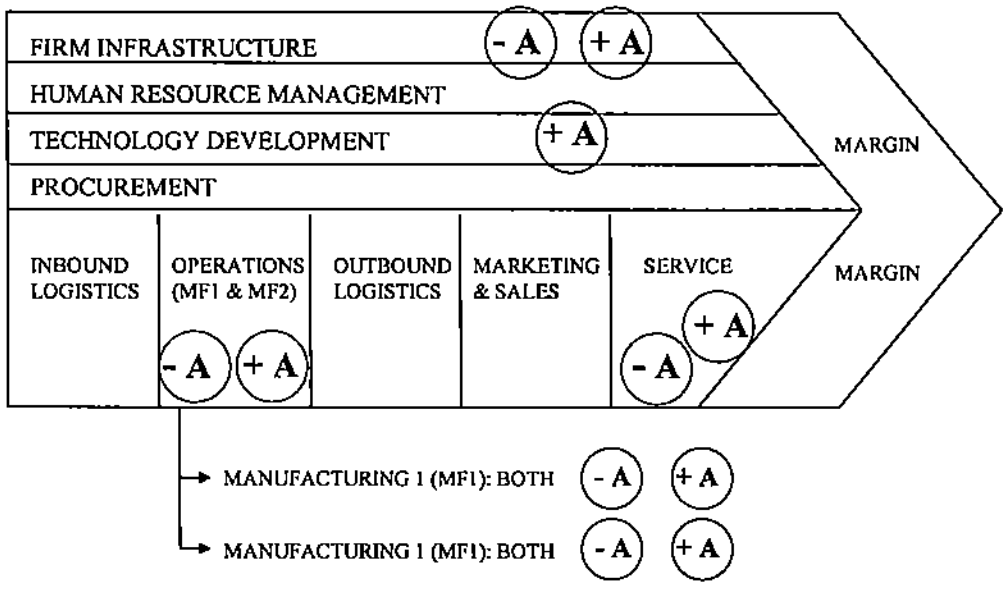


Figure 3. Value and non-value creating activities located in the case organization's value chain. Model is adapted from Porter's (1985) value chain diagram.

6. DISCUSSION

Drivers for the non-value creating and value creating activities

Operations in the case organization are divided into two manufacturing units: MF1 and MF2. The following step in this study is to discuss the potential drivers for positive or negative value creation in activities that have the most loadings in PLS analysis. In this study, drivers refer to aspects, which have an effect on the daily operations of the company and its activities, and further, on the profitability, but which, for the time being, are more or less latent in the organization. Those can be the results of a combination of the existing resources, capabilities and knowledge, the way the work is done, used ERP programs, as well as the consequences of management and strategic choices of the company.

PLS analysis showed that the case organization had two activity clusters. The first cluster (#1) had only negative effects on the product/customer profitability (value creation), while the other (#2) had only positive effects. The 'latent' driver in the first activity cluster has a connection with the less profitable product families (Table 5).

Table 5. PLS loadings on the first two selected activity clusters, together with information of the applied ABC cost driver.

Influence on Customer Profit (€)

	Activity Group definition by Porter (1985)	Profit of Produced Products In respective Activity Group*	Activity Cluster #1	Activity Cluster #2	ABC cost driver
AG1	Technology Development	High Positive		0,451	# of special product codes
AG4	Operations (MF1: 1 Standard)	High Negative	-0,270		# of manufacturing batches
AG7	Operations (MF1: 2 Special)	High Positive		0,310	# of manufacturing batches
AG11	Operations (MF1: 4 Special)	High Negative	-0,262		# of manufacturing batches
AG12	Operations (MF1: 5 Standard)	High Negative	-0,253		# of manufacturing batches
AG13	Operations (MF1: 5 Special)	High Negative	-0,257		# of manufacturing batches
AG14	Operations (MF1& MF2 : 6 Standard)	Positive	-0,273		# of manufacturing batches
AG15	Operations (MF1& MF2 : 6 Special)	High Positive		0,409	# of manufacturing batches
AG22	Service	Positive	-0,253	0,277	revenue per product families
AG23	Inbound Logistic	Negative	-0,300		# of places in warehouse
AG24	Outbound Logistic	Negative	-0,290		# of domestic shippments
AG25	Outbound Logistic	Negative	-0,252		# of foreign shippments
AG26	Firm Infrastructure	Negative	-0,260	0,256	"a special driver"
AG27	Firm Infrastructure	Negative	-0,264	0,261	"a special driver"

PLS method
Model effect loadings
*Profit of Produced Products in respective Activity Group is calculated by multiple the total profit of the product family with the ratio of the volume of product family driver of the total volume

The loadings on the first cluster (#1) are placed either to the manufacturing (operations, see Table 5) or to the more general work (service, outbound logistic and firm infrastructure, see Table 5). The results show, that the use of certain activities has had a negative effect on the profitability of product families and, maybe in the long run, the value of the company, if it is not corrected. A closer analysis of the data is needed, in order to find out the possible drivers for the negative effect on value creation. In this case, the interest is to find out what are the ABC cost drivers, which define the allocation of the company's resources to produced products (Table 5), and to investigate other factors that appeared in the discussions with the ABC project members from different functions.

Porter (1985) has identified 10 generic drivers: scale, capacity utilization, linkages, interrelationship, vertical integration, location, timing, learning, policy decisions, and government regulations. Stabell and Fjeldstad (1998) have specified the key cost and value

drivers for value chain as: scale and capacity utilization. Additionally, Riley (1987) has made a list of cost drivers. He has divided those into two categories. The first category comprises of structural cost drivers: scale, scope, experience, technology, and complexity. The second category of cost drivers consists of executional drivers: work force involvement, total quality management, capacity utilization, plat layout efficiency, product configuration, and exploiting linkages with suppliers and customers. The difference between those categories is that when 'more' is not always better for each of the structural drivers, it is that for the executional drivers (Riley 1987).

The main non-value creating activities can be located in manufacturing (operations), logistics and firm infrastructure. The 'latent' drivers could be low volumes compared to fixed costs, too high range of different products, or an inefficient way to change the manufacturing batches, as the ABC costs are allocated by using '# of manufacturing batches' as an ABC cost driver. In logistics, the 'latent' drivers certainly have some connection with the costs of transportation and storing the final products. According to the analysis (see Table 5.) it seems that some of the logistic activities (both inbound and outbound logistics) have been drivers for low profitability. It is possible that these activities are currently performed inefficiently, when compared those of other products on market, the market price and competitors[6]. It can also be that the structure of the logistic process is too demanding, because the analysis suggests that those activities are non-value creators. It is important for the case company to analyse manufacturing and logistic activities systematically, so as to find the reasons behind lost competitive advantage.

