Research Journal of Finance and Accounting
ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online)
Vol.9, No.14, 2018

Effectiveness of Cost Management Systems in Turkish Manufacturing Companies with a Special Emphasis on Use of Activity Based Costing

Arif Ayluçtarhan

Istanbul University, School of Business, Avcilar Kampusu, Isletme Fakultesi, Avcilar /Istanbul, email: Tel: +90-506-744-3329 E-mail: arif.ayluctarhan@vdk.gov.tr

Abstract

Accurate and analytical cost information is vital for operational and strategic decisions in an organization. Overhead costs are one of main components of the product cost along with direct material and direct labour costs. Since overheads are allocated by means of simplistic cost drivers, e.g., labour hours, process time, traditional cost methods were criticised by activity based cost supporters, claiming traditional methods were distorting the cost information. ABC was designed and developed to provide more accurate and analytical cost information by means of appropriate cost drivers to allocate overhead costs fairly.

The purpose of this study to examine and understand the adoption and effectiveness of cost systems especially ABC (Activity Based Costing) in publicly listed large manufacturing companies in Turkey.

The results of the study indicates that 35 Turkey's manufacturing companies out of 193 publicly listed manufacturing companies, calculates the production cost mainly by traditional cost systems. 15 of responders replied that they have adopted ABC. On the other hand, 20 of the participants stated that they were still using traditional cost systems. Even though ABC users assessed their cost systems more successful for a few applications, for the rest of applications traditional method users assessed their system as more successful against ABC users.

Key Words: Activity Based Costing, Overhead Costs, Activity Based Management, Corporate Strategy

1. Introduction

Activity based costing has been preserving its novelty as a costing method which provides more accurate cost information for a long time. Over the last decades the business environment has become more and more competitive, which has led to an increasing level of enforcement for new flexible machine based production and more overhead costs and the need of authentic cost information.

In order to make appropriate decisions for both operational and strategic issues, managers need both analytical and accurate cost information. Mainly, total cost information includes production cost and period costs, e.g., sales and marketing, distribution costs, administrative expenses, research and development costs (Davies and Boczko, 2005). Among components of total costs, production cost is a primary cost.

In the 1980s, Activity Based Costing (ABC) method was introduced to provide more accurate production cost rather than using the traditional cost system. However, despite providing more accurate cost information and introducing a new version of ABC (time driven activity based costing), ABC is not used by a significant number of manufacturing companies. Latest research shows that the adoption rate is 52 % in USA (Kiani and Sangeladji, 2003), 23 % in UK (Tayles and Drury, 2001), 33.3 % in USA (Rahmouni, 2008; cited in Elhamma and Fei, 2013), and research from Turkey provides data in manufacturing industry that adoption rate is 66.6 % compared to the other cost management systems (Karcıoğlu and Öztürk, 2012).

This study aims to argue about the effectiveness of cost information by analysing uses of cost methods in the decision making processes. In addition, the study provides essential arguments around the accuracy of cost systems which will affect their effectiveness.

The result of the usage of ABC gives the company the key points of accurate cost information. The aim of this paper is to examine, regardless of the fact that ABC may have been adopted is to find out whether organisations use cost information effectively or not.

2. The Cost Classification of Accounting Theory and From Traditional Cost Method to ABC Cost Method

In the context of accounting classification, cost can be classified into two major classes in terms of

manufacturing industry: manufacturing and non-manufacturing costs. Manufacturing costs can be classified as direct material costs, direct labour costs and manufacturing overhead costs. The term "direct" represents that these costs can be directly associated with production of the product. Manufacturing overhead costs include all other production costs except direct costs. These costs are components of manufacturing cost and their function is that they transform raw materials to finished goods. When the products are sold, the manufacturing costs are part of the total cost of sale and impacts upon the gross profit reported on income statement. On the other hand, non-manufacturing costs are the costs that include administrative and marketing costs. These costs are perceived as periodical costs rather than production costs. In other words, they don't necessarily associate with production costs and are shown separately on the income statement to reach net income (Glautier and Underdown, 2001).

Overheads are residual costs in the production cost and they are not directly associated with products individually. Therefore, it is required to find a method of fair allocation so as to generate comprehensive unit product cost information. In the organisation, the unit cost information is necessary for many reasons, e.g., planning and decision-making (Innes and Mitchell, 1993).

Traditional cost accounting systems allocate overheads by using simplistic measurements such as direct labour hours, machine hours or processing time (Cooper, 1998). In the last quarter of the twentieth century, overhead costs became much more significant in the total cost of production. Miller and Vollmann (1985) reported that manufacturing companies especially those in the electronics and mechanical equipment (machinery) industries are facing high manufacturing overhead costs. Their data suggests that in US industry, overhead costs compose 35% of total costs. For Japanese products this rate is 26%. These rates are particularly high in the electronics and machinery industries, which result in 70 to 75% of value added in USA and 50 to 60% of value added in Japan. By the process of automation within manufacturing, labour costs have fallen and overhead costs have increased in order to maintain and run the automated equipment. High- volume standardized products by highly automated processes have caused notably greater overhead costs rate in total costs.

