



BS thesis
in Business Administration

Evolution of Cost Allocation Systems
Implementation ABC methods by Icelandic companies

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Faculty of Business Administration
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HÁSKÓLI ÍSLANDS

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This thesis is a 6 credit final project towards a BS degree in Business Administration at the School of Social Science at the University of Iceland.

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Prologue

This thesis is a 6 credit final project towards a BS degree in Business Administration with an emphasis in Accounting at the University of Iceland.

The paper is prepared under the guidance of Bolli Héðinsson, adjunct at the University of Iceland. The author would like to thanks Bolli Héðinsson for providing the valuable guidance.

The author would like to also thanks Gunnar Már Petersen, CFO of Nýherji, Inga Guðrún Gestsdóttir, CFO of Emmessis, Jón Þór Eypórsson, owner of Reikningshald and skattskil ehf., for finding time and providing valuable information that makes possible this thesis.

Abstract

The purpose of the current study was to describe the evolution of cost allocation systems from the simplest ones to the most complex – integrated cost allocation system, which use financial and non-financial information to evaluate organizational performance. Then, apply theories into practice by research and analysis of cost allocation systems in the use by Icelandic companies.

The first chapter introduces cost accounting and management accounting, and how these disciplines developed over the time. Inclusive is a short overview of the history of cost accounting from the dawn of civilization to the present time. The main emphasis was on the development of modern theories, methodologies and practices. Based on academic literature and publications about cost accounting and management accounting were described four-stage model for designing cost and performance measurement systems. Special attention was paid to activity-based cost methodology and systems.

In the second chapter were described the research of what types of cost allocation systems are used by companies operating in Iceland. In scope of this research, companies were divided into three groups by their size: small, medium and large-sized companies. Cost allocation systems were observed and examined. The examination sought to establish the links between theories of different designs of cost allocation systems from the first part of the thesis, and general companies' practices. The chapter closes with the overview of findings and possible proposed solutions.

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1 Introduction

The relevance of the study. In today's permanently changing environment and aggressive market competition, the survival of an organization heavily depends on the ability of the organization to adapt rapidly to such changes. Organizational strategies are focusing on quality, novelty and variability of products, low costs and satisfied customers. Cost accounting and management accounting provide managers with a variety of information that could potentially help complete organizational goals. Activity-based cost systems were in the high interest area of academics and practicing cost accountants since ABC (Activity-Based Costing) was introduced by its pioneers Robin Cooper and Robert Kaplan and until today. Surveys between 1990s and 2008 shows an increasing interest of the companies to adoption of ABC (Elhamma, 2012). "In the USA, the adoption rate of the ABC method has increased from 11% (1993) to 52% (2003) and that of UK companies has increased from 6% (1991) to 23% (2001). Also, the firms in France increased their ABC adoption from 15, 9% (2002) to 33, 3% (2008). In Australia, the ABC adoption rate is very high in 1998 (56%) and it is 27,9% in Ireland (2004)" (Elhamma, 2012).

The novelty of the thesis consists in research among Icelandic companies on the subject of using ABC systems for cost accounting.

The practical importance of this paper consists in the findings and possible solutions for companies, which do not use the ABC costing.

The subject of the research is the adaptation of ABC methodology by the Icelandic companies.

Method of the research is the interviewing people directly involved in cost management and decision making.

Structure. The paper's structure includes an introduction, two chapters of main body, conclusion and references.

The first chapter describes cost accounting definition and historical development of cost accounting systems.

The second chapter examines and classifies ninety three Icelandic companies on the subject of using cost systems and defines the stage of development of cost accounting.

In the conclusion the results of this study are summarized and general conclusions are drawn.

2 Cost accounting – definition and historical development

2.1 Definition of cost accounting

The main purpose of most companies is to be profitable and produce cash flow in the present and over the long run. If a company is not able to generate enough profit over time, its survival is questionable. Therefore, managers are heavily involved in the permanent process of decision making; this includes making decisions regarding products and services design, improving activities and processes, making investments, choosing suppliers and negotiating price. One of the most important factors that managers take into account in their decision making is data from cost accounting. Cost accountants provide the link between management and profit. They can help management insure that processes utilize resources and capital in a way that will provide a solid base for future profitability (Cokins, 1996).

The definition of cost accounting was modified from: „cost accountancy is the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and ascertainment of profitability“ (Bhar, 2008, p.12) to: „cost accounting measures, analyzes, and reports financial and non-financial information relating to the costs of acquiring or using resources in an organization“ (Horngren, Datar, & Rajan, 2012, p.26). The contemporary explanation demonstrates that the scope of cost accounting has increased to such an extent that it now refers to collecting and providing all kinds of financial and non-financial information that assists managers in fulfilling any organizational goals. Modern cost accounting is being termed as management accounting, since managers are the primary users of accounting information and they are increasingly using such data provided by the accounts and cost controllers, when setting objectives and controlling the operations of the business. Leading companies require information from their cost systems, which provides them with directions for the “following activities:

- Design products and services that both meet customers’ expectations and can be produced and delivered at a profit.
- Signal where either continuous or discontinuous improvements in quality, efficiency, and speed are needed.

- Assist front-line employees in their learning and continuous improvement activities.
- Guide product mix and investment decisions.
- Choose among alternative suppliers.
- Negotiate about price, product features, quality, delivery, and service with customers.
- Structure efficient and effective distribution and service process to targeted market and customer segments”(Kaplan & Cooper, 1998, p.1).