When discussing the results, the case company's ABC project members from different functions agreed that the volume of produced products could certainly be one of the reasons for the positive or negative value creation. When the volume is too low, the allocated fixed cost can become too high compared to the total profit/product at specific activities. Also the driver like technology, complexity, capacity utilization, plant layout efficiency, and product configuration could be drivers for high or low profitability (see Riley 1987). Furthermore, the costs of launching and finishing a manufacturing batch could become drivers for negative profit, if the number of batches is high and product volumes are low. This would suggest bad capacity utilization or plant layout efficiency. Even if the members had an idea of the reasons behind the low profitability, they lacked

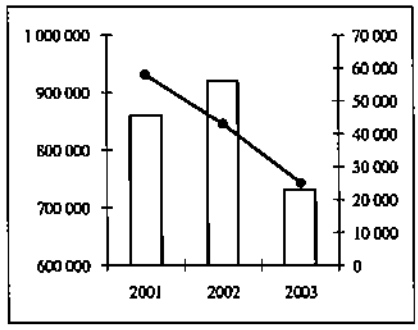
[6] This reference comes from the assumption that competitors can handle the same products in a more efficient way, which means better profitability with the same market price.

the method which would prove their idea true or false in practise. They also lacked a method that could locate the value and non-value creators.

A closer analysis about the variation of the product volumes showed that some of the product families became less profitable when the volume increased, but not always (Figure 4). The charts in figure 4 include volumes (bars, left y-axis) and profit (line, right y-axis) of respective product families during 2001–2003.When the volumes of the example product families Blue and Green changed, this had an effect to their profitability. Volume for the Blue changed between 730.000 and 920.000. At the same time, the margin-% changed between 3% and 7%. For this product family, the volume did not seem to be the main driver to improve the profitability. The other example Green (also Figure 4) had a positive margin-% (5–7 %) when volume was over 230.000, but when it decreased into 160.000, the margin-% became negative (-16%). Hence, certain activities that these products were using or began to use seemed to become non-value creating activities, due to the changes in volumes, and simultaneously, in product assortment (standard – special).

According to the results, volume did not seem to be the main driver for the improved profitability, although it surely had an effect on it. The ratio between standard and special products proved to have a more profound effect on product profitability. This topic can be analysed from the activity clusters (#1 and #2). Cluster #1 is more concerned with producing standard products, while cluster #2 is concerned mainly with special products. The ratio between standard and special products (Blue) are 80/20 (2001), 93/7 (2002) and 94/6 (2003). The margin becomes higher the more special products are being produced, compared to the standard ones. Likewise, the profitability decreases the less special products of Green are being produced. During the first two years (2001 and 2002) only special products were produced. The ratio changed substantially during the 2003 when the amount of special products decreased to 55% of all. At the same time, the margin dropped from 5% to -16%.

Product family 'Blue'	2001	2002	2003
volume (rev)	860 000	920 000	730 000
profit	58 000	43 000	25 000
margin	7 %	5 %	3 %
standard/special ratio (%)	80 / 20	93 / 7	94 / 6



Product family 'Green'	2001	2002	2003
volume (rev)	230 000	350 000	160 000
profit	11 000	17 000	-26 000
margin	5 %	5 %	-16 %
standard/special ratio (%)	0 / 100	0 / 100	45 / 55

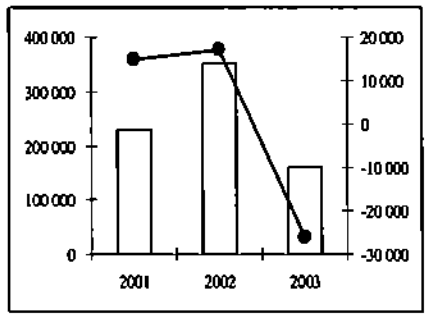


Figure 4. An example of the product families' volumes and profitabilities (case companies' ABC model data 2001–2003).

So far, the value and non-value drivers could be located in the case company's value chain. After that the analysis of two product families which used activities from activity cluster #1 and #2 were presented and analysed. Next, the possible 'latent' drivers for the activity clusters (#1 and #2) are discussed.

Cluster (#2) includes activities which have a link mainly with special products, while the first cluster (#1) is linked with standard products (Table 4 and 5). Special products include work which is more personal, and consists of different kinds of operations than standard products. The 'latent' drivers seem to have a linkage to good technology development and to smart way of working which is suitable for the production process (like scheduling and machines). Findings are in accordance with Riley's (1987) ones: technology and work force involvement and capacity utilization. During 2003, about half of produced products in product family Green were standard ones. At the same time, its profitability decreased, becoming negative. One explanation for this could be that the volume of 'Green's' standard products was too low when compared with the market price and fixed costs.

Consequently, the profitability became too negative, even if the special part of it still had the same positive result as before.

For the activity cluster #1 it can be stated that the 'latent' drivers seemed to be mainly the results of the operations' inefficiency in specific activities, combined with the market price level in relation to the operational costs.

As a summarizing comment it can be stated that the 'latent' drivers for the activity cluster #2 are closer to differentiation (competitive advantage, Porter 1985) or the above mentioned drivers by Riley (1987). The profitability of the product families is much better for those products which use the activities within this cluster. The business model (products, processes, management and strategic choices) of those products seems to bring competitive advantage for the case company.

7. CONCLUSION

Today, there exist only a few VCA studies with empirical data. This study definitely contributed to the existing literature from the VC perspective. Furthermore, this study revealed some new possibilities for future research areas. This study investigated the possibility of finding the value and non-value creating activities from a case organization's value chain. The first aim was to make an empirical test of whether the case company's activities could be located as value creators or non-value creators according to their effect on the customer profitability. The second aim was to discuss the possible 'latent' drivers for the value and non-value creating activities.

This method can be used in those organizations that are able to establish the kind of data presented in table 1. The main requirement is to have a data that connects the volume and money views (see causalities). With those causalities, it is possible to make the PLS analysis, and to search for the value creating activities, as well as to discuss the drivers for those within each activity. Activities which are vital in improving or weakening the value creation depend, however, on the company.

Comprehensive and sufficiently specific data makes it possible to carry out the empirical tests. According to the applied PLS analysis, it is possible to determine the activities to have either a negative or a positive effect on the case company's value creation. Also the 'latent' drivers for those were discussed. A more profound examination showed that these drivers came close to the competitive advantages of costs and differentiation (Porter 1985),

had a linkage to scale and capacity utilization (Stabell & Fjeldstad 1998), and to the list of cost drivers (Riley 1987). In this study, the changes in volumes and in the ratio of the standard and special products seemed to be driver for the value creating activities.