The problem with the traditional approach is that the drivers behind overhead costs are not always labour or machine hours. Many managers who use traditional cost systems are aware of distortion in product costs and they use some informal ways to compensate that (Cooper and Kaplan, 1988).

Based on previous studies, the main criticisms of traditional cost methods are articulated below (Drury and Tayles, 1994):

- Due to over-simplistic methods (i.e. volume drivers such as direct labour hours) in computing, product costs are distorted.
- Direct labour-based overhead allocation is used in automated and machine-based manufacturing companies, which may lead a huge distortion in cost.
- With the impact of external financial reporting, product costing practices follow financial accounting mentality. However, product costing has a wider function than inventory valuation in terms of decision making.

Activity based costing method has been developed as an alternative approach to the traditional approach. According to Hilton (2005), ''ABC is a two-stage procedure used to assign overhead costs to products and services produced. In the first stage, significant activities are identified, and overhead costs are assigned to activity cost pools in accordance with the way the resources are consumed by the activities. In the second stage, the overhead costs are allocated from each activity cost pool to each product line in proportion to the amount of the cost driver consumed by the product line''.

Activity based costing allocates overheads through activities. The philosophy behind ABC is mainly that activities consume resources and products consume activities. Innes and Mitchell (1993) associated this activity basis with Miller and Vollman's (1985) "hidden factory". Miller and Vollman (1985) defined these activities as transactions which any organisation implements. While generally direct labour and direct materials are considered as main parts of manufacturing, real driving forces come from transactions which also drive overhead costs.

Innes and Mitchell (1993) have explained ABC stages as based on notion of activities. Accordingly, ABC includes two main stages. The first stage is pooling of the overhead costs as activity costs. These activities may not match formal departmental boundaries as they represent real happenings in a company. The second stage is allocating these costs to production output.

In order to realize the first stage, activities are defined; activities are all the actions which are performed to convert inputs to outputs. Defining these activities is an attempt for analysing what is going on within the organisation. Therefore, this stage will be achieved by consulting with staff, especially line workers within the

organisation. For instance, some activities can be defined as set up, maintenance, purchasing, production control. Purchasing activity can also be subdivided as sub activities as supplier vetting, preparing purchase agreements, supplier liaison, order processing, order expediting. After pooling all overhead costs in activities by means of resource drivers which assign resources to activities, these activity costs will be assigned to products (also services, any cost objects) by cost drivers. Some examples of cost drivers are given below (Innes and Mitchell, 1993).

Table 1- Activities and cost drivers

Activities	Costs Drivers
Material Procurement	No. of Purchase Orders
Material Handling	No. of Movements
Quality Control	No. of Inspections
Engineering Services	No. of Change Orders
Maintenance	No. of Breakdowns
Line Set-up	No. of set-ups

Kaplan and Atkinson (1998) classify activities in three stages. Accordingly, unit level-activities are activities which are performed for every unit. For these activities, traditional drivers can be utilized (e.g. labour hours, machine hours). There are batch-level activities in the second stage of this activity hierarchy. Since these activities are not directly related to units of products, they are instead related to batch of products (e.g. setup machines, purchase orders); these are considered as fixed costs by the traditional approach. According to the ABC approach, these activities are also assigned to products via activity drivers. The third stage is product sustaining and activities-customer sustaining activities. These activities can be exemplified as maintaining and updating product specifications, market research and support. These activities are allocated to the products as well.

3. Activity Based Management

Activity based management (ABM) draws information from activities and cost drivers which can create further management implications. Hilton (2005) defined activity based management as: ‘‘Using an activity based costing system to improve the operations of organisation”. ABM is going beyond costing technique per se to focus on activity analysis and cost drivers. While ABC generates more accurate cost information, ABM utilizes activity analysis to contribute understanding towards the objectives of an organisation and implementing all processes in the organisation to reach these objectives (Gosselin, 2007).

Turney (1992) states that ABM obtains data from ABC, while activity based costing follows the resources-activities-cost objects path, activity based management focuses on cost drivers and activities to reach performance measures. This structure provides useful insights for decision-making within an organisation. From a customer’s perspective, ABM analyses the cost of servicing each customer or customer segment. Beyond simple cost information, ABM puts revenue in an equation to reach ABM product contribution (Gupta and Galloway, 2003).

4. Activity based Cost Information in Support of decision making

In an organization both at operational and strategic levels, plenty of decisions should be made in order to achieve operational outcomes and contribute to the success of strategic goals. In order to provide consistency in decisions, an overarching corporate strategy is required. Strategy can be defined as how the main objectives of the company can be accomplished. Corporate strategy brings the organisation from its current position to reach their main objectives. In addition, the main objective is obtained by deploying a corporate strategy and corporate strategy requires an appropriate operations strategy (Russell and Taylor, 2011).