2.2 Historical development of cost accounting

Accounting is a very old profession, and cost accounting is probably one of the oldest managerial tools that have been used from the dawn of civilization. It was used when determining the amount of taxes that were taken by kings as well as when pricing the products that trade people of antiquity were selling. Ancient Chinese, Egyptians, Phoenicians, and the Arabs had accountants in the service of royal courts, some of whom specialized in the cost determination (Perren, 1944). In ancient Greek and Roman Empires primitive forms of cost keeping were held. The main purpose of these records was to create a basis for taxes. This work was always carried by salaried court officials (Perren, 1944).

Growth of commercial activities at the beginning of the 11th century triggered growth of bookkeeping practices as well.

However, the development of cost and management accounting began in the middle age. As the businesses grew, accounts were used in a very simple way for product cost cords. In his book „Evolution of Cost Accounting” Garner (Garner, 1954), explains that some of early users of industrial accounts, include „Del Bene firm” and „Datini of Prato”. Both companies were Italian wool processing manufactures that operated in the 13th century who used simple one entry records. There were a few types of books in use, which allowed for the recording of every transaction of wool purchased, labor expenses to manufacture a certain amount of specific quality of woolen cloth and cost of dyers. These records were summarized at specified intervals and at the end of a period. Thus, manufactures could evaluate profit or loss for a given period.

The origins of accounting are generally attributed to the work of Luca Pacioli, an Italian Renaissance mathematician. He invented double entry bookkeeping and described it in his work "Summa de Arithmetica, Geometria, Proportione et Proportionalite" in 1494 (Weygandt, Kieso, & Kimmel, 2005).

In the sixteenth century a big part of cloth manufacturing business belonged to famous Medici families. To control their business, they kept simple records of all operations, and these records have come down to us. Instead of only one journal, very often there were several books of primary entry, such as a raw materials book, a cash book, a wage ledger, a book of dyers and other workers, a book of weavers, and a book of spinners. All those records are dated 1556-1558 and they are looked as a present double-entry bookkeeping records. From all these records, the Medici family received information for adequate control of the flow of raw materials, for pricing their products and control of money (Edler, 1937). De Roover (De Roover, 1955), who studied the Medici's cost records too, concluded "cost accounting, consequently, is nothing new, but there is no evidence that it was, at first, part of an integrated system fulfilling all the requirements of double entry".

A few references can be mentioned in the development of cost accounting in the 17th century. Garner describes an interesting cost calculation example of the Worshipful Company of Bakers that is dated to 1620. The London members of this company issued a cost statement to show that the selling price of baked bread did not cover the baking expenses (Garner, 1954). Another interesting example is given by Edwards and Newell (Edwards & Newell, 1991) about a copper production mine. They pointed out that 1615 accounting records of the copper mine near Keswick included remarkably detailed estimates of the cost of copper production which were then used for pricing and cost related decisions.

In the 18th century knowledge and technology experienced rapid growth which allowed record-keeping methodology and control of production processes expanded. Cost managing techniques are part of the developing process; they are studied, recorded and published. For example, the book "The Accountant, Or, the Method of Book-Keeping" by James Dodson was published in England in 1750 and described the cost evaluation of shoes making (Dodson, 2010). The author recommended that his

audience use different books for different types of transactions; such as a book for operational transactions, a book for cash sales, etc. Many other sources make it evident that cost managing techniques were used in the 18th century.

The nineteenth century was the century of the industrial revolution. Large business enterprises, mostly in cotton and textile, iron, steel and railroad industries, appeared in the UK and US. Special needs for operating those industrial giants led to important developments in cost and management accounting. Most of these methods and techniques are still in use today by many organizations. Managers of early nineteenth century „received information about the hourly cost of converting raw materials (cotton) into intermediate products (thread and yarn) and finished products (fabric), and the cost per pound of output by departments and for each worker” (Kaplan & Cooper, 1998, p. 28). Thus, owners and managers received information for measurements of processes efficiency which convert raw materials into finished goods, productivity among workers and productivity of individual workers over specific period of time. The collected data helped in decision making about process improvements and additional compensations for the most productive employees.

The development of cost and management accounting in the twentieth century can be divided into two parts, before and after 1950. Management accounting practices of the late nineteenth and early twentieth century’s came from engineers, who were working in process efficiency improvement and the overall profitability of the company was beyond its scope. Cost allocation systems were designed to assign costs to products and product lines. They designed procedures to measure the quantity of materials and the labor and machine hours required to manufacture individual products at significantly detailed levels. The collection and segmentation of cost data became very difficult and expensive. This cost information was reliable for cost evaluation; however, it was irrelevant and misleading for decision-making needs. All of these disadvantages led to the disappearance of these practices. The accountants of that period did not add much innovation to the cost accounting techniques. Evidently, accountancy was far behind the industrial development and needed adjustments in the new era. In 1919, the Institute of Cost and Works Accountants was established in UK and today it is known as the Chartered Institute of Management Accountants (CIMA) at London. At the same

time in US, the National Association of Cost Accountants, which is now known as the National Association of Accountants, was established in New York. Under the leadership of these two institutes, the profession and concepts of cost accounting developed significantly. There were no textbooks assigned to management accounting in this period of time. The aim of existing books was to verify the true cost of production. There was nothing in these books about decision making or how managers had to use received information about cost. The first book, where it was determined that different costs are employed for different purposes, was a management accounting textbook by Professor Vatter ("William J. Vatter notable contributor to Management Accounting," 1991). This book was published in 1950. During the 1950s, and 1960s academics in the cost accounting discipline conducted some research with the focus on relevant costs for decision-making. In this period, some of the first modern cost accounting textbooks with a managerial emphasis were published. According to Horngren (Horngren, 1989), "the emphasis on cost control and management decision making in new books shifted from 27% of the total chapters in 1945-50 to 54% in 1961-70". In the early 1980s, some academics and researchers began to question adequacy of current cost and management accounting techniques. One of the pioneers of new cost systems, Robert Kaplan, wrote several articles where he criticized traditional cost accounting systems. He claimed that those systems distorted cost information since they were outdated and did not respond to the requirements of the new production environment.