The VC analyses clearly need more researching that would develop the existing theory. More practical studies are also needed in order to develop the VCA method, because the topic still lacks sufficient studies with proper empirical data. These should be performed in combination with other methods like ABC/M, SCM or PVA.

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Management accounting in the new economy: from 'tangible and production-focused' to 'intangible and knowledge-driven' MAS by integrating BSC and IC*

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ABSTRACT

This research is focused on studying the homogenous structure for tangible and intangible measurement systems and presenting a framework for its use. The aim is (1) to develop *a conceptual homogenous structure* for the combined tangible and intangible measurement and management system, (2) to present how those can be *connected* to a company's ABC system (a new application), and (3) to discuss *the benefits* of a developed model, trough a case example. The purpose of the developed model is to link the company's organizational effectiveness, in terms of successful accomplishment of strategic goals and performance measures, with a strategy that ensures their relevance to the organization. Literature on intellectual capital (IC) advocates the use of an IC measurement system and stresses the importance of strategic planning and development. This research describes how the structure of BSC can be utilized in both tangible and intangible measurement systems. The role of the ABC system as a link between operational performance and strategic priorities is perceived, tested with an empirical material and later discussed. This research provides a new innovative model for the future's more detailed empirical testing. The case material showed the importance of the intangible and knowledge-driven issues as a part of a company's strategic management accounting system.

Key words: management accounting, strategic management accounting, activity-based costing, tangible and intangible measurement system

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1. INTRODUCTION

During the 1980's an early attempt to measure IC was made by practitioners. Intellectual Capital (IC) was noted but often generally referred to as goodwill (Petty & Guthrie 2000; Guthrie 2001). Companies have been implementing increasingly different measurement and management concepts and areas, so as to increase the company's profitability and to improve the understanding of organization (processes, activities, knowledge sharing, innovation and learning). Activity-based costing/management (ABC/M), balanced scorecard (BSC), knowledge management (KM), human capital (HC) and intellectual capital (IC) are examples of such concepts or areas. Some of the used, tested and implemented management concepts are focused mainly on tangible valuation like ABC and BSC[1]. Topics or research areas, like KM, HC and IC are in their own models and concepts focused more on recognizing individual components and evaluating intangible assets without any generally accepted connection with the company's tangible valuation.

Since 1980's companies have adapted many new operative innovations to handle the needs of customers better. This has affected the development of the operative and strategic measurement systems and increasingly the discussion of tangible and intangible. In a survey by the Nordic Industrial Fund and PLS Pamboll which included 350 businesses in five Nordic countries in August 2000, more than 85% considered IC to be "strategically important" for the company (Nordic Industrial Fund 2001). IC was seen as the key to strategic planning and development, and to improving resource management, products and services. However, many companies that set out to measure and report their IC found that generally recognized measuring and reporting methods were lacking. Similar findings were made in Australian research (Petty & Guthrie 2000).

2. RESEARCH OBJECTIVES

The overall aim of this research is to create a model that combines tangible and intangible measurement systems that would have a relationship between strategic priorities, management techniques and management accounting. The object of such a measurement framework can be either external comparison or supporting internal management

[1] Later on, BSC has moved more towards being a combination of tangible and intangible measurements, and the importance of IC has increased (Kaplan & Norton 2001).

behaviour (Shulver 2000). In this research the focus is on how combinations of management techniques and management accounting practices enhance the performance of an organization, under particular strategic priorities. The applied case data consists of causal links (costs, resources, products, customers and revenues) of organizational operations[2]. In this research it is assumed that the value of the company will increase more from internal operations than from external promises in the long run. According to Ward and Patel (1990) the ABC system can play a central role in the understanding of a company's activities and provide the right information for those management decisions which have an impact on shareholder value. Today companies focus on managing and reporting IC in order to develop the factors that will ensure their long-term value and create business opportunities (Nordic Industrial Fund 2001). The main research questions are:

- Is it possible to use a homogenous *structure* for the intangible measurement system?
- Is it possible to use the ABC system as *a connection* between tangible and intangible management systems?
- What would be the *benefits* of such a combined model?

This research has two main objectives. First, the aim is to examine the structure of the intangible measurement system to find out how this system could be added to the balanced scorecard (BSC) concept. Shulver (2000) argues that there is a clear need for a process model that facilitates the development of IC measures that are linked with the strategy. The second aim is to present a framework for the connection between tangible and intangible management systems. Over the last decade many useful tools have been developed aimed at understanding and creating a structure to make intangible assets explicit (Sveiby 1997; Edvinsson & Malone 1997; Stewart 1997; Roos, Roos, Edvinsson & Dragonetti 1997; Brooking 1996; Sullivan 2000). Companies have recognized that IC is at least as important as other resources and that it represents future earnings potential (Nordic Industrial Fund 2001).

In addition to the presented research objectives, the latter aim includes a simple empirical investigation about the use of the ABC data; providing information and analysis for

[2] The applied data is from the case company's mass-tailored ABC system.

strategic decisions, and showing the link to the value creation[3]. According to Hoque, (2001) the strategic management accounting is the process of identifying, gathering, choosing and analysing data for helping managers to make strategic decisions, and also to assess organizational effectiveness. It is generally argued that the architecture of cost management system should follow the strategically important issues (Porter 1985). The latter aim can be seen as a consequence of the movement towards more strategic management accounting system.

3. RESEARCH METHODOLOGY

The target for this research is to present a framework (new application) to control a company's tangible and intangible resources.

The two aims of this research paper were studied by using the existing literature. It is the outcome of collecting, analysing, comparing and synthesizing theoretical knowledge from BSC and IC models. The latter part of this research includes also a short empirical part. Therefore the nature of this study includes mostly to normative-empirical research approach. The applied data is taken from the case company's ABC system, and it includes a one year's period. The ABC system is a process based and customer oriented full costs model. The objective of the case data is to show a practical example of how the developed model can be used. As a summary, this research can be seen as a study where a new framework is presented and later tested with empirical case data. The case example is used to clarify the aims of the research.