Operations strategy is viewed as implementation of the corporate strategy. In other words operations strategy utilises all efforts and resources in an organisation to realize business strategy (Brown et al., 2013). These operations also have a role of delivering and driving business strategy. Appropriate operational activities can

develop the organisation's capabilities such as better products, services, and faster deliveries, which gives a long-term competitive edge (Slack et al., 2001). These are all decisions which are made during operations to affect the overall organisation's goals by means of measuring operational outcomes such as quality, cost effectiveness, efficiency and productivity (Russell and Taylor, 2011).

Since its inception, activity based costing (ABC) has been presented and advocated as a superior method rather than a traditional methods of costing in terms of both strategic and operational decisions. Activity based costing is perceived to provide long-term accurate cost information in order to make strategic decisions. Johnson and Kaplan (1987) criticised traditional cost systems due to not producing long-term reliable cost information. They suggested that ABC provides qualified information to help management take strategic decisions.

ABC system provides a helpful basis for determining operational management decisions. Cooper (1998) claims that activity based costing is an instrument of corporate strategy as it is a formal accounting system. Any of the strategic decisions cannot be made effectively without accurate cost data.

Gupta and Galloway (2003) proposed an operations hexagon which shows how ABC contributes to integrating various operational decisions. This hexagon includes product planning and design, process design and improvement, inventory management, quality management and control, capacity planning, and workforce management. Since activity based costing is designed as a system which focuses on activities and processes and provides information on which activities consume what proportion of resources and which products utilise these activities, it provides highly efficient information based on these designations. This information can contribute to determine about more profitable products, more value added activities, new product design, supplier relationships, customer satisfaction and so forth. In the frame of activity based management, analysing activities pushes managers to make and consider decisions about frequency of activities by changing some factors such as product design, product mix, outsourcing or production. Analysing activities leads to monitoring and reengineering activities and defining cost drivers, which provide a useful insight in terms of decision making. ABC does not only provide some financial data but it also goes beyond that as it analyses processes to define where value- added and non- value added activities occur. Based on this knowledge, the operations hexagon has a broad applicability to the companies' operations. ABC/M (activity based costing/management) system draws on an inner activity based information to keep in balance operational components (Gupta and Galloway, 2003).

Based on this analysis, ABC might be considered as a basis for decision making. Although, this approach does not seem to provide all significant inputs for the operational decision making process (e.g. market price, competitors), however, it can contribute to understanding the connection between ABC/M and operational decisions. Moreover, it can be useful to investigate the components of this hexagon.

Product planning and design is one of the operational areas that ABC contributes to significantly. ABC provides accurate cost information by focusing on production processes. Overhead is a main concern in this analysis. Although, direct costs are mostly being considered as the only input by designers, indirect costs (overheads) have a significant role on product designing (Uusi-Rauva and Paranko, 1997 cited in Tornberg et al. 2002). At the design stage, ABC systems help designers by giving process based costs. Kaplan (1990) has commented that activity based cost system has an advantage of sending a specific message to product designers and engineers about developing manufacturing capacity. Moreover, since ABC provides more accurate information, it gives more relevant cost information to designers.

Inventory management efforts involve appropriate and less inventory investment endeavours. Player and Kramer (1995) conveyed a good implementation of activity-based costing system based on an automatic replenishment system that provided a significant amount of savings in terms of inventory investment. Kelle and Akbulut (2005) introduced ABC as the best tool in Enterprise Resource Planning (ERP) software products which is utilized for inventory storing cost and setup cost evaluation.

ABC can also play a very important role in quality management and control. Since it analyses activities and eliminates non-value activities, it has significant impact on projects in terms of prioritization and cost justification (Schneider, 1992). ABC also helps to calculate the cost of quality (Gupta and Galloway, 2003).

Capacity planning and investment management has a function which reduces unused capacity to save resources. ABM monitors unused capacity by focusing upon activities. Baxendale and Gupta (1998) reported that how a small custom screen-printing company utilised ABC to find out how much unused capacity it had by examining the unused parts of activities. Capacity planning is also important in terms of joint products and outsourcing decisions. Tsai and Lai (2007) suggested a new integer of programming which consisted of a joint products decision model that maximized a firm's profit by utilising ABC. They used the model which helps making optimal decisions in terms of further processing, capacity expansion or outsourcing.

Lastly, the activity based system is strongly related to workforce management as well. The ABC process involves significant effect on employees in a company. Since it provides a basis for analysing activities and related activities, they become more visible, which leads to more empowerment, accountability, and clear roles and responsibilities and performance measures (Turney, 1993).

5. Prior Research

In USA a large survey, which was conducted across 2,500 American firms in 1991, concluded that adoption rate was 23% (National Association of Accountants, 1991). Another survey conducted in USA showed that application rate was 27 % (IMA, 1993).

Moreover, some previous studies, which have been conducted in UK, showed that adoption rate was 10 % (Innes and Mitchell, 1991), 4% (Drury and Tayles, 1994), 20% (Innes and Mitchell, 1995), 18% (Innes and Mitchell, 2000) and one of the latest study showed 14% (Al-Sayed, 2011).