Since one of the purposes of this essay is the development of the modern cost system, the next chapter will describe Kaplan's four stage model of cost system evolution in depth.

2.3 Evolution of modern cost systems

Since the end of the 1970s global competition and technological innovations have triggered changes in business directions and methods. This new environment demands adaptation of cost and performance information to enhance the needs of managers and entrepreneurs. Cost accounting systems can be important source of information for managers.

Managers need cost systems that will provide them with three main "functions:

1. Valuation of inventory and measurement of the cost of goods sold for financial reporting.
2. Estimation of the costs of activities, products, services, and customers.
3. Providing economic feedback to managers and operators about process efficiency”(Kaplan & Cooper, 1998, p. 2).

Properly implemented cost systems can provide the best information at the best time to affect future cost. They can satisfy the external needs of investors, creditors, regulators and tax authorities and internal needs of the organization. In theory, cost accounting helps managers make decisions to fulfill an organization’s goals. In his book “Cost and Effect”, Kaplan states that managers can develop adequate cost systems through four stages(Kaplan & Cooper, 1998). The characteristics of these stages are shown in the Table 1.

Table 1. Four-Stage Model of Cost Development (Hackman, 2001).

Aspects of Cost System	Stage 1: Poor Data Quality, Broken	Stage 2: Focus on External Financial Reporting	Stage 3: Specialized Innovation: Managerial Relevance	Stage 4: Integrated Cost Systems
Data Quality	Data Errors Math Errors Large Variances Writedowns Post-closing adjustments	No surprises Fast monthly closings Meets External Audit standarts	Shared databases Stand-alone Systems Informal linkages Reporting frequency varies by systems	Fully linked databases and systems
External (Financial) Reporting	Inadequate	Tailored to financial reporting needs	Keep Stage 2 system	Expanded ABC system: Supports financial reporting as well as product cost management.
Product Costs	Inadequate	Inaccurate product cost Hidden cost and profit	Develop ABC system	
Operational Control	Inadequate	Limited feedback Delayed Feedback	Develop operational performance measurement system	Operational and strategic performance measurement control system

The next subchapters' will describe the characteristics of each stage at a more detailed level.

2.3.1 Cost systems of Stage I and II

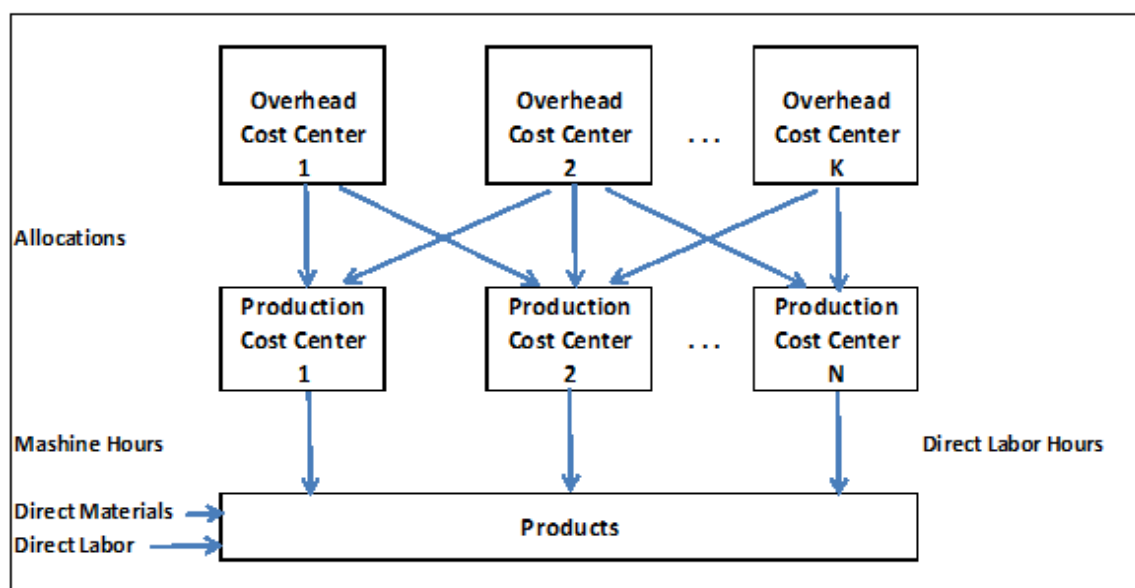
Stage I systems are inadequate even for purposes of financial reporting (Kaplan & Cooper, 1998). These systems were installed decades ago and there have been too many undocumented changes and updates made to them that no one fully understands their mechanism or logic. Stage I systems often exist in newly merged companies that have not yet had time for proper changes. They have poor internal transaction records and lack internal control. Some of these systems even have incorrect algorithms for cost allocation. There is no distinction made between fixed and variable costs, nor between actual and standard costs. The total actual cost of a cost center is divided by the output produced by this cost center over specified period – actual cost driver rate. Then, this actual cost driver rate is used for cost allocation to direct cost centers or to products. In addition to the previously mentioned problems, Stage I systems require a lot of time and extensive recourses to consolidate different reporting units within the company for each accounting period closure. After the closure, unexpected variances occur because physical inventories are written down and post closing adjustments are needed after internal and external audits. This stage has general lack of integrity and audit ability of the data.