4. LITERATURE REVIEW

Stewart (1997) defines intellectual capital as intellectual material – knowledge, information, intellectual property and experience – that can be put into use to create wealth. Bontis (2001) mentions intellectual capital, knowledge capital, knowledge organizations, learning organizations, organizational learning, information age, knowledge era, information assets, intangible assets, intangible management, hidden value and human capital as parts of a new lexicon describing new forms of economic value. Lev (2001) defines Intellectual assets as a claim for future benefits that do not have a physical or

[3] In this research the value creation mainly consists of improved customer and product profitability.

financial embodiment, as stock or bonds have. Lev (2001) mentions that a patent or a brand are examples of intellectual assets, which are yielding more revenue, but also a unique organizational structure can be an intellectual asset, and in this case we are referring to assets which generate cost savings. Luthy (1998) divides the IC measurement methods into two categories: the component-by-component method and the assets in financial terms. Sveiby (2001) has extended the classification of IC models suggested by Luthy (1998) and Williams (2000). Sveiby (2001) categorized the IC approaches as four different categories: direct intellectual capital methods (DIC), market capitalization methods (MCM), return-on-assets methods (ROA) and scorecard methods (SC). In this research the focus is strongly on the SC category but also on MCM methods to some extent. The aim is to develop a structure which supports the internal development of the organization by identifying the individual components, and, in addition, the aim is to present a case example of the link that operational efficiency has to value creation.

Methods included in the DIC and ROA categories are outlined. Both DIC and SC methods identify the intangible components, but in the SC methods no estimates of the intangible assets' $-value are made, while in DIC estimation of the intangible assets' $-value is made. The estimation of $-value is made by identifying various components. Afterwards, the components are evaluated either individually or as an aggregated coefficient. The methods in the SC category identify the various components of intangible assets or intellectual capital. After identification, indicators and indices are generated and reported in scorecards or as graphs. A composite index may or may not be produced by SC methods. In this research the $-valuation has been taken into account as a concept level. The assumption is that there is a causal link between operational level performance and the organization's value creation.

In this research the first main aim is to combine the structures of tangible and intangible measurement systems. The IC-methods used in this research are: Sveiby (1997), Edvinsson and Malone (1997), and Roos et al. (1997). All these methods are included in the SC category. The second aim is to present a link between those systems with an empirical case model in a strategic management accounting context.

Sveiby (1997) in the intangible assets monitor (IAM) divides the market value into tangible assets (visible equity) and intangible assets. The intangible assets Sveiby (1997) further divides into three: external structure (brands, customer and supplier relations), internal structure (the organization management, legal structure, manual systems, attitudes, R&D, software) and competence of personnel (education, experience). In IAM the

following indicators measure each intangible asset: growth and renewal (change), efficiency and stability.

Edvinsson and Malone (1997) in skandia navigator (SN) focused on five areas: financial, customer, process, renewal, and development and human capital. Skandia business navigator (SBN) is a tool for measuring human capital. The navigator reflects the entirety and includes both financial and non-financial measures from each area and gives information on its history, present time and future. Edvinsson and Malone (1997) also present the skandia value scheme (SVS). The SVS is a model in which the market value is divided into financial capital and intellectual capital. Intellectual capital is further divided into human capital and structural capital. The difference between human and structural capital is in the ownership. Structural capital is divided into customer capital and organizational capital, which is the sum of innovation capital and process capital. Innovation capital is again divided into intellectual property and intangible assets.

Roos et al. (1997) have developed the IC distinction tree to illustrate the market value of the company. Also they divide the market value into financial capital and intellectual capital. Intellectual capital is divided into human capital and structural capital. Up to this point the model is identical with the skandia value scheme. Human capital is divided into competences, attitudes and intellectual agility. Structural capital is divided into customer relationships, organization and capability for renewal and development. Roos et al. (1997) also suggest other measures besides the individual measures to calculate different indexes. The IC -index is an example of "second generation" practices that attempt to consolidate all the different individual indicators into a single index, and to correlate the changes in intellectual capital with changes in the market (Roos et al. 1997).

All the above presented models begin by dividing the market value into shareholders' equity (tangible) and intellectual capital (intangible). The models are developed to measure the components of IC and to manage internal development. The structures of all the models are quite similar but not identical. The structure or the categories of models, like groups, units or perspectives, resemble the ones in the balanced scorecard, which, according to Sveiby (2001), also include the SC category. The one which comes closest is the IAM, developed by Sveiby, followed by skandia value scheme and the IC-index.

In this research the BSC concept is chosen as a basic framework for the developed BSC+IC concept instead of using an IC concept as a base, because the BSC concept differs from other systems in that it contains outcome measures and the performance drivers of

outcomes, linked together in cause-and-effect relationships (Kaplan & Norton 1996). Additionally, BSC translates the vision and strategy of an organization into objectives and measures in four different perspectives; financial, customer, internal-business processes and learning and growth (Kaplan & Norton 1992). BSC has also proved successful in many organizations for over 10 years, and it has been developed more into being a continuous learning model (Kaplan & Norton 2001). The BSC -concept is defined as a set of measures which gives top managers a fast but comprehensive view of the business, and it has been developed for years to be more as a concept; from management control system *"designed around a short-term, control-oriented financial framework, 1996"* to a strategic management system *"designed around a longer-term strategic view, 2000"* (Kaplan & Norton 2001). Lately the BSC has been added by *"the HR scorecard, 2001"*. According to this development the business operation and also the content of MAs (including the strategic view) would be moving from a tangible and production-focused to a more intangible and knowledge-driven system. This research determines that the developed BSC+IC framework must be similar to the original BSC, including perspectives, strategic targets, key-success factors and measures. Wingren and Korpi (2004) have studied whether it is possible to build a general structure for the IC, which would follow the structure of BSC. According to their study it is possible to build a BSC-based IC –model[4]. The BSC type perspectives in the IC model are expectation, imago, internal structure and learning and growth (Wingren & Korpi 2004). The original IC models do not include the fourth intangible asset perspective, like the BSC.

Wingren and Korpi (2004) decided to use the expectations on the measure and value of the future cash, which, at this moment, is still only expectation of future earnings. Another important object for expectations was seen to be the explanatory part of market expectations of the future (share price). It was perceived as the major explanation for the possible gap between market value and book value. Expectations can be the results of good strategic planning and operational efficiency. In this research the structure of their research is used as a base for the BSC+IC concept[5].

Wingren and Korpi (2004) did not study the link between tangible and intangible systems. Their focus was on studying the possibility of using BSC structure in the general IC-

[4] Their research was a conceptual one, as it did not include any empirical data.

[5] The used structure means that both tangible and intangible measures include a homogenous architecture which follows the structures of BSC: perspectives, strategic goals, key-success factors and measures.

model. This research will extend their findings to a broader entirety, which in this research means a conceptual alliance to the context of intellectual capital perspectives by Fersntröm, Pike and Roos (2004), and Roos and Roos (1997). They use five resource categories as a framework facilitating the identification of all the different resources (Roos & Roos 1997). These categories are: human, organizational and relational resources on the intangible side, and monetary and physical resources on the tangible side. Human resources include e.g. the knowledge, competence, intellectual agility and attitude of the employees. Organizational resources include e.g. structures, systems and processes that the company uses to support their operations. In addition to that, also items such as brands, image, culture and documented information are included in these resources. The last group of intangible resources are the relational resources e.g. customer relationship, suppliers, strategic partners and other alliances (Fersntröm et al. 2004).