Latest research showed that adoption rate is 52 % in the USA (Kiani and Sangeladji, 2003), 33.3 % in USA (Rahmouni, 2008), 23 % in UK (Tayles and Drury, 2001), 14% in UK (Al-Sayed, 2011) In addition, research from Turkey provides data in manufacturing industry that adoption rate is 66.6 % compared to the other cost management systems (Karcıoğlu and Öztürk, 2012). It can be seen that the adoption of ABC is increasing (Elhamma and Fei, 2013).

Two of those above studies can be very helpful to draw a framework for this study. Innes and Mitchell (1995) and Innes et al. (2000) conducted two follow up surveys of activity based costing in the U.K.'s 1,000 largest companies. Main findings of these surveys are adoption rate of ABC, specific application of ABC and the view of participants on success and importance of ABC.

6. Research Method

The main objective of this research is to investigate the effectiveness of cost management system in publicly listed manufacturing companies of Turkey. Since ABC is suggested and subjected in many studies as providing the most accurate information, this study has a special emphasis on use of activity based costing. In the previous parts, main concepts of cost issues and activity based costing have been reviewed. Following that, this study will engage in:

- Identifying cost system of participants,
- Investigating effectiveness of costing methods based on how successfully they use costing system for purposes of usage of costing methods,
- Assessing adoption of activity based costing.

A survey has been employed to collect data about general information of costing methods' implementation. Collected quantitative data analysed quantitatively by using descriptive and inferential statistics. Besides, a few causal relationships among the factors highlighted. Along with these primary data sources, some previous studies (e.g. Karcıoğlu and Öztürk, 2012; Innes and Mitchell, 1995) findings used as secondary data as comparators with this study's findings.

Participants of this survey are managers of accounting departments of publicly listed manufacturing companies in Turkey. By August 2014, there were 193 publicly listed manufacturing companies. Distribution in subcategories is as follow.

Table 2- Distribution of publicly listed manufacturing companies in Turkey

Subcategory	Number
Food, Beverage and Tobacco	30
Textile, Wearing Apparel and Leather	27
Wood Products Including Furniture	4
Paper and Paper Products, Printing and Publishing	17
Chemicals, Petroleum Rubber and Plastic Products	34
Non-metallic Mineral Products	29
Basic Metal Industries	17
Fabricated Metal Products, Machinery and Equipment	31
Other Manufacturing Industry	4
Total	**193**

This survey applied to publicly listed manufacturing companies' managers because these companies are perceived to have a more organised structure and procedures, and are more likely to have considered adopting modern managerial accounting methods. A previous research applied to the same population (i.e. Karcıoğlu and Öztürk, 2012). As a result, this study is a follow up study in regard to design of some questions in the survey. Consequently, this situation provided an opportunity to compare the findings within the two studies. The surveys strategy was to reach full population of the survey like the previous survey.

Since the population of the survey is composed by larger manufacturing companies in all Turkey, their headquarters are in different areas in Turkey. Therefore, due to time and travelling limitations, the survey was from long distances via internet. This resulted in 35 individuals of the all population responded the survey.

7. Survey Findings

The survey comprises of four parts. These four parts of survey responses are analysed in the following sections.

7. 1. Organisational Structure and Profile of Responders

In the survey, the first set of questions includes queries about current activities of the organisations and some information about participants.

Industrial distribution of the participated organisation varies. Total set of participants are extended across all main sectors. The distribution is listed in the Table no. 3.

Table 3 - Sector distribution of Surveys Participants

Subcategory	Number
Food, Beverage and Tobacco	9
Textile, Wearing Apparel and Leather	3
Wood Products Including Furniture	2
Paper and Paper Products, Printing and Publishing	2
Chemicals, Petroleum Rubber and Plastic Products	8
Non-metallic Mineral Products	2
Basic Metal Industries	3
Fabricated Metal Products, Machinery and Equipment	3
Other Manufacturing Industry	3
Total	**35**

When the relationship between ABC adoption and the size of companies is examined, a significant proportion was found showing that company size is a significant factor in terms of ABC adoption in larger companies in Turkey (chi square 0.527 significant at the 5% level). Company size factors analysed as SME size and large companies.

As it is shown in Table 4, 44.4% of large companies are applying ABC, 55.6% (n =15) of LARGE companies are using traditional costing methods. On the other hand, 37.5% (n=3) of SME companies are applying ABC and 62.5% (n =5) of SME companies are using traditional costing methods.

Table 4 - SME / LARGE - ABC/Traditional Costing Methods

Size	**ABC users**		**Traditional users**		**Total**	
	n	%	n	%	n	%
LARGE companies	12	44,4	15	55,6	27	100
SME companies	3	37,5	5	62,5	8	100
Total	15	42,9	20	57,1	35	100

Table 5 breaks down industrial distribution of companies that are applying ABC as follows: food, beverage and tobacco (n=3), textile, wearing apparel and leather (n=4), chemicals, petroleum rubber and plastic products (n=3), non-metallic mineral products (n=3) and fabricated metals (n=2).