Stage II is commonly known as “standard cost and flexible budgeting systems” (Kaplan & Cooper, 1998) and is employed by a lot of the companies. Stage II cost systems are based on the next topics: 1) defined cost centers, 2) made clear distinction between fixed and variable cost at every individual cost center and, 3) appropriate cost drivers are associated with each type of cost center. This system allocates overhead costs first to production cost centers and then to products. Picture 1 shows the structure of a traditional cost system.

As a result these cost systems enable managers to monitor and control the efficiency of responsible centers, to avoid the averaging of various cost behavior within the cost center. The system clearly separates fixed and variable costs which make possible short-term cost control and permits flexible budgets to be prepared for each period so the actual expenses for a given period can be compared to a budget level. This stage is

good for evaluating inventory and preparing periodical financial reports, which are to meet financial reporting requirements.

However, these systems have few limitations that decrease their value for modern companies. First, they do not report accurately on products and customers costing. Standard systems rely on a few cost drivers for assigning indirect costs to cost centers: direct labor hours, machine time, and material quantities. As a result, overhead cost allocated to a simple in production product is often overestimated, whereas, overhead for a complex product is mostly underestimated.



Picture 1. Allocation overheads in standard cost system (Kaplan & Cooper, 1998).

Large variety of costs do not capture or trace accurately by standard cost system. Costs triggered by designing, producing, marketing, delivering, selling and servicing are not allocated to individual product or customer, because these costs are not part of the cost-of-goods-sold calculation. Cost allocated to cost centers and not to activities and process. The second limitation of standard costing systems is the failure to provide managers and frontline employees with timely feedback. These systems rely heavily on financial results, where reports are generated at the end of the reporting period. Generally, cost centers managers can receive feedback on monthly basis and as a historical data. Furthermore, standard systems designed for companies, where employees have assigned micro tasks and only an engineer or manager has an authority to change or adjust a process. In the modern, rapidly changing environment, frontline

employees are empowered to make decisions that can improve quality, reduce cycle time, lower cost satisfy customer's needs and in the best way possible. Empowered employees need to receive timely and accurate feedback on their improvement and, without this condition, empowerment is impossible. Thus, Stage II standard systems have many limitations of improvement of ongoing, real-time processes.

Traditional standard cost and flexible budgeting systems worked well for companies operating in the stable environment with a mature products and stable customer relationship. However, they are inadequate for managers and employees in today's competitive environment where many of new products are introduced, new processes are implemented and new customers need to be attracted.

2.3.2 Stage III: Activity-based costing

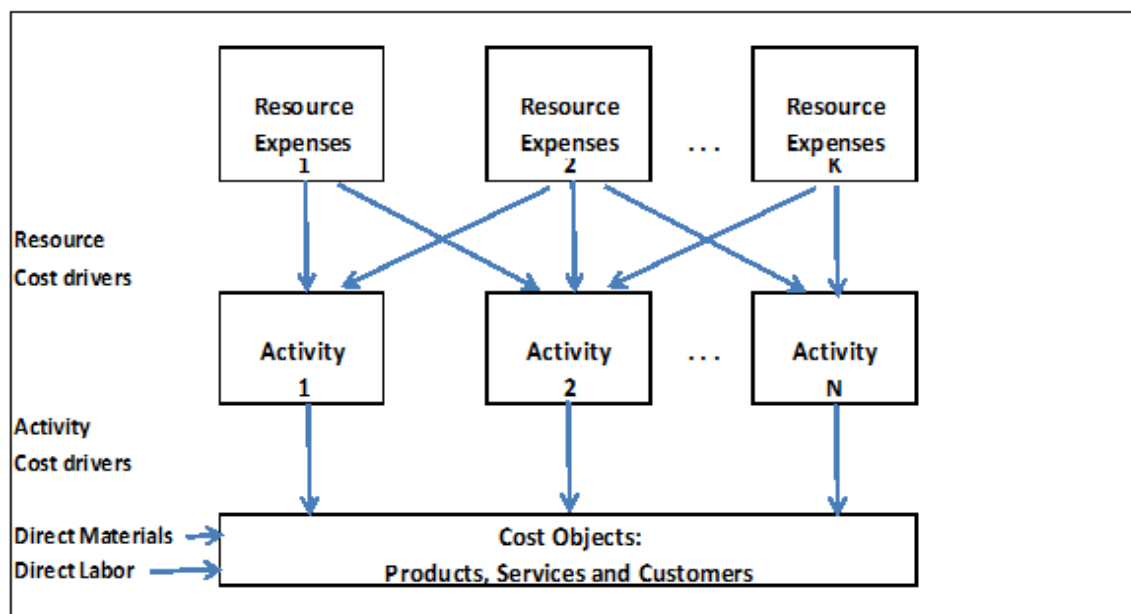
As explained in the previous chapter, Stage II standard cost and flexible budget systems succeed in cost control of responsible cost centers, but failed to provide relevant information about operational improvements and cost of organizational processes, products and customers. Therefore, Stage II standard cost systems must be upgraded so they can provide managers and frontline employees with relevant and timely information.

In the 1980s, new costing philosophy emerged when companies started to develop Stage III for financial reporting, cost management and performance management. The major component of Stage III cost systems is innovation of activity-based-costing (ABC). The main distinction between traditional cost systems and ABC is that in ABC's focus is shifted from how to allocate cost to why the organization is spending money in the first place (Kaplan & Cooper, 1998). Activity-based cost systems trace resources expenses to activities, and then use activity cost drivers to trace activity costs to cost objects.

