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Application of activity – based costing in companies in Poland

Abstract

The purpose of this paper is to explore the application of activity-based costing in companies in Poland, and more specifically, to analyse problems in ABC implementation, the structure of ABC systems and the ways in which ABC information is used.

Findings of the research have both practical and theoretical implications. First, from the practical point of view, future implementers of ABC systems should be aware of factors actually influencing ABC implementation as well as problems which can be encountered during the implementation process. Managers considering activity-based costing implementation may see level of detail and methods of construction of an ABC information model. They may also benefit from the knowledge of how information generated by an ABC systems is actually used by companies. All this may help to make better decision about ABC implementation and if the decision is to implement ABC, it may help to implement it successfully. From the theoretical point of view the research carried out makes it possible to establish a general tendency: modifications in costing systems applied in Polish enterprises and development of management accounting practice such as ABC follows the same general direction as management accounting practice in the world.

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1. Introduction

Process orientation of management accounting resulted at the turn of the 20th century in the emergence and development of activity-based costing. This concept is known to accounting practitioners across the world owing to numerous conferences, training courses, publications by practitioners and academics and intensive activity of consulting companies. In the 80s and 90s, activity-based costing spread mainly in the countries of North America and Western Europe. Its application in the accounting practice of the East-Central European countries became more widespread at the turn of the 20th century.

The purpose of this paper is to explore the ways in which activity-based costing is functioning in Polish enterprises, with a particular focus on problems in ABC implementation, the structure of ABC systems, and application of information supplied by ABC. The findings of this study may be useful to Polish enterprises modifying their cost accounting systems and implementing or considering implementation of activity-based costing.

2. Review of empirical research on the application of activity-based costing in selected countries

The degree of diffusion of activity-based costing systems as well as their structure and application in business practice of different countries vary widely, as has been demonstrated by numerous empirical studies. Research into this subject, apart from investigating the issues mentioned above, concentrates on analysis of the impact of such factors as company size, cost structure, strategy or competition on ABC implementation, shape, functioning and application. The majority of empirical research attempted to establish what percentages of companies in different countries were using activity-based costing, were considering its adoption, had abandoned such plans after cost-benefit analysis or had never considered adoption. The extent of ABC adoption in different countries is shown in table 1.

Table 1. ABC diffusion in selected countries

	companies using ABC	companies considering use of ABC	companies rejecting ABC	companies not considering ABC
Sweden (Ask, Ax 1992, pp. 1-22)	0.0%	23.0%	-	-
Finland (Lukka, Granlund 1996, pp. 1-18)	5.0%	25.0%	-	-
Italy (Cinquini <i>et al.</i> 1999, pp. 1-24)	10.0%	12.0%	-	-
Great Britain (Innes, Mitchell 2000, pp. 349-362)	17.5%	20.3%	15.3%	46.9%
Japan (Bescos <i>et al.</i> 2001, pp. 1-34)	7.0%	34.5%	5.6%	53.9%
Canada (Bescos <i>et al.</i> 2001, pp. 1-34)	23.1%	9.3%	13.9%	53.7%
France (Bescos <i>et al.</i> 2001, pp. 1-34)	23.0%	22.9%	11.9%	42.2%
USA (Kianni, Sangladij 2003, pp. 174-182)	11.8%	40.0%	0.0%	48.2%
Ireland (Pierce 2004, pp. 28-31)	27.9%	9.0%	10.7%	52.4%

Source: author's research.

Analysis of research results presented in table 1 reveals considerable differences. The proportions of companies that have adopted ABC ranges from 0 to over 20%, which is due to differences in the level of management accounting development in particular countries, the sample companies (large/small companies, manufacturing/non-manufacturing companies, financial institutions etc.) and the period covered by surveys (earlier surveys generally indicate significantly lower proportions of ABC adopters).