Table 5- Sector Distribution of Participants

Subcategory	**Number**
Food, Beverage and Tobacco	3
Textile, Wearing Apparel and Leather	4
Chemicals, Petroleum Rubber and Plastic Products	3
Non-metallic Mineral Products	3
Fabricated Metal Products, Machinery and Equipment	2
Total	**15**

When companies that are applying ABC were examined in terms of industries, the results shows that there is no correlation between the types of industries and the tendency to apply ABC.

28 of the respondents of the survey are general accounting department managers and financial directors. The remainders (7) were also working in accounting departments of the companies. In general they were well-experienced accountants in the company, averaging 6 years of employment within the company.

7.2. Using of Traditional Costing Methods and ABC Method

In the second part of the survey, the costing method of organisation is attempted to be identified by questions asked.

According to the questions which are related to overhead costs allocations and description of the current costing method, the majority of the respondents are using traditional costing methods (57% of all organisations, n= 20).

Table 6 shows the types of the traditional overhead costs allocation base. These traditional cost allocation bases are labour hours (38%, n= 8), machine hours (24%, n= 5), process time (19% of (n= 4), and labour and material costs (19% of (n= 4). Interestingly, several of the companies use more than one traditional costing method to

allocate overhead costs to products.

Table 6 – Types of Cost Allocation Base

Methods	**n**	**%**
Labour Hours	9	38
Machine Hours	5	24
Process Time	4	19
Labour and Material Costs	4	19

As it can be seen in Table 7, only 43% of (n= 15) the companies are using ABC (or Time Driven ABC). ABC application that was determined in this study is lower than that was found in the previous study. In the previous study, Karcıoğlu and Öztürk (2012) found the rate 66.6% (n= 58).

Most of non-ABC users have not done any assessment on ABC adopting until now, 60% of (n= 12) them. While 20% of (n= 4) them have been considering adopting ABC, 10% of (n= 2) them have rejected ABC adoption after an assessment (2 of them did not respond).

Table 7 - ABC Adoption Status

Status	**n**	**%**
Currently Using ABC	15	43
Not Assessed Yet	12	60
Currently Considering ABC	4	20
Currently rejected Using ABC	2	10
No Answer	2	10
Total	**35**	

Those organisations which have not considered or rejected ABC adoption mostly have reasoned that it is not appropriate for their type of business (n= 8). The other reasons for not adopting ABC were that it requires high level of resource to design, initiate and implement it (n= 5), lack of sufficient benefit comparing to its cost (n= 3), and resistance of employees (n= 1) (2 of them did not respond to this question) (Shown in Table no. 8)

Table 8 - Reasoning for Not Adopting

	n	**%**
Not appropriate	9	45
It requires high level of resource to design	5	25
Lack of sufficient benefit	3	15
Resistance of employees	1	5
No answer	2	10
Total	**20**	**100**

7.3. More about architecture of Costing Methods adopted in the Organisations

In the third part of the questionnaire, some additional queries take place in order to reach more about architecture of costing methods.

According to the survey's findings, larger Turkish manufacturing companies have been dealing with production activities for a long time (averaging 49 years). The findings also showed that the duration of using same costing method is very long (averaging 15 years).

Responders of the survey have also been using some additional modern costing methods along with their current costing methods (kaizen costing n= 2, target costing n= 5, quality cost system =2, just-in-time costing n= 2, product life cycle costing n= 1).

Both traditional costing and activity based costing methods users were asked about estimation of the average proportion of overhead costs in the production costs. The findings are shown in Table 9. As it is shown there is an important rate of overhead costs in total production costs which require proper distribution methods to reach more accurate cost information (averaging 22% of the product) (ABC users: 31% - Traditional Method users: 17%). This rate also points out the main argument of the ABC since the method is suggested as providing more appropriate cost drivers to distribute overhead costs fairly.

Table 9 – Estimated Rate of Overhead Costs in Total Costs

Firm Type	%
ABC Adopted Firms	31
Traditional Methods Adopted Firms	17
Average for All	22

7.4. More about ABC usage in the organizations

In the forth part of the survey, some additional questions take place which aim to obtain more information about ABC implementation.

Table 10 shows stage of ABC adoption. ABC users showed different stages of adoption. 10 of ABC users have adopted ABC for all the applicable parts of the organisation, while 3 of them applied ABC for only a few of applicable parts and 2 of them applied for the most applicable parts of the organisation.

Table 10 - Stage of ABC Adoption

Stage	n
All Applicable Parts	10
Most Applicable Parts	3
Few Applicable Parts	2

Table 11 describes replacement level of ABC adoption. Only 7 ABC users responded that ABC has replaced the previous costing system. 6 of them responded that ABC was being used in parallel with previous costing system. The other 2 ABC users replied that ABC was considered only to be in an early pilot testing form.

Table 11 - ABC Adoption as Replacement Level

Replacement Status	n
Sole ABC	7
With Previous System	6
Pilot Testing	2

Table 12 reveals the answers of “To what extend do top management support adoption of ABC?” question. It was answered by 7 of them as “neutral”, by 3 of them as “fairly weak”, by 2 of them as “fairly strong” and by 2 ABC users as “very strong” and by 1 ABC user as “very weak”.