Picture 2 shows the structure of the ABC system. Since the cost drivers are assigned costs to activities, they occur on several levels or "hierarchy of activities" as Cooper and Kaplan call it (Cooper & Kaplan, 1991):

- Unit-level activities – they have to be performed for every unit of product or service produced. The examples of unit-level activities are drilling holes or machining a surface.

- Batch-level activities are the activities that have to be performed for each batch or setup of work performed. Examples of these activities are setups of machines for new products, purchasing materials.
- Product sustaining activities are performed to enable the production of individual products (or service) occur. Examples of these activities are maintaining and updating product specification, technical support provided to individual products and services.
- Facility sustaining activities – they are related to the facility’s manufacturing process. Examples of these activities are plant management, building and grounds, heating and lighting. According to Cooper and Kaplan (Cooper & Kaplan, 1991): “In ABC, facility-level expenses are kept at the plant level and not allocated to products. Facility-sustaining expenses become part of another slice, such as a geographical, where the company is managing a number of facilities in an area.”



Picture 2. Structure of activity-based cost systems (Kaplan & Cooper, 1998).

ABC systems can be developed through four steps.

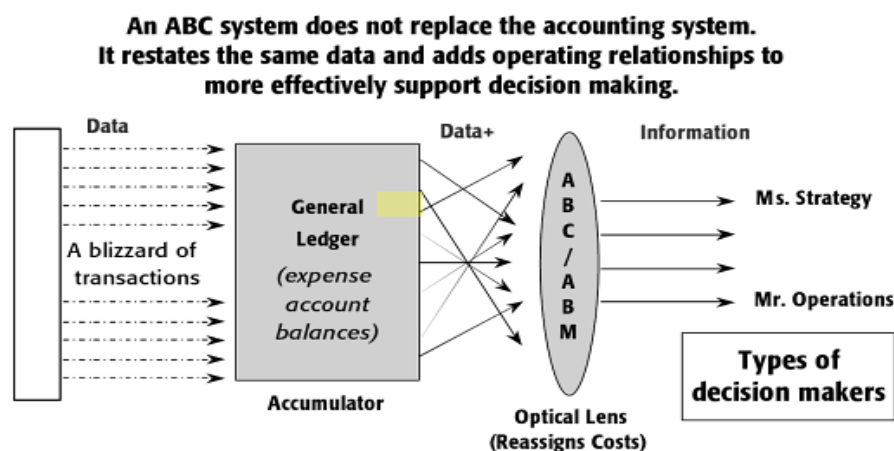
The first step in developing an activity-based cost system is to identify activities being performed by its indirect and support resources. Number of activities varies among different organizations. Some companies identify activities at a very micro level, but most of companies identify activity dictionary with 10 to 30 activities. The different number of activities is used for different purposes – estimation of product and customer costs or process improvement.

The second step is to map recourse expenses to activities, using recourse cost drivers. A range of cost drivers can be used to assign costs to activities: setup hours, number of setups, material handling hours, ordering hours, number of times ordered, maintaining hours, and so on. This step uses the expense information from an organization's financial system. General ledger categorizes expenses by spending code, for example, salaries, office supply, travel, telecommunication, maintenance and depreciation. The recourse cost drivers collect them from this system and trace to activities being performed by the organizational recourses. At the end of this step organizations learn how much they are spending on activities. At this stage organizations received the practical information that can be used for improvement of activities. In next two steps, activity costs are driven down to cost objects such as products, services and customers.

Step three is very important because activities costs should be linked to product, service and customers. Thus, the third step is the step that identifies products, services and customers and this helps to answer questions about profitability of activities and processes.

Lastly, the fourth step creates a linkage between activities and cost objects. An activity cost driver is a measure of the output of an activity.

When an ABC system is implemented and working it provides managers with a more accurate economic map of organizational spending and activities. As demonstrated in Picture 3, ABC is a linkage between financial, operational and strategy management.



Picture 3. Linkage between financial operating and strategy management (Cokins, 1996).

Cokins (Cokins, 1996) names ABC systems as an “optical lens” that serves as a translator of data from general ledger to a more useful and flexible format for optimization and decisions making. Thus, ABC analysis highlights where a manager’s actions are likely to have the most impact on profits. “By revealing the links between activities and resource consumption, ABC points directly to profit opportunities” (Cooper & Kaplan, 1991).

2.3.3 Stage IV: Integrated Cost management and Financial Reporting

Stage IV systems are the vision for the future. Currently, many companies in parallel with ABC systems are investing in enterprise-wide systems (EWS). These new systems will have structured centralized common data and will be accessible from anywhere in the world. They will provide managers with an integrated set of operating, financial and management system and supporting both external and internal reporting. Kaplan’s concludes with his vision of Stage IV systems as “cost and performance measurement systems will provide the timely, valid information organizations need to survive and prosper in today’s environment, an environment characterized by global markets and competitors, rapid technological advances, customer focus, and knowledge-based competition” (Kaplan & Cooper, 1998, p. 322).

3 Cost allocation methods in use by Icelandic companies

3.1 Overview of companies in scope of research

As a cost management innovation, activity-based cost systems and methods received considerable attention from academics and practicing cost accountants. There are thousands of publications connected to this topic in the Journal of Management Accounting Research and Accounting Review. That is why the purpose of this research is to collect and analyze information about cost systems and methods that are in use by companies operating in Iceland.