Questionnaire surveys, naturally, are not a source of extensive knowledge about ABC systems functioning in different countries. This is due to the very nature of such studies – they do not provide sufficient data for a very detailed analysis of the structure and application of ABC models. To gain a more in-depth knowledge for the analysis of ABC models structure and application, the survey method can be usefully supplemented with the case study method and direct observation through participation in ABC designing and implementation in companies. The use of these methods makes it possible to see how ABC models are being implemented in different companies, how they are functioning and being monitored, and how different employees assess their usefulness. The case study method and action research method, despite their shortcomings, allow a more in-depth study of the issues mentioned above.

Already in the 1980s Kaplan (Kaplan 1984, pp. 429-452, 1986, pp. 390-418) advocated research in the form of case studies and action research (innovation action research) for better understanding and analysis of management accounting practice, to provide a basis for developing new concepts and methods to be subsequently used in practice. It particularly refers to research on the functioning of ABC systems in practice. Despite certain limitations of case studies (Hopper et al. 2001, pp. 263-291; Zimmerman 2001, pp. 411-427), this method is increasingly adopted for the purpose of detailed analysis of ABC systems implementation and application in practice, and for identification and understanding of the related processes and problems.

In the early phase of popularization of activity-based costing, many of the published case studies focused on comparative analysis of ABC and traditional costing systems (e.g. Platt, Towry 2001, pp. 99-124). A considerable proportion of case studies at that time was concerned with ABC systems design, in particular with estimating costs of activities, choice of activity cost drivers, construction of costing systems for operational and strategic purposes, and integration of management accounting with financial accounting systems (e.g. Cooper, Weiss 1999, pp. 287-293). The authors of published research analysed ways of interviewing line managers during system designing and presented methods of cost accounting in ABC, especially with regard to determination of costs of resources on the basis of accounting information and their allocation to activities (e.g. Cooper 1999, pp. 293-300).

Many of the widely publicised case studies are focused on comparison of the results of cost calculation using ABC and traditional costing systems, and on investigation into causes of these differences (e.g. Cooper, Montgomery 1999a, pp. 301-302; Cooper, Montgomery 1999b, pp. 302-309). A topic that is very often addressed in case studies is the economic consequences of implementing activity-based costing, including such issues as price policy formulation, products and production technologies designing, analysis of customer service costs and their profitability, and business strategy implementation (e.g. Kaplan 1999a, pp. 355-362).

Relatively many case studies were devoted to broadly understood activity-based management (ABM), and particularly to analysis of activities, continuous improvement and performance management (e.g. Kaplan 1999b, pp. 322-340). Other issues addressed include, among others, variance analysis, ABC systems implementation and behavioral implications of ABC application. Case studies on activity-based costing are often concerned with the functioning of ABC in companies using other advanced management and management accounting methods, such as benchmarking (e.g. Kaplan 1999c, pp. 480-491), target costing (e.g. Kaplan 1995; Horváth et al. 1998, pp. 16-24), balanced scorecard (e.g.

Kaplan 1999b, 322-340), economic value added (e.g. Hubbell 1997, pp. 16-24) or theory of constraints (e.g. Campbell et al. 1997, pp. 16-25).

3. Review of empirical research on the application of activity-based costing in Poland

The first survey examining adoption of ABC by Polish companies was carried out by Sobańska and Wnuk (2000, pp. 215-221). Other research projects identified isolated cases of applying activity-based costing or its elements (Jarugowa, Skowroński 1994, pp. 166-172; Szycha 2001, pp. 101-119, 2002, pp. 401-418; Karmańska 2003, pp. 297-315; Januszewski, Gierusz 2004, pp. 19-23; Januszewski 2005, pp. 35-39; Wnuk-Pel 2006, pp. 209-225; Szycha 2006, pp. 189-208, 2007, pp. 222-250) or found that companies surveyed were implementing or planning to adopt ABC (Dyhdalewicz 2001, pp. 33-38; Szycha 2001, pp. 101-119, 2002, pp. 401-418; Karmańska 2003, pp. 297-315; Januszewski, Gierusz 2004, pp. 19-23; Januszewski 2005, pp. 35-39; Szycha 2006, pp. 189-208, 2007, pp. 222-250). Some of the surveys conducted so far have not identified any companies implementing ABC or even considering its adoption. It should be noted, though, that most of such findings were reported by earlier surveys (Kinast 1993, pp. 6-12; Sobańska, Szycha 1996, pp. 111-122; Gierusz *et al.* 1996, pp. 41-47; Radek, Schwarz 2000, pp. 58-83; Szadzińska 2002, pp. 90-112, 2003, pp. 54-65). The results of research into ABC adoption by Polish companies carried out to date are presented in table 2.