Table 12 - Management Support

Support Level	n
Very Strong	2
Fairly Strong	2
Neutral	7
Fairly Weak	3
Very Weak	1
Total	**15**

Table 13 reveals an evaluation on key benefit of ABC. The main positive benefit of ABC was mostly answered as “refining product cost to improve profit analyses of individual product lines” (n=7), “visibility and scope in for resource consumption” (n=3), contributing to customer and market profitability analysis (n=2), “It aids price decisions” (n=2), “It can improve performance in activities which become the focus of the system” (n=1).

Table 13 - Main Benefit

Benefit	n
Refining product cost to improve profit analyses of individual product lines	7
Visibility and scope in for resource consumption	3
Contributing to customer and market profitability analysis	2
It aids price decisions	2
It can improve performance in activities which become the focus of the system	**1**
Total	**15**

7.5. Overall and Specific Success Rating and Effectiveness of ABC

In the last part of the survey, effectiveness of the costing method is aimed to be measured by asking questions based on usage purposes of the costing method (i.e. rational of uses). These questions point out to the rational for operational and strategic decisions. The main queries in this part are about, stock valuation, product/service pricing, product/service output decisions, cost reduction, budgeting, capacity planning, new product/ service design and planning, process design and improvement, customer profitability analysis, and activity performance measurement/ improvement.

Table 14 reports overall and specific success ratings of costing methods for different usage purposes.

Table 14 - Purposes of Use

Purpose	ABC Method Users		Traditional Costing Method Users	
	Grade Over 5	SD	Grade Over 5	SD
Overall Satisfaction as a Cost Management System	3.7	0.5936	3.75	1.0699
Stock Valuation	3.8	0.5606	3.95	0.9495
Product/Service Pricing	3.93	0.7037	4.15	0.6708
Product/Service Output Decisions	3.80	0.5606	3.85	0.7452
Cost Reduction	3.87	0.6399	3.75	0.6387
Budgeting	3.67	0.8165	3.70	0.7327
Capacity Planning	3.60	0.9103	3.55	0.8256
New Product/ Service Design And Planning	3.67	0.9759	3.75	0.7164
Process Design And Improvement	3.67	0.8165	3.75	0.6387
Customer Profitability Analysis	3.73	0.5936	3.90	1.0208
Activity Performance Measurement/ Improvement	3.47	0.8338	3.95	0.6048

7.5.1. Overall Satisfaction

When traditional costing method users and ABC users are considered separately, traditional costing method users rated their overall satisfaction from the cost management system as 3.75 over 5 on average (Standard Deviation – SD=1.0699). ABC users rated overall experience with ABC as 3.73 (SD=0.5936) over 5 on average.

Innes et. al. (2000) presented overall success of ABC in two follow up studies as 3.8 over 5 (SD= 0.7) (1994), 3.9 over 5 (SD= 0.8) (1999).

7.5.2. Stock Valuation

This grade was 3.95 (fairly successful) (SD=0.9495) for traditional method users. However, this application was graded as 3.80 (fairly successful) on average by ABC users (SD=0.5606).

Innes et. al. (2000) presented success of ABC for stock valuation based on two follow up studies as 3.6 over 5 (SD= 1.0) (1994), 4.6 over 5 (SD= 0.5) (1999).

7.5.2. Product/Service Pricing

Product/Service Pricing was graded as 4.15 (fairly successful) (SD=0.6708) by traditional method users. On the other hand, ABC users graded this application as 3.93 (fairly successful) on average (SD=0.7037). This application is one of most highly rated application among the others in general, particularly by traditional method users.

Innes et. al. (2000) presented success of ABC for Product/Service Pricing based on two follow up studies as 3.8 over 5 (SD= 0.8) (1994), 4.1 over 5 (SD= 0.8) (1999).

7.5.3. Product/Service Output Decisions

This application was graded as 3.85 (fairly successful) (SD=0.7452) by traditional method users. On the other hand, ABC users scored the same application as 3.80(fairly successful) on average (SD=0.5606).

Overall success of ABC for output decisions was presented by Innes et. al. (2000) based on two follow up studies as 3.7 over 5 (SD= 0.8) (1994), 4.2 over 5 (SD= 0.8) (1999).

7.5.4. Cost Reduction

This function was graded as 3.75 (fairly successful) on average (SD=0.6387) by traditional method users. In particular, ABC users graded this application as 3.87 (fairly successful) (SD=0.6399).

Innes et. al. (2000) presented success of ABC in terms of cost reduction based on two follow up studies as 3.8 over 5 (SD= 0.8) (1994), 4.0 over 5 (SD= 0.8) (1999).

7.5.5. Budgeting

This application was graded as 3.70 (fairly successful) (SD=0.7327) by traditional method users. On the other hand, ABC users scored same application as 3.67 (fairly successful) on average (SD=0.8165).