Method of research used was collecting information by interviewing persons who are involved in cost management and decision making. All of the interviewees have received a preliminary questionnaire by e-mail and been asked for an interview. They are Jon Thor Eythorsson, owner of Reikningshald & skattskil ehf, Gunnar Mar Peterssen, CFO of Nyherji, Cost Controller of DHL Express in Iceland and CFO of Emmessis Inga Gudrun Gestsdottir.

According to Commission Recommendation [2003/361/EC](#) of 6 May 2003, companies are divided into three size categories: micro, small and medium-sized enterprises. Companies are defined according to their staff headcount and turnover or balance sheet total ("Commission Recommendation (2003/361/EC) of 6 May 2003 concerning the definition of micro, small and medium-sized enterprises," 2003). Companies with the number of employees less than 250 person and annual turnover that do not exceed EUR 50 million are defined as a medium-sized. Companies that employ less than 50 person and annual turnover do not exceed EUR 10 million are defined as small. If the number of employees are less than 10 person and annual turnover do not exceed EUR 2 million, such companies are defined as microenterprises. Companies which employ more than 250 persons are defined as large-sized companies in this paper.

For the purpose of this research companies are divided into three groups: large-sized companies, medium-sized companies and small, which consist of small and micro enterprises.

Nyherji is an Icelandic company that provides service in the field of information technology, supply of hardware and software, office equipment and technical service. Nyherji represents such brands as IBM, Lenovo, Canon, Lexmark, Sony, Heidelberg, SAP,

Avaya, Cisco Systems and APC in Iceland. The 270 employees are working for Nyherji in Iceland and an annual turnover were over of 87 million EUR in 2012. Nyherji has been classified as a large-sized company.

DHL Express in Iceland is part of one of the biggest global logistics company. DHL Express in Iceland (DHL) employed 54 people and an annual turnover were 10 million EUR in 2012. Thus, DHL is classifying as a medium-sized company in this work.

Emmessis is one of two Icelandic ice-cream production companies. Thirty employees are working at Emmessis, and annual turnover in 2012 were 4, 5 million EUR. Therefore this company is classified as a medium-sized company.

There are ninety companies that J.T. Eythorsson's company provides with bookkeeping, auditing and consultancy services. Fifteen of them are non-profit organizations, such as churches and Public organizations. They are classified as medium-sized companies. Fifty are private limited companies and twenty five individuals companies. John classified seven of the limited companies as medium-sized companies with an annual turnover up to 10 million EUR, and forty three as a small size companies. All individual's companies are classified as small. Thus, totally information was collected from ninety three companies.

3.2 Results of the questionnaire and interviews

First three questions were the same for all interviewees.

First question was: how will you classify the company as a production, service or other?

The answers separated companies into the following groups:

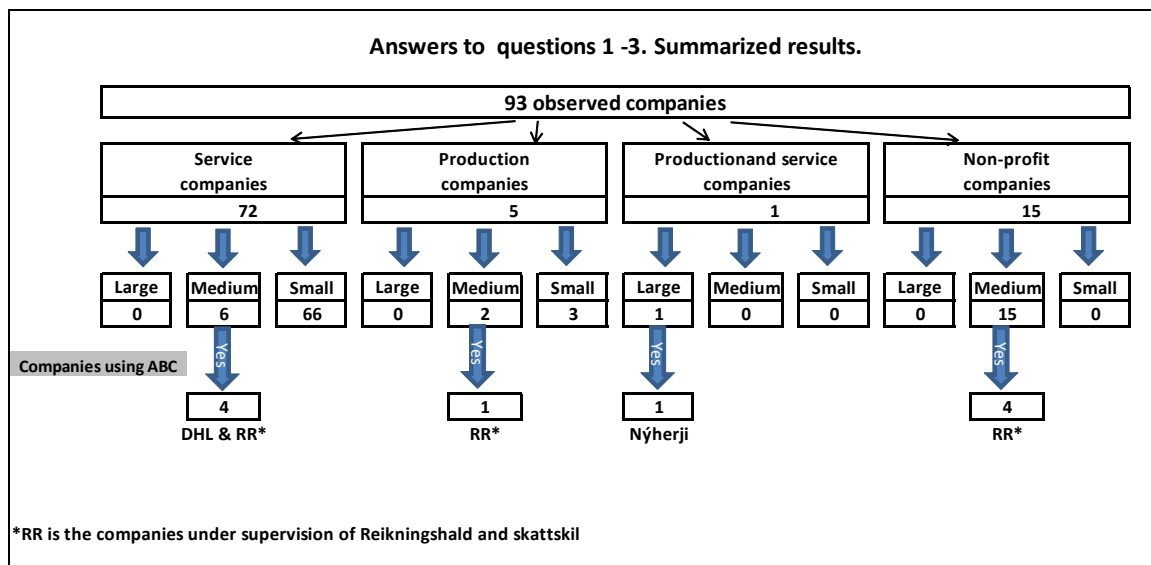
- Non-profit organizations – fifteen companies, medium-sized.
- Service organizations – seventy two companies, no one of them are classified as a large-sized company, six of them are medium, and sixty six are classified as small-sized companies.
- Production organization – five companies, two of them is medium-sized and three are small-sized companies.
- Production and service organization – one large-sized company.

Next question was: what financial system is in use for financial records and financial reporting?

Five different financial systems are in use: DK, Navision, SUN, Axapta and SAP. All companies are satisfied with these systems. The systems were characterized as a corresponding to modern technology, user friendly and meeting requirements of present accounting purposes and external reporting.

Third question was: does your company use ABC concept for cost accounting?

There are ten companies who answered positively to this question. One of them belongs to the group that is classified as “large-sized companies” and nine are classified as a “medium-sized companies”. One of these companies is a production company; four – service companies; one is the production and service company, and four of them are non-profit companies. None of the small companies interviewed were using ABC concept or ABC systems. The answers to this question are summarized on the Picture 4.