Table 2. ABC diffusion in Poland

	research method	number of companies	companies using ABC	companies using elements of ABC	companies implementing ABC	companies considering implementation of ABC
Kinast 1993, pp. 6-12	case study	9	0	-*	-	-
Jarugowa, Skowroński 1994, pp. 166-172	case study	1	0	1	-	-
Sobańska, Szychta 1996, pp. 111-122	questionnaire	20	0	-	-	-
Gierusz <i>et al.</i> 1996, pp. 41-47	questionnaire	60	0	-	-	-
Sobańska 2002, pp. 6-11	questionnaire and case studies	104	2	-	-	-
Radek, Schwarz 2000, pp. 58-83	questionnaire	200	0	-	-	-
Dyhdalewicz 2001, pp. 33-38	case studies	10	0	-	-	1
Szychta 2001, pp. 101-119, 2002, pp. 401-418	questionnaire and case studies	60	0	3	1	-
Szadzińska 2002, pp. 90-112, 2003, pp. 54-65	questionnaire	246	0	-	-	-
Karmańska 2003, pp. 297-315	questionnaire	342	1	-	3	-
Januszewski, Gierusz 2004, pp. 19-23; Januszewski 2005, pp. 35-39	questionnaire	101	3	5	1	29
Wnuk-Pel 2006, pp. 209-225	case studies	6	6	0	0	0
Szychta 2006, pp. 189-208, 2007, pp. 222-250	questionnaire	90	9	-	-	13

* „-” meaning that this feature was not analysed.

Source: author's research.

The case study method and action research method are increasingly used in research on ABC implementation in Polish companies. The first case studies were carried out in 2000 (e.g. Wnuk 2000, pp. 110-132), and action research – in 2001 (e.g. Świdorska, Pielaszek 2001, pp. 1-11). Later the number of such

research projects grew, especially from 2004, when there was a steady increase in the number of companies using, implementing or considering implementation of ABC. The subject matter of this research varied widely – generally speaking, it was mainly concerned with ABC systems implementation and the utilisation of information generated by these systems. The topics of research in the form of case studies and action research can be presented as follows:

- circumstances of ABC implementation (e.g. Świdarska, Pielaszek 2001, pp. 1-11),
- structure of ABC information model (e.g. Świdarska *et al.* 2002, 223-228; Czakon 2004, pp. 1-12),
- use of information generated by ABC system (e.g. Szyszłowski 2006, pp. 13-17, 2007, pp. 42-46; Wnuk-Pel 2008, pp. 383-396);
- analysis of ABC assumptions on the quality of information generated by ABC model (e.g. Wnuk 2000, pp. 110-132).

To sum up the above overview of empirical research into ABC in Poland it should be stated that it was primarily concerned with the extent of ABC adoption (questionnaire studies). Research findings point to an increasing percentage of enterprises which are using, implementing or planning implementation of ABC. Case studies and action research make possible an analysis of the functioning of ABC systems and application of information that they supply.

The author of this chapter is among those who have done empirical research on this subject. His work, including surveys, case studies and action research, carried out in the years 2005 – 2009, was motivated by the need to identify and analyze problems involved in ABC implementation in companies operating in Poland. The research was specifically concerned with the implementation process itself, the structure of the ABC system, types of analyses made in this system, the ways that ABC is used in different companies, and methodological and institutional changes resulting from ABC implementation.