In this research the resource categories in the intangible side are used as to explain the case company's situation (see the chapter on case example). According to Fersntröm et al. (2004) all companies benefit from a better understanding and management of their intangible assets, as these resources have over time come to play a more central role in creating value (see also Lev 2001). In this research the case company's situation is discussed by using customer and product profitability reports and a resource-based view of the company and the intellectual capital. Mapping all the resources at a company's disposal – both the tangible and the intangible – as well as their interaction with one another extends to assessing the effectiveness with which the resources are deployed (Fersntröm et al. 2004).

Another model that can be categorized close to the SC methods has been presented by Ericsson Business Consulting (Lövingsson et al. 2000). They use the Skandia model by Edvinsson and Malone (1997) as a base for the IC. In their model the balanced scorecard was applied as a tool to incorporate the IC into the management system. They used the IC capital form as perspectives, and instead of resulting in four, they resulted in five. They do not explain how they chose the 'perspectives' from the IC distinction tree, or which of the individual assets were included in the perspectives. The integration in the 'normal' BSC was also missing.

The literature of the latter part of this study consists of ongoing discussions on management accounting and strategic management accounting. While the literature, presented earlier, is more focused on the first two research questions, the literature presented henceforth is related to the last research question.

The discussion on whether a management accounting system should have a more strategic view has risen during the last decade. The first signs of strategic management accounting (SMA) in the literature were published at early 1980's by Simmonds (1981, 1982). Simmonds (1981) pointed out that strategic management accounting had a character external focus, unlike the conventional management accounting. The importance of strategic issues and the discussion about the existing lag between the accounting systems and manufacturing processes continued by Kaplan (1986). Bromwich and Bhimani (1989) also pointed out the importance of the external orientation, but they highlighted the operational effectiveness as well.

It is argued that strategic management accounting is intimately related to the pursuit of sustainable competitive advantage (Roslender, Hart & Ghosh 1998). Porter's (1985) strategic cost analysis brings together marketing and management accounting insights. Shank and Govindarajan's (1993) strategic cost management approach is another method to change the focus to be more strategic. Although there are a number of different kinds of methods, analyses and techniques, the amount of practical findings are few (Lord 1996). The challenge is to identify examples, explore those and bring them to the attention of the wider crowd. Today the term strategic management accounting is in itself fascinating. It can be understood in somewhat different ways. Some are more concerned with the sustainable competitive advantage (like Porter 1995), or those benefits, which seek to cost the benefits that products provide for customer (Bromwich 1990; Shank & Govindarajan 1993). In this research the case example is an empirical example of how the different systems can be linked together. It is also a lead for the future studies of such linkages.

5. FRAMEWORK FOR THE INTEGRATED BSC AND IC CONCEPT (BSC^{IC})

The integration of BSC and IC is illustrated in Figure 1. Both concepts originally categorize the Intangible areas into three (Sveiby 2001). The fourth area in the BSC - concept is finance perspective and in the IAM it is the tangible assets. In this research the structure of BSC is used and the fourth perspective is selected to be expectations according to the model developed by Wingren and Korpi (2004).

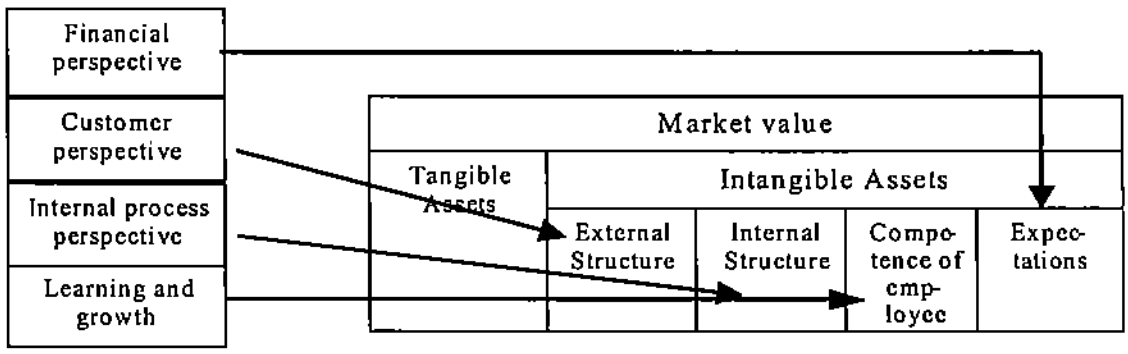

Figure 1. Framework of how the perspectives in BSC correspond with the perspectives in the IC model, extended from Wingren and Korpi (2004).

In this study it is assumed that the change in the measures cannot be made without involvement of the employees. The individual component that leads the change is carried out in the activities, and the change leads from the decisions according to different strategic management activities. Therefore, in the BSC^{IC} model, the activities play an important role. Activities that lead or can be managed and measured to tangible outcomes are linked to the tangible side of the BSC^{IC} model, and activities that lead or can be managed and measured to intangible outcomes are linked to the intangible side of the BSC^{IC} model.

The structure of the BSC+IC model has to include strategic targets, key success factors and measures like the BSC model. To illustrate strategic targets, key success factors and operational effectiveness, the case data is included in this research. The structure of the developed BSC^{IC} is compared with the other SC category models in Table 1. The corresponding perspectives are shown and named according to BSC, and according to the research findings from Wingren and Korpi (2004) and Fersntröm et al. (2004).

Table 1. The developed model of BSC+IC, *the BSC^{IC}* –concept compared with other SC models.

Kaplan & Norton (BSC)	*Sveiby (IAM)*	*Edvinsson (SVS)*	*Roos et. al. (IC index)*	*Wingren (BSC <+> IC) (BSC^{IC})*
Financial				Financial <+> Expectations
Customer	External structure	Customer capital	Structural capital	Customer <+> Relational
Internal processes	Internal structure	Organizational capital	Structural capital	Internal processes <+> Organizational
Learning and growth	Competence of personnel	Human Capital (SBN)	Human capital	Learning and growth <+> Human

The management of activities should be seen as a tool to be employed in the creation of value for customers, shareholders and employees (McConnachie 1997). It involves identifying activities, assessing their links with the present and future value of the company, measuring their value, discovering intangible activities and finally being able to efficiently manage those activities (Sánchez, Chaminade & Olea 2000). Lev (2001) argues that intangible assets are non-physical sources of value, generated by innovation, unique organizational designs or human resource practices. Intangible often interacts with tangible and financial assets, so as to create corporate value and economic growth. It has been discussed whether each perspective needs its own management of activities and a system for measurement (see Arveson 1999). He suggests the following strategic management activities for each BSC perspective: budget and cost management for the financial perspective, customer relationship management for the customer perspective, business process improvement for the internal process perspective and knowledge management for the learning and growth perspective. In this research the suggestions by Arveson (1999) are taken into account on the conceptual level. The framework is created by placing the activities in the middle. Those work as links between tangible and intangible systems in the developed BSC^{IC} model (see Figure 2). The perspectives and key success factors are also placed on each side of the model.