Picture 4. Summarized answers to questions 1- 3 (image is designed by the author).

After the interview, additional information about ABC systems was received from the participants. Seven of these companies use personally designed activity-based systems based on software such as Oracle and SAP, which are different from the financial system. These systems receive specially adjusted data from the general ledger of the financial system and non-financial data, which collected and recorded directly to ABC system. ABC system prepares reports using the data that are easily understandable by financial persons as well as by operating managers and frontline employees. One

company in this research uses SAP software for financial records and reporting, as well as for tracing of expenses and cost management.

Two medium-sized service companies use an extended version of the Navision financial system. This version has additional functionality such as “source” which makes it possible to record expenses for indirect and supporting activities straight to a project, products or customers.

During the interview with J.T. Eythorsson, question about cost controlling in small limited companies came up. These companies could not afford to purchase and install specially designed ABC systems. Hence, the only information they receive is the financial information from the general ledger and financial reports. Companies’ budgets are prepared on the annual bases. Variances that occur when actual numbers are compared to plan numbers could be significant and expected profit could become a loss. These companies are often looking for competence advice that could help find the roots of any unexpected results. Annual reports do not provide the owner with guidance or an explanation of the financial result in most cases.

Fourth question was addressed only to companies that are using ABC systems: for what purposes does your company use the ABC systems?

All companies are using their activity-based cost systems for permanent real-time cost monitoring, forecasting, budgeting, and definition of price and product mix and process improvements.

An interesting comment was received from J.T. Eythorsson about non-profit organizations. Overhead and support expenses of these organizations are often under strong pressure from the public or the members of the organization. That is why it is vital for them to understand the cause of the expenses and have detailed information for reporting purposes and possible improvement. ABC system provides them with the answers to both of these questions.

CFO of Nyherji G.M. Petersen, explained in the interview that for a large company that is working in the market for new technology and developing of new software, cost controlling is extremely crucial. There are several different projects usually under development at the same time and every project at the end should develop a profitable output. Nyherji uses project accounting to assign expenses to product. Every project is

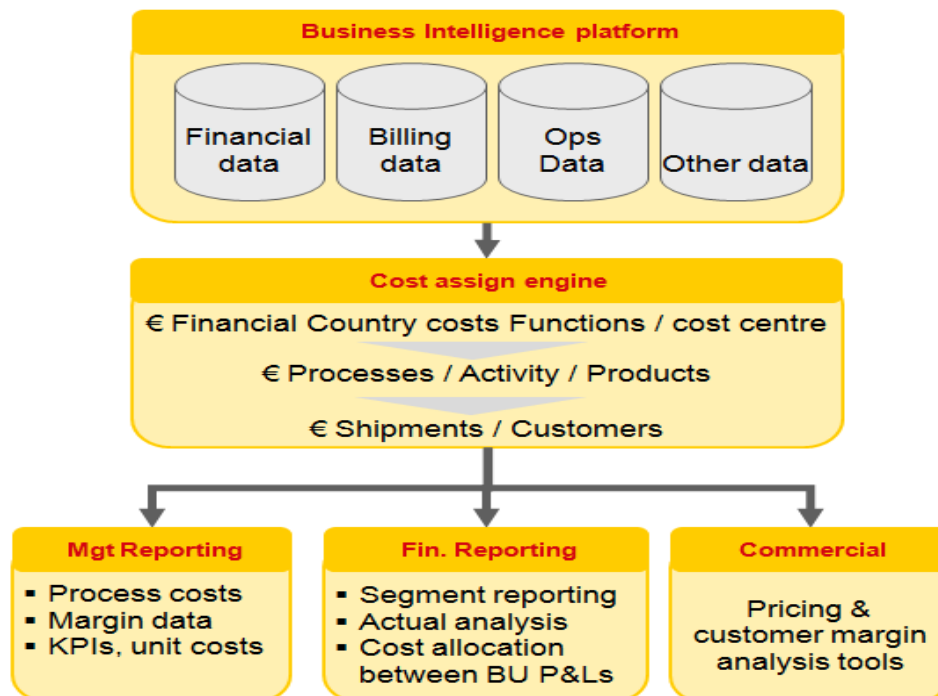
segregated to a highly detailed dictionary of activities. All expenses are assigned directly to the correct activity as soon as they occur. Market and demand for new technology and software products is consistently changing with products having a short life span as newer ones enter the market. Hence, research and development expenses are recorded to activities immediately as cost. These expenses are never capitalized. Records of activities are filled on a daily basis. Cost drivers “activities to a product” are hours that have been used for a specified activity. Nyherji use SAP software for both financial and operating records. The system is modified in the way that it captures financial and non-financial records and returns requested data to managers that is adapted to their needs. For example, a project manager is able to follow the development of a product on the daily basis and the system highlights activities that have significant variances from forecast for analysis. From the other side, CFO can receive instant updates on the financial status of the project, and make comments on the costs of the project. Thus, the cost controlling system of Nyherij has absolute control over costs of products, processes and customers. It helps to understand the developing processes, gives the ability to recognize and act immediately to any deviations from a planned process, and identifies opportunities for improvements.

DHL Express in Iceland is part of the biggest global logistics company and has access to new technology, methodologies and resources that such an organization can provide. There are two systems in use: one is for local financial records and external reporting whereas in the second system local data is presented as part of a global company.

DHL's cost controlling system was implemented decade ago and has been consistently adjusted to present requirements of the business. DHL's cost controlling system was built according to ABC theory of hierarchy. All direct costs are assigned to unit-level activities.