Innes et. al. (2000) presented success of ABC for budgeting based on two follow up studies as 3.7 over 5 (SD= 0.9) (1994), 3.9 over 5 (SD= 0.1) (1999).

7.5.6. Capacity Planning

This application was graded as 3.55 (fairly successful) (SD=0.8256) by traditional method users. On the other hand, ABC users scored same application as 3.60 (SD=0.9103).

7.5.7. New Product/ Service Design and Planning

This grade was 3.75 (fairly successful) (SD=0.7164) for traditional method users. On the other hand, ABC users scored same application as 3.67 (SD=0.9759). This query also took a place in a paper by Innes et. al. (2000) based on two follow up studies scored by ABC adopters as 3.8 over 5 (SD= 0.9) (1994), 3.8 over 5 (SD= 1.1)

(1999).

7.5.8. Process Design and Improvement

This application was graded as 3.75 (fairly successful) (SD=0.6387) by traditional method users. On the other hand, ABC users scored the same application as 3.67 (fairly successful) on average (SD=0.8165).

7.5.9. Customer Profitability Analysis

This application was graded as 3.90 (fairly successful) (SD=1.0208) by traditional method users. On the other hand, ABC users scored the same application as 3.73 (fairly successful) on average (SD=0.5936).This application is one of the most successful application that ABC users rated. This query also took a place in a paper by Innes et. al. (2000) paper based on two follow up studies scored by ABC adopters as 3.9 over 5 (SD= 0.7) (1994), 4.2 over 5 (SD= 0.8) (1999).

7.5.10. Activity Performance Measurement/ Improvement

This application was graded as 3.95 (fairly successful) (SD=0.6048) by traditional method users. On the other hand, ABC users scored the same application as 3.47 (fairly successful) on average (SD=0.8338). This query also took a place in a paper by Innes et. al. (2000) paper based on two follow up studies scored by ABC adopters as 3.7 over 5 (SD= 0.8) (1994), 3.9 over 5 (SD= 0.8) (1999).

8. Conclusions

Long-term accurate, analytical and reliable cost information provides a strong basis in terms of operational and strategic decisions. Activity based costing and time driven ABC has been developed and advocated as a superior method rather than previous traditional methods to provide long-term accurate cost information in order to make appropriate decisions. In addition to that, Activity Based Management was developed as a management method that improves the operations by means of activity based system. Literature shows that ABC has various uses in the managerial area as a cost system such as stock valuation, product and service pricing, output decisions, cost reductions, capacity planning, and workforce management. According to the theory, activity based costing methods mainly allocate overhead costs more appropriately to obtain more accurate cost information. In the last quarter of the twentieth century, because of more and more automation in production overhead costs (such as set up machine cost, maintenance of machines) have become much more significant in the total cost of production comparing stable or decreasing level of labour and material cost.

This research aimed at investigating the effectiveness of the cost management systems in larger manufacturing companies of Turkey. Since ABC (activity based costing) is suggested and subjected in many studies as providing a more accurate, analytical and long-term reliable information, this study has a special emphasis on use of activity based costing. The research part included a survey to engage in:

- identifying cost system of population of the study,
- investigating effectiveness of costing methods based on how successfully they use costing system for the purposes of usage of costing methods,
- assessing adoption of activity based costing.

This study showed that to some extent publicly listed manufacturing companies in Turkey have adopted and implementing Activity Based Costing systems. However, the majority of organisations whose managers responded to this survey were still using traditional costing systems. In addition to that, when overall satisfaction of cost systems compared, ABC satisfaction was rated less than traditional costing methods. Moreover, when the other applications take into account, traditional costing systems were generally viewed as more successful than ABC in terms of majority of applications. More particularly, ABC was viewed for only a few applications as more successful than traditional methods. For the rest of applications, the average perceived success was less than traditional methods.

When the survey results are considered, it is very clear that traditional methods are still primarily applicable within activity based cost systems. Moreover, there are some other conditions along with accurate cost information that have some impact on determining the cost system, e.g., company size, sector, adopted software

program and cost of the system. These conditions are also part of equation since designing an optimal cost system is complex and expensive, there is a dilemma between accurate cost information and its expense. Therefore Drury (2013) and Kaplan and Atkinson (1998) argued about to make decision between traditional cost systems and ABC or more complex ABC and essential type of ABC.

References

Al-Sayed, Mahmoud (2011) Predicting ABC adoption in UK manufacturing sector. In, British Accounting and Finance Association Annual Conference, Birmingham, GB, 11 - 14 Apr 2011. 30pp.

Baxendale, S. J. and Gupta, M. C. (1998) Aligning TOC and ABC for Silkscreen Printing. Management Accounting, LXXIX (10): 39-44.

Brown, Steve, Bessant, John, Lamming, Richard (2013) Strategic Operations Management. 3 Edition. Routledge. London and Newyork.

Cobb,I, Innes, J. and Mitchell, F. (1992) Activity-Based Costing: Problems in Practice (CIMA Research). CIMA Publishing.