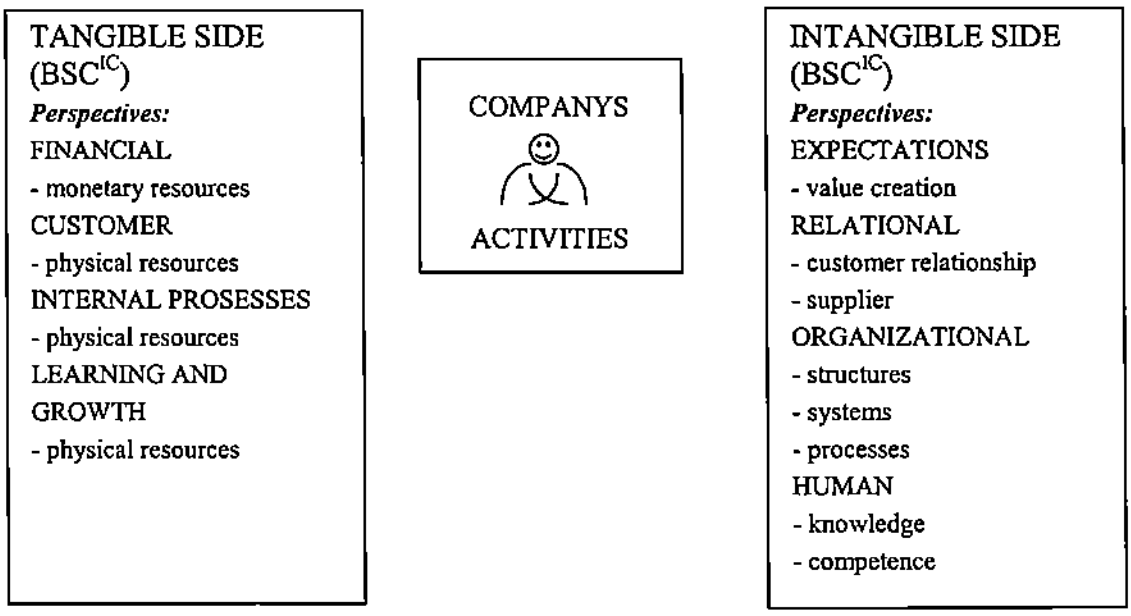

Figure 2. Framework of the developed BSC^{IC} model.

6. CASE EXAMPLE

Customers

The use of the developed strategic management accounting BSC^{IC} model is presented in the next case example. The material is from the case company's ABC system. The case company operates on wholesale trade. It has slightly over 100 employees and the revenue is around 35 t€. The company has 18 customer groups and a few thousand single products, which are categorized into about 50 product groups and further into three main product categories. From a strategic perspective, the customers are divided into key customers and other customers. During the last years, the case company has made a relatively good profit (6–8% of revenue) per year. Thus, they did not have any major profitability –related reason for the analysis. Rather, the general manager's interest in his organization was a willingness to know; which product groups and customer groups were the profitable ones, and whether the strategic choices had been the correct ones. Furthermore, they wanted feedback on the existing business model. Here, the interest can be directed to the value creation. The general manager explained before the project that he had a divination of the

situation, but could not formulate any report or analysis which would examine it. The existing reports did not present the profitability of customers or products, which the managers would have liked to know. The costs were mainly allocated according to the volumes, and not according to the need of resources to fulfill the requirements of customers. The existing reports were less focused on the intangible resources, the feedback of existing work, structure and processes, and on the entire business model, compared to the strategic targets.

The situation of the 18 customer groups can be seen from Figures 3 and 4. The profit per each customer group is presented in Figure 3, while the percentages of S&M costs and profit to revenues are presented in the Figure 4.

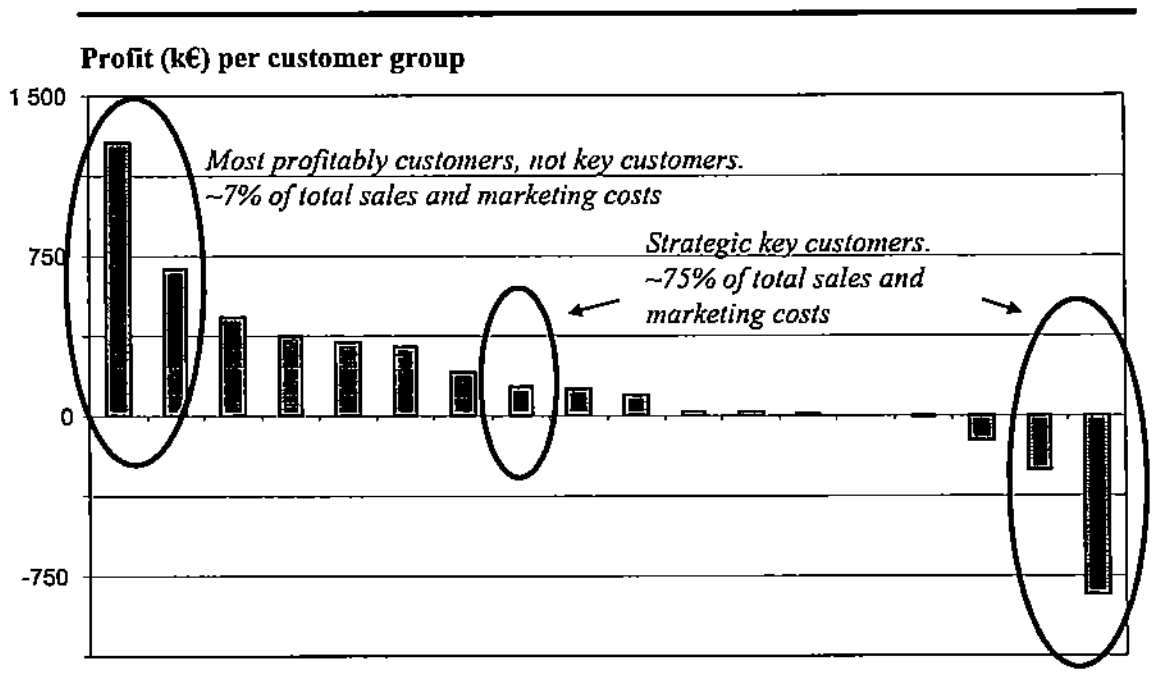

Figure 3. The case company's customer groups' profit.