4. Presentation and analysis of the author's empirical research

4.1. Research methodology

This study reports the findings of a research exploring the extent of adoption and the functioning of activity-based costing in companies operating in Poland. The research was preceded by literature studies reviewing publications on activity-based costing and activity-based management, with a particular focus on research investigating the diffusion of ABC systems and the ways in which they are functioning in companies. The findings of the literature review, summarized in the first part of this paper, made possible the formulation of research questions and identification of the variables to be studied. The literature studies also provided a basis for formulating the purpose of this paper – it attempts to explore the application of ABC in companies in Poland, and more specifically, to analyse problems in ABC implementation, the structure of ABC systems and the ways in which ABC information is used. For a more detailed explication of the research subject, the following hypotheses have been formulated:

1. Various factors influence the implementation of activity-based costing, the most important being: (a) demands of the head office (e.g. parent company), (b) increased competition and looking for new markets, (c) dissatisfaction with the current costing system, (d) change in the organizational structure and/or strategy, implementation of new technologies, (e) seeking cost reduction and improvement of performance, (f) employees' attitude favourable to changes, (g) availability of financial and human resources.
2. Major problems encountered in the process of activity-based costing implementation include: (a) lack of management support, (b) high costs of ABC implementation and operation, (c) high labour input in ABC implementation and operation, (d) other priorities (e.g. implementation of ISO, TQM, ERP, etc.), (e) insufficient knowledge of ABC, (f) difficulties in designing a model (e.g. identification/selection of activities, cost drivers, etc.), (g) lack of adequate resources.
3. The structure of activity-based costing systems functioning in Polish enterprises is in conformity with the structure of systems used in companies in other countries and with practices reported in ABC literature.
4. Information provided by ABC systems is used in making a wide range of decisions, and companies which have adopted activity-based costing also use other advanced management accounting tools and techniques.

Three main groups of variables have been used in the analysis of activity-based costing models used in Polish enterprises: (a) variables providing a general view of ABC in a given company, (b) variables relating to the structure of ABC in the company being studied, (c) variables relating to the application of ABC in the company being studied. The choice of the groups and variables was guided by the research objectives, with a view to carrying out a reliable analysis of activity-based costing models functioning in Polish practice.

In order to analyse the process of implementation and operation of activity-based costing in Polish companies, it was necessary to identify the companies which had adopted ABC. To identify a possibly largest population of ABC adopters, the author made use of all available sources, such as: (a) results of earlier survey studies conducted by the author, (b) cost systems design and implementation projects (including ABC systems) carried out by the author as part of his consulting activity, (c) all publications available to the author describing companies using ABC, (d) conference publications and training materials naming companies-ABC adopters, (e) information from IT and consulting companies which had adopted ABC.

In the years 2006-2008 a total of 71 ABC adopters were identified (46 companies were found through surveys carried out by the author, and 25 – using other sources). These companies were surveyed by means of personal, telephone or email inquiries. 33 completed questionnaires were returned, so high a rate being due to the author's having personal contacts with most of these companies. The author made sure that the persons that were interviewed had practical knowledge of ABC application – they were persons participating in the implementation and modification of ABC systems in their companies.

4.2. General description of the companies covered by the survey

Of the 33 enterprises (ABC adopters) that were surveyed, 19 are manufacturing companies (57.6%), and 14 are non-manufacturing companies (42.4%). It might be interesting to note that surveys investigating cost accounting methods used in the largest British companies, carried out in 1994 and then in 1999 (Innes, Mitchell 1995, pp. 137-153, 2000, pp. 349-362) found that while in 1994 the proportions of manufacturing and non-manufacturing companies using ABC were significantly different (15.4% of manufacturing companies and 30.3% of non-manufacturing companies), in 1999 these figures were much closer to each other (14.0% of manufacturing and 20.4% of non-manufacturing companies). Those studies also found that in 1994 as many as

54.0% of financial institutions declared the application of ABC, while in 1999 this figure dropped to 40.7%.