Cooper, R (1998) The rise of activity-based costing-part one: what is an ABC system? Journal of Cost Management pp. 45–49 (Summer).

Cooper, R. & Kaplan, R. (1988) Measure Costs Right: Make Decisions Right. Harvard Business Review, September-October, 96-103.

Davies, Tony and Boczko, Tony (2005) Business Accounting and Finance. McGraw-Hill Education.

Drury, Colin (2013) Management Accounting For Business. 5th Revised edition. Cengage Learning EMEA.

Drury Colin and Tayles, Mike (1994) Product costing in UK manufacturing Organisations, The European Accounting Review, 3:3 p 443-469 .

Elhamma, Azzouz and Fei, Zhang YI (2013) The Relationship Between Activity Based Costing, Business Strategy And Performance in Moroccan Enterprises, Accounting and Management Information Systems Vol. 12, No. 1, pp. 22–38. Glautier, M. W. E. and Underdown B (2001) Accounting Theory and Practice. 7 Edition. Financial Times Management.

Gosselin, M. (2007), A review of activity-based costing: technique, implementation, and consequences, in Chapman, C.S., Hopwood, A.G. and Shields, M.D. (Eds), Handbook of Management Accounting Research, Vol. 2, Elsevier, Oxford, pp. 641-71.

Gupta, M, Galloway, K (2003) Activity-based costing/management and its implications for operations management. Technovation, 23(2), 131–138. Available at: http://www.sciencedirect.com/science/article/pii/

S0166497201000931. [Accessed 02 July 2014].

Hsien Tsaia, Wen, Wen Laia, Chien (2007) Outsourcing or capacity expansions: Application of activity-based costing model on joint products decisions Computers & Operations Research Volume 34, Issue 12, December 2007, Pages 3666–3681.

Hilton, R. W. (2005) Managerial Accounting: Creating Value in a Dynamic Business Environment. Newyork, McGraw-Hill/Irwin.

Institute of Management (IMA) (1993) Cost Management Update, Montvale, NJ.

Innes, J., Mitchell, F. (1991) ABC: a survey of CIMA members. Management Accounting (UK) October, 28–30.

Innes, J. and Mitchell, F (1995) A survey of activity-based costing in the U.K.'s largest companies. Management Accounting, 6 (1995), pp. 137–153.

Innes, J. and Mitchell, F (1993) Overhead Cost London: CIMA.

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

Johnson, H. Thomas, and Robert S. Kaplan (1987) The importance of long-term product costs. McKinsey Quarterly 23.4 (1987): 36-48.

Kaplan, Robert S. (1990) Measures for Manufacturing Excellence, Harvard Business Press. USA.

Kaplan, Robert S., Atkinson Anthony A. (1998) Advanced Management Accounting (3rd Edition). 3rd Edition.

Prentice Hall.

Karcıoğlu and Öztürk, (2012) Karcıoğlu, R. – Öztürk, M. (2012) İMKB'ye Kayıtlı Sanayi İşletmelerinin Maliyet Yönetim Sistemlerini Uygulama ve Uygulamama Nedenlerinin Tespitine Yönelik Bir Araştırma, Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 16, 1, p. 477-496.

Kelle, Peter, Akbulut, Asli (2005) The role of ERP tools in supply chain information sharing, cooperation, and cost optimization . Int. J. Production Economics 93–94 (2005) 41–52.

Kiani, M. & Sangeladji, M. (2003) "An empirical study about the use of ABC/ABM models by some of the fortune 500 largest industrial corporations in the USA", Journal of American Academy of Business, Cambridge, vol. 3(1/2): 174-182.

Miller, J.G. and Vollmann, T.E (1985) The Hidden Factory, Harvard Business Review, 63, 142-150.

Player, S, Kramer, M (1995) Using ABC to increase revenues Player, Keys (Eds.), Activity-Based Management: Arthur Andersen's Lessons from the ABM Battlefield, Mastermedia Limited, New York (1995).

Rahmouni, A .F. (2008) La mise en œuvre de la comptabilité par activités dans les ntreprises françaises, Thèse de doctorat, Université du Sud Toulon– VAR.

Russell, Roberta S. and Taylor III, Bernard W. (2011) Operations management International student version 7th ed. John Wiley.

Schneider, A.J.,(1992) TQM and the financial function. Journal of Business Strategy 13 (5), 23–24.

Slack, Nigel, Chambers, Stuart, Johnston, Robert (2001) Operations Management (3rd Edition). 3 Edition. Financial Times Management.

Tayles, M. & Drury, C. (2001) "Autopsy of a stalling ABC system: a case study of activity based cost management and performance improvement", The 24th Annual Congress of the European Accounting Association, Athens, Greece, April 18-20.

Turney, P.B.B., (1992) Activity-based management. Management Accounting 74 (January), 20–23.

Turney, P.B.B., (1993) Beyond TQM with workforce activity-based management. Management Accounting. 75 (3), 31.

Uusi-Rauva, E., Paranko, J. (1997) The role of cost accounting in engineering, Proceedings of the International Conference on Engineering Design, Tampere, Finland.