Unexpectedly for the company's managers, two key customers were the most unprofitable ones (see Figure 3). Strategically, these customers were considered as the most important ones, e.g. the S&M (sales and marketing) costs investment on them was 75% of all. Those costs include costs of S&M resources, material, IT-systems and costs of other S&M activities. It was almost equally unexpected that the most profitable customers were those that were not handled as strategic ones. It was recognized that those customers were

important customers (measured in revenue) but the investments on them were only 7% of all sales and marketing costs (Figure 4). Three key customers represented almost 50% of the total revenue, while the most profitable ones represented 20 % of all.

The amount of sales and marketing costs compared to revenue are presented in Figure 4. The customer groups are on the x-axis, and they are in the same order as in the previous figure. On the left y-axis is the percentage of S&M costs per revenue. Generally, the ratio is below 10% but the most unprofitable ones, on the right side, have a ratio around 20%. The highest percentage is over 50% (fourth from the right). On the right y-axis is the ratio of profit and revenue. The most profitable customers have a ratio around 20%, while the key customers have a ratio up to -20%.

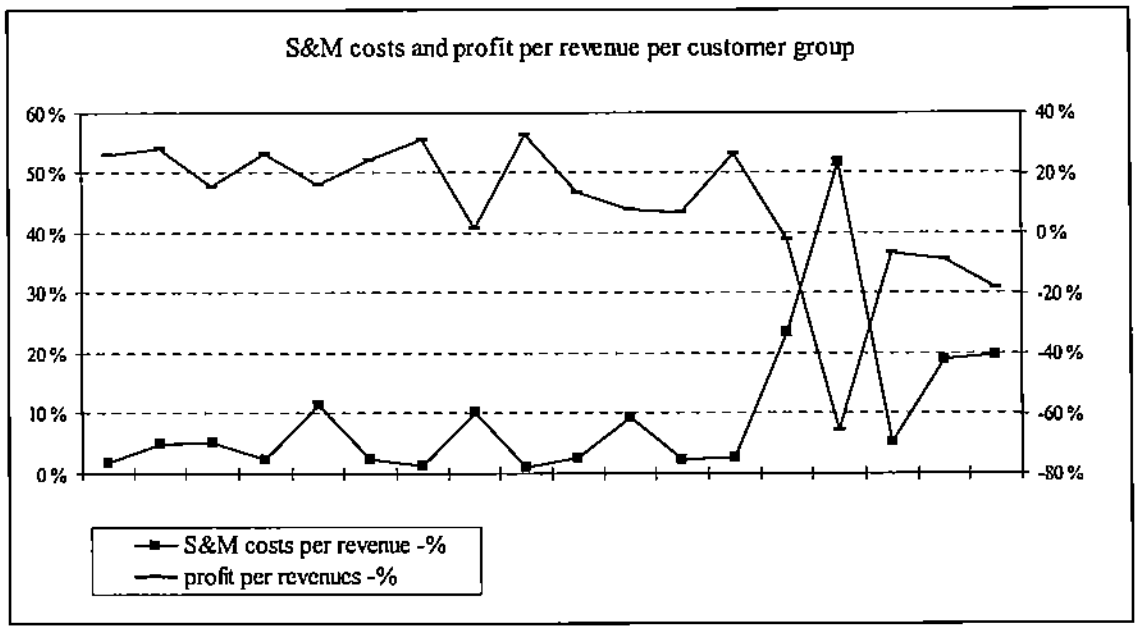

Figure 4. The case company's S&M (sales and marketing) costs and profit per revenue per customer group.

As a summary, a short analysis of the customer group situation. The reports showed that the key customers were, unexpectedly, the most unprofitable ones. The reports also showed that the S&M costs for the key customers were very high. They were around 20%, while the ratio for the most profitable customers was under 5% of revenue. The results showed that there is a clear disparity between the business model, strategic thinking and

operational effectiveness. This issue will be discussed more deeply later on in this research. The reports concerning the products will be presented next.

Products

The present financial situation for three product groups can be seen from Table 2. The revenues for the product groups are: 15,535 k€ for product group #1, 8,204 for #2 and 10,058 k€ for #3. The costs for each product groups include all other than the costs for sales and marketing, which are allocated directly to the customers. The most profitable product group is #3 (2,717 k€, 27% margin), while the profitability of the others is slightly positive for #2 and slightly negative for #1.

Table 2. Data about the case company's product groups.

(k€)	Revenue	Cost	Profit	Margin
Product Group 1	15 535	16 011	-475	-3,1 %
Product Group 2	8 204	7 837	367	4,5 %
Product Group 3	10 058	7 340	2 717	27,0 %
Total	33 800	31 189	2 609	7,7 %

The reasons for low and high customer profitability are analysed by using the data from Table 3. In that table, the cost of products and cost of S&M are summarized to customers according to their volumes per each product group. For example, the total revenue of the key customer AA is 2 558 k€. It consists of three product groups: 1 814 k€ from product group #1, 679 k€ from #2 and 64 k€ from #3. Respectively, the costs of products are summarized to the customer according to the volumes per product groups.

Table 3. Data about the case company's product groups.

(k€)	Revenue	Cost	Profit	Margin	S&M costs	S&M costs of revenue
Key Customer AA	2 558	2 786	-227	-8,9 %	483	18,9 %
Product Group 1	1 814	2 011	-196	-10,8 %		
Product Group 2	679	718	-39	-5,9 %		
Product Group 3	64	55	8	13,6 %		
Key Customer BB	4 158	4 911	-752	-18,1 %	818	19,7 %
Product Group 1	3 062	3 672	-609	-19,9 %		
Product Group 2	1 026	1 182	-156	-15,2 %		
Product Group 3	69	56	13	19,1 %		
Customer CC	4 471	3 317	1 154	25,8 %	86	1,9 %
Product Group 1	98	77	21	21,4 %		
Product Group 2	498	415	83	16,7 %		
Product Group 3	3 874	2 823	1 050	27,1 %		

The assortment of product groups seems to be one of the major reasons for the results on high and low customer profitability. The key customers (AA and BB, see Table 3) mostly buy the products which are included in the product group #1, and only a very small amount of products from group #2 and #3. This means that those customers are buying nearly exclusively only the most unprofitable products for the case organization. Customer CC is buying mostly from the product group #3 and only a very small amount from groups #2 and #3. This is vice versa in the case of the key customers.