The companies covered by the survey served varying numbers of customers and pursued both cost strategy and product differentiation strategy (table 3).

Table 3. Main areas of activity of the companies surveyed

	n	%
provision of mass-produced goods to many customers (cost strategy)	11	36.7%
provision of mass-produced goods to a small number of customers (cost)	0	0.0%
provision of special products to many customers (differentiation strategy)	17	56.7%
provision of special products to a small number of customers (differentiation)	2	6.7%
total	30	100.0%

Source: author's research.

Nearly two-thirds of the companies (65.4%) follow product differentiation strategy, and slightly over one-third (36.7%) pursue cost strategy. As many as 93.4% sell their products to many customers and only 6.7% (2 companies) serve a limited number of customers. The companies also differ in respect of competition in their main areas of activity (table 4).

Table 4. Competition in the companies' main areas of activity

	n	%
weak competition	3	9.1%
moderate competition	7	21.2%
strong competition	23	69.7%
total	33	100.0%

Source: author's research.

More than two-thirds of the companies surveyed (69.7%) described competition in their basic area of activity as strong (the percentages for manufacturing and non-manufacturing companies are similar – 68.4% and 71.4%, respectively), 7 companies stated that competition was moderate, and only three companies assessed it as weak. As regards the source of equity capital, 17 (51.5%) companies declared only domestic capital, 9 companies (27.3%) – mixed capital and 7 companies (21.2%) – only foreign capital.

13 companies (39.4%) in the sample of ABC adopters sold their products only in domestic markets, while the remaining 60.6% operated both in the country and abroad. It should be noted that for 15.2% of these companies exports constituted over a half of the total value of sales, and that none of them was engaged solely in export activity.

The number of employees – a variable used in this research project to define the size of the companies – is presented in table 5.

Table 5. The number of employees in the companies surveyed

	n	%
1 – 100 employees	5	15.2%
101 – 500 employees	13	39.4%
501 – 1000 employees	7	21.2%
more than 1000 employees	8	24.2%
total	33	100.0%

Source: author's research.

The research has shown that in over a half of the companies the form of the activity-based costing system depends solely on independent decisions of management (18 companies, i.e. 54.5%); in 12 companies (36.4%) it is determined in part by the management and in part by the headquarters (e.g. parent company), and only in 3 cases it depends wholly on the headquarters.

Of the 33 companies surveyed, 100% use activity-based costing (which is self-evident because of the character of the sample); 26 companies (78.7%) also employ traditional actual cost systems (full or variable costing), 14 companies (42.4%) – standard costing (full or variable), and only 5 companies makes use of target costing parallel with ABC. 9 companies stated that they applied activity-based costing only in a limited form.

The sample companies vary considerably as regards the cost structure – the proportions of indirect costs in total costs are shown in table 6.

Table 6. The share of indirect costs in cost structure of the companies surveyed

	n	%
up to 10% of indirect costs	4	14.8%
from 11% to 20% of indirect costs	6	22.2%
from 21% to 30% of indirect costs	5	18.5%
from 31% to 40% of indirect costs	5	18.5%
from 41% to 50% of indirect costs	2	7.4%
from 51% to 60% of indirect costs	3	11.1%
from 61% to 70% of indirect costs	2	7.4%
total	27	100.0%

Source: author's research.

In the majority of the companies the proportion of indirect costs grew over the last 10 years – in 10 companies (37.0%) it increased only slightly, and in 5 companies (18.5%) the increase was quite significant. In 3 of the firms

(11.1%) no change in the percentage of indirect costs was reported, and in 9 cases (33.3) it was stated to have decreased.

4.3. General description of activity-based costing systems

In response to the question whose initiative it was to adopt ABC, more than a half of the respondents (54.5%) stated that the idea came from the owner/head office/management. In 13 cases (49.4%) it was the initiative of the economic section. In 2 companies adoption of ABC was stated: (a) to have been the consequence of implementing SAP/R3 (manufacturing company) (b) to have been postulated by the Purchasing Department (company producing household articles).