Reports that can be retrieved from the system will show direct cost per unit such as shipment, weight and piece. On the batch-activities level expenses for indirect activities such as sales, invoicing, service, purchasing are added. Product-sustaining activities consist of expenses for use in DHL's global network such as aviation and hub and gates expenses. DHL uses extremely detailed activities dictionary and specified cost drivers for every level of hierarchy. When all kinds of costs are assigned to corresponding

products on all levels, reports can be generated for managers of different levels and authorized employees for up-to-date analysis and feedback. DHL's cost assigning process is shown in Picture 5.



Picture 5. Cost allocation system of DHL Express in Iceland (Internal DHL's resource).

Forecasts are prepared on a weekly basis, and actual and planned data are analyzed at the same time. Therefore, ABC system provides DHL with accurate cost information that leads to more streamlined and effective cost management decisions that enhance the ability for revenue improvement and for improved pricing and product mix management. All these benefits from ABC system allows the company to keep a leading place in the business.

During the interview with the CFO of Emmessis, I.G. Gestsdottir, some surprising information came to light. Emmessis is a medium-sized production company and they do not use adequate cost allocation systems. For many years the company experiences losses in the business. The annual revenue was twice less than revenues of a competing company with similar size and capacity. The company cannot define costs of separate processes, thus making impossible to identify profitable and non profitable products, processes and customers. Fortunately, the new management team of the organization

is staying open-minded to changes and implementations of modern techniques and methods.

3.3 Findings and recommendations

In this work, information concerning cost accounting and management in Icelandic companies was collected and analyzed. The ninety three companies were observed on the subject of using different stages of cost allocation systems. The number of analyzed companies is too small to estimate the usage of ABC by Icelandic businesses. That is why this work is an observation of the collected data.

One of the findings of this research is that only 11% of the observed companies use activity-based cost systems and methodology. 40% of these 11% are non-profit companies, 40% are service companies, 10% are production companies and the remaining 10% are production and service companies.

This research also shows that size of the company has significant impact on positive use of management accounting based on ABC.

According to R. Kaplan and R. Cooper, definition of the stages of the cost accounting systems, most of the companies in scope of this work are at the Stage II, eight companies are using ABC systems which bring them to Stage III, and one large-sized company and one medium-sized company are using integrated cost systems of Stage IV.

Summarized results for finding are shown in the Table 2.

Emphasis was put on companies that are using activity-based cost systems. Interviews with CFO's of companies that are using ABC systems indicated that these companies significantly benefited by implementing and using up-to-date technology and methodologies. They receive on time necessary information which provides the organizations with the competitive advantage. These companies are undeniably the leaders in their market segment with profitable products and satisfied customers.

Another finding from this research could be a future business opportunity. As research shows, small companies are searching for help in the development of their business. In a rapidly changing environment small businesses have to recognize changes in the market and adjust to these changes quickly. More accurate products cost information, identification of cost drivers, and better recognition of non-profitable

activities have the potential to advantageous for small businesses. Implementing the ABC concept can also be much easier for small companies because their infrastructure is flexible and decision making does not require a long approval list. The company's accountant and operation managers can take the opportunity to identify the cost activities, cost drivers and how to apply such a data to a product.

Table 2. Summarized results of the research (image is designed by the author).

Summarized results of research				
	Nýherji	DHL	RR*	Emmessis
Financial system in use	SAP	SUN/Navision	DK/Navision	Axapta
Usage of ABC concept	Yes	Yes	Yes(8) No(82)	No
Size of company	Large	Medium	Medium (8 with ABC concept) Small (82)	Medium
ABC system in use	SAP	SAP	Oracle(6) Navision(2)	
Dictionary of activities	Very detailed	Very detailed	Very detailed(6) Detailed(2)	
Stage of cost allocation system	Stage IV Integrated system	Stage IV Integrated system	Stage III (8) Stage II (82) traditional cost systems	Stage II traditional cost systems
*RR is the companies under supervision of Reikningshald and skattskil				

Research also shows that the implementation of ABC concepts can be essential for production companies such as Emmessis. It helps the company identify profitable and non-profitable processes, correctly calculate price of the products and provide optimal flexibility and profitability to products mixes. Recognition of problems and improving the decision making process on all levels can bring this company back to profitability and probably to competitiveness.

4 Conclusion

Cost and management accounting has involved throughout the years in every types of business from the global giants to micro enterprises. Academically supported cost and management accounting is an integral part of a profitable business. That is why this work dedicated to cost accounting and management accounting, while also explaining the historical development of cost and management accounting with references to academics as well as practicing accountants.

The modern stages of the development of cost systems are described in further details. Analysis of cost systems show that systems of Stage I systems are out of date and inadequate for all purposes and should be replaced with the modern systems. Stage II systems satisfy financial and external reports requirements, but have serious limitations for managerial purposes and process improvements. Stage III systems are known as activity-based cost systems and are a beneficial addition to Stage II. ABC methods provide managers with measurements of costs and profitability of activities, processes, products, and customer. Usage of Stage III cost systems covers the limitations of Stage II systems. Also, Stage IV integrated cost systems are considered to be the vision for the future development of cost and management accounting.

This paper presents research that was conducted among Icelandic companies on the subject of implementation of ABC concepts and systems. Information from ninety three various sized companies was collected and analyzed.

The findings demonstrated that companies that already implemented the ABC system greatly benefited from this innovation.

In addition, possible business opportunities for accountants and engineers were shown in designing ABC systems that can be easily applied without high expenses to small businesses.

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