On the right side is the amount of S&M costs and its ratio to revenue, as in Figure 4. The company's investment (S&M cost) on the key customers is remarkably high, almost 20%, while the investment on the other customer is even less than 2% of the customer revenue.

After creating an overview of the situation, the presentation of how the developed BSC^{IC} model, in which the focus is more on the intangible and knowledge-driven issues, can be applied in increasing the operational effectiveness, key success factors, and the value of the company in a longer run. A framework for the developed BSC^{IC} model is presented in figure 5.

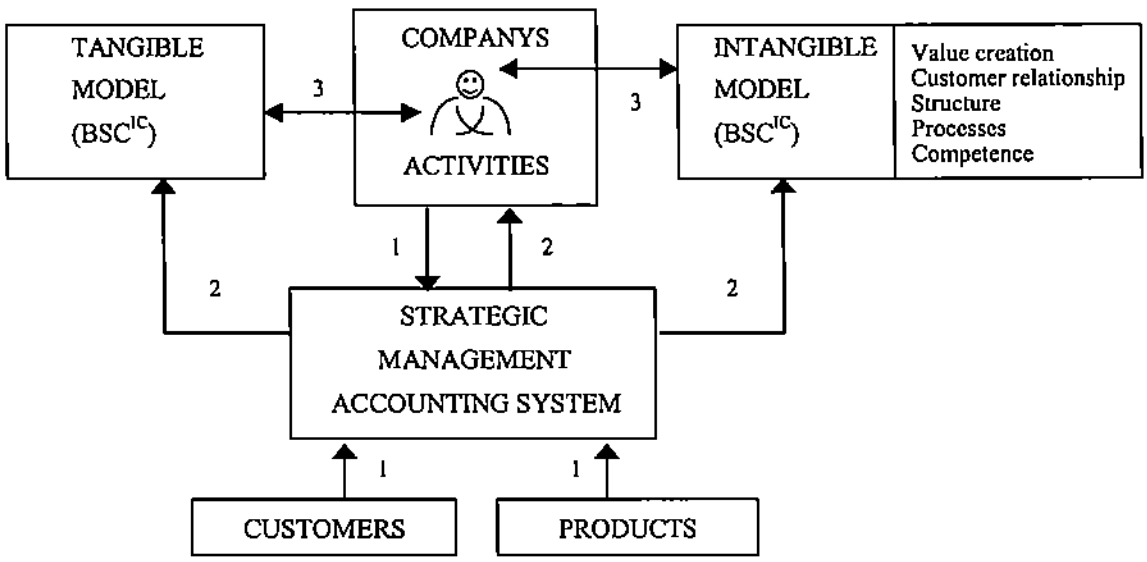

Figure 5. An example of how the developed BSC^{IC} concept can be used as a strategic management accounting system. The use is presented in more detail, together with the case company's ABC data.

A short example is illustrated of how to use the developed BSC^{IC} model in the case company's presented situation. The managers were interested in an analysis on the state of customer and product profitability. They wanted to know whether the operative activities are in line with the company's strategic targets, and what its effectiveness was. This part, gathering and analyzing the material, is presented by a phase number (1) in Figure 5. It includes data from the operative work (activities) and data from the customer relationship and products. In this case the needed material is collected from the company's ABC system.

As described, the prior operative effectiveness was not good in the case of the key customers. To improve the fulfillment of the strategic targets and operational effectiveness, the company definitely needs to invest in the intangible part of its operation: knowledge, competence, systems, structure and processes (2). For the case company, this would include re-evaluating the strategic targets and value creation. By re-categorizing customers, the S&M resources and the total S&M investment, the case company could improve the operative effectiveness and direct the operative work closer to strategic targets. After the required new issues have been generated, they can be simulated. If the corrective actions

are experienced as suitable ones, they should later be integrated into the existing knowledge, competences and structures (3). Without recognizing the intangible activities, the company does not have a clear and systematic route (strategy) to the strategic targets and vision (Sánchez et al. 2000).

The perspectives in the intangible side are according to Figure 2 (expectations, human, organizational and relations). The selected key success factors are value creation, customer relationship, structure, processes and competence. The measurements could be same as in the presented figures and tables in this research. The purpose would be to strengthen the linkages between strategic targets and operational activities. An improved value creation would be achieved with an improved use of S&M resources and investments, focusing more on the product group profitability in the sales, and changing the structure and processes in customer service. The required competences should be discussed in all mentioned organizational modifications.

7. CONCLUSIONS

In this research a framework for the new strategic management accounting system was presented. This research focused on prior literature, on literature which main focus has been on the IC concepts in the SC category, linking the BSC and IC. The goal in the developed model is to have a characteristic external focus. The model is concerned with the customers and products, and has an explicit emphasis on long term value creation. The difference between the BSC model is that while it has only one main perspective and target (mostly financial), the integrated model in BSC^{IC} will have two different main targets: one from tangible side and one from intangible side. The *tangible BSC^{IC} side* shows the critical factors needed in order to reach the targets in the monetary and physical resources, and the *intangible BSC^{IC} side* shows the critical factors needed to reach the targets in the human, organizational and relational resources. The target of the integrated system is that companies could achieve a balance, also between tangible and intangible, not only between short- and long-term objectives, between financial and non-financial measures, between lagging and leading indicators, and between external and internal performance measures.

The model will integrate the activities in a stronger way into the key success factors and measures. This can lead to a more understandable knowledge of the entire operations. The structure of the developed BSC^{IC} model is focused on identification, measuring and managing the internal individual components. Some of them can be evaluated, but the

structure is not necessarily suitable for overall valuation. The BSC-based IC model can also be seen as a tool for evaluating the development of the company's market value, even if its main purpose is rather to be a useful tool for internal development.

The aims of the research have been tested in a case example. Homogenous structures for the tangible and intangible model could be found, and a link (activities), which integrates both sides, could be illustrated. The reasons for high and low customer profitability could be defined. The BSC^{IC} model proved that in the case example, the major development should be aimed at the intangible side. The structure and processes were not working effectively enough. The model also gave a possibility to compare the strategic targets with operational effectiveness. The case example suggested the need for this kind of comparison analysis.

This research is the outcome of collecting, analysing, comparing and synthesizing theoretical knowledge from BSC and IC models. This research can be seen as a pre-study for a more detailed empirical study. In order to ensure the suitability of the developed BSC^{IC} model, it has to be tested further in different kinds of organizations in the future.

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