The activity-based costing systems functioning in the companies in question were implemented at various times. In 22 companies (66.7%) they had been functioning no longer than three years (in 7 of them – for less than a year, and in 15 – between 1-3 years). Only 11 companies (33.3%) had been using ABC for longer than three years. The mode of activity-based costing implementation is presented in table 7.

Table 7. The mode of ABC implementation in the companies surveyed

	n	%
by employees without external assistance	14	42.4%
by employees with external consulting	13	39.4%
by employees with headquarters' assistance	6	18.2%
total	33	100.0%

Source: author's research.

In most cases ABC was implemented by the companies' employees with outside assistance – 13 companies (39.4%) used the services of external consultants, and in 6 firms (18.2%) the head offices provided assistance. In 14 enterprises (42.2%) no outside help was needed.

The number of employees engaged in ABC implementation varied from company to company: (a) 1-3 employees in 9 companies (27.3%), (b) 4-10 employees in 16 companies (48.5%), (c) 11-30 employees in 5 companies (15.2%), (d) more than 30 employees in 3 companies (9.1%). The number of employees taking care of the systems maintenance and operation after completion of the implementation process is shown in table 8.

Table 8. The number of employees engaged in operation of ABC systems

	n	%
one employee, as part of responsibilities	14	43.8%
one employee, as main responsibility	2	6.2%
two – three employees	11	34.4%
four or more employees	5	15.6%
total	32	100.0%

Source: author's research.

Research on companies which have adopted ABC in such countries as the United States or Great Britain indicates that it is extremely rarely that activity-based costing thoroughly replaces the existing cost systems. The usual practice in such cases is to use the existing system for external reporting and ABC for management purposes. Research into the relation between ABC and other cost accounting systems used in parallel with it will make it possible to establish whether the practices found in western countries are equally common in Poland. Analysis of the sample population reveals that after ABC implementation 24 companies (72.7%) have not given up the formerly used costing system and are using it parallel with ABC. In 5 companies (15.5%) the old system continues to function, but has been marginalized (ABC has the primary importance). In only 4 cases (12.1%) the old system has been given up entirely.

The next of the selected variables, i.e. success of ABC implementation, was to indicate not so much the objective success or otherwise of this system implementation, but rather the way it is received by the employees – whether the "climate" in the company is favourable to the new system. Shields (1995, pp. 148-166) has demonstrated a relationship between the perceived success of ABC implementation and six variables: management support, integration with strategic initiatives strengthening competitiveness such as TQM or JIT, performance evaluation and rewarding, project management by non-accounting personnel, training during ABC design, implementation and application, and availability of resources necessary for implementation. Shields also found that such variables as the type of software used or designing the ABC model without external assistance have no impact on implementation success. Research carried out by McGowen and Klammer (1997, pp. 217-237) confirms a connection between three variables identified by Shields with perceived success of ABC implementation. These factors are: management support, performance evaluation and rewarding, and training during ABC design, implementation and application. Foster and Swenson (1997, pp. 109-141) found that success of ABC implementation depended primarily on integration with the performance evaluation and reward system, links with quality improvement projects,

management support, training during implementation, and availability of resources. The findings of the three research projects mentioned above roughly agree as to the factors that have the greatest impact on ABC implementation success. To identify factors conditioning successful implementation of ABC, Friedman and Lyne (1999, pp. 1-35) conducted research in Great Britain using the long-term case study method. The results of this research coincide for the most part with results of research carried out in the United States – success of ABC implementation was found to depend on: recognized need for implementation, wide support for implementation, especially from management, close cooperation between accounting and non-accounting staff during ABC implementation and use, incorporation of ABC into organizational structure and practice, availability of resources, and links with other projects such as TQM. Innes and Mitchell (1995, pp. 137-153, 2000, pp. 349-362) explored the importance for successful implementation of such factors as management support, engagement of consultants, involvement of accounting team and production personnel, and companies' prior experience with ABC models. The findings suggest that only management support had a significant influence on implementation success.

The respondents of the research on ABC application in Poland, were asked to assess the implementation of activity-based costing systems in their companies on a 5-grade scale, from total failure through partial failure, moderate success and success to great success. None of the companies considered implementation as complete failure or partial failure. Only one company declared great success, and 31 (of the 32 companies which answered this question) evaluated ABC implementation as moderate success (19) or success (12).

As far as problems with ABC implementation are concerned (see table 9), high labour input in implementation and maintenance were named as considerable problem (average grade – 3.55). None of the problems listed in the survey questionnaire was assessed as significant or very significant. The respondents named four problems, assessed by them as moderately important:

1. insufficient knowledge of ABC among employees (average grade – 3.42),
2. difficulties with model designing, e.g. choice of activities, drivers, etc. (3.25),

3. other problems, such as resistance to change (foodstuffs manufacturing company) or mutual antagonism caused by disclosure of individual divisions profitability as a result of activity-based costing implementation (service company) (3.00),
4. inadequate IT resources (2.68).

Table 9. Main problems during ABC implementation

	mean*	standard deviation	variability coefficient	dominant value
high labour input during ABC implementation and operation	3.55	0.97	0.27	4
insufficient knowledge of ABC among employees	3.42	0.99	0.29	4
problems with model (selection of activities, drivers, etc.)	3.25	0.92	0.28	3
other	3.00	2.00	0.67	1
lack of adequate IT resources	2.68	1.44	0.54	1
high cost of ABC implementation and operation	2.33	1.09	0.47	3
lack of support from management/head office, etc.	1.81	1.14	0.63	1
other priorities (implementation of ISO, TQM, ERP, etc.)	1.80	1.12	0.62	1

*The respondents assessed the significance of problems according to the following scale: 1 – no problem, 2 – insignificant, 3 – moderately significant, 4 – significant, 5 – very significant.

Source: author's research.

Problems evaluated as insignificant included: high costs of ABC implementation and maintenance (average rating – 2.33), lack of management/headquarters, etc. support (1.81), and other priorities, e.g. adoption of ISO, TQM or ERP (1.80).

Innes and Mitchell (1995, pp. 137-153, 2000, pp. 349-362) observed that high labour input is regarded to present a problem not only before but also after ABC implementation. It was named as one of five main problems encountered by companies using ABC, the remaining four problems being: difficulties with collecting data on cost drivers, processes crossing divisional boundaries, other priorities, and great time load placed on the accounting personnel.

4.4. Analysis of activity-based costing systems structure

Activity-based costing systems employed in sample companies operate in various IT applications – see table 10.

Table 10. IT environment of ABC models in the companies surveyed

	n	%
spreadsheet or database (EXCEL, ACCESS, etc.)	19	57.6%
specially written computer program	5	15.2%
ready-made specialized software adapted for specific needs of the company	4	12.1%
ready-made (adjusted for specific needs) module in an integrated system	5	15.2%
total	33	100.0%

Source: author's research.

Lack of appropriate software is among the chief problems connected with ABC implementation in Poland, which has often been pointed out by practitioners. There are two kinds of tools most commonly used for this purpose: ready-made, customized for individual companies needs, specialized programs for ABC (this mode of ABC informatization is mostly adopted by large enterprises in Poland, e.g, NETIA SA, Fortis Bank SA) and in-house designed models of ABC using spreadsheets and data banks (this way is usually chosen by small enterprises, which on the one hand do not have sufficient resources to buy specialist software and on the other hand do not need very sophisticated systems, because the structure of ABC in such companies normally is relatively simple). Rather rarely are used such modes of informatization as individually developed information systems and ready-made, adapted for individual needs modules of integrated systems.

ABC includes five basic elements, i.e. resources, resource drivers, activities, activity drivers and cost objects. This is a simplified model, but it provides a good indication of ABC structure in particular companies and the degree of the model's complexity.

Activity-based costing systems functioning in the companies covered by the survey vary widely in respect of the elements identified (see table 11).

Table 11. Number of elements identified in ABC systems

	1-5	6-20	21-100	101-500	501-	total
resources	3 14.3%	12 57.1%	4 19.0%	1 4.8%	1 4.8%	21 100.0%
resource drivers	6 28.6%	11 52.4%	3 14.3%	1 4.8%	0 0.0%	21 100.0%
activities	4 13.8%	12 41.4%	9 31.0%	4 13.8%	0 0.0%	29 100.0%
activity drivers	6 23.1%	12 46.2%	7 26.9%	1 3.8%	0 0.0%	26 100.0%
cost objects (products,	2 6.9%	3 10.3%	8 27.6%	5 17.2%	11 37.9%	29 100.0%

Source: author's research.

Analysis of data presented in table 11 reveals that:

1. in most of the companies, activity-based costing systems have the following numbers of elements: 6 – 100 resources (76.1% of companies), 1 – 20 resource drivers (81,0% companies), 6 – 100 activities (72.4%), 6 – 100 activity drivers (73.1%) and over 500 cost objects (37.9%),
2. in 2 cases activity-based costing had more than 100 resources (101-500 and over 500),
3. only 1 company used more than one hundred different resource cost drivers,
4. only 4 companies (13.8%) identified more than 100 activities, and only 1 company (3.8%) – more than 100 various activity cost drivers,
5. the majority of the companies (55.1%) identified over 100 cost objects (products, customers, etc.),
6. several respondents stated that their ABC systems used at the maximum 5 resources, resource drivers, activities, activity drivers or cost objects – it indicates that their systems' level of detail is rather low (it should be noted that 9 companies had declared earlier that they used activity-based costing to a limited extent).

The respondents were next asked about the number of cost calculations done for different objects (products, customers, etc.) as part of activity-based costing (see table 12).

Table 12. Number of calculations for different cost objects in the companies surveyed

	1-5	6-20	21-100	101-500	501-	total
products	5 20.8%	3 12.5%	8 33.3%	2 8.3%	6 25.0%	24 100.0%
groups of products	6 25.0%	12 50.0%	5 20.8%	1 4.2%	0 0.0%	24 100.0%
customers	2 15.4%	3 23.1%	3 23.1%	3 23.1%	2 15.4%	13 100.0%
groups of customers	7 43.8%	7 43.8%	1 6.3%	1 6.3%	0 0.0%	16 100.0%
sales regions	7 46.7%	7 46.7%	1 6.7%	0 0.0%	0 0.0%	15 100.0%
distribution channels	10 66.7%	4 26.7%	1 6.7%	0 0.0%	0 0.0%	15 100.0%
organizational units	9 47.4%	4 21.1%	5 26.3%	1 5.3%	0 0.0%	19 100.0%
projects	7 46.7%	5 33.3%	3 20.0%	0 0.0%	0 0.0%	15 100.0%

Source: author's research.

Analysis of data presented in table 12 reveals that:

1. the highest proportion of the companies (33.3%) calculate costs for 21-100 products; 25% – for over 500 products,
2. 98.5% of the companies make cost calculations for up to 100 groups of products; only one company – for between 101-500 groups,
3. cost calculations are made for 6-20 customers (23.1% of the companies), 21-100 customers (23.1%) or 101-500 customers (23.1%),
4. 87.6% calculate costs for 1-20 groups of customers,
5. costs are also calculated for 1-20 sales regions (93.4% of the companies),
6. 66.7% calculate costs for several (1-5) distribution channels,
7. calculations for 1-5 organisational units are done in 47,4% of the companies, and 46,7% calculate costs for several (1-5) projects.

The number of profitability analyses based on ABC carried out in individual company cases was addressed in the next question. The answers showed that numbers of profitability analyses coincided with the numbers of cost calculations, which means that, generally, profitability analyses were prepared for those cost objects for which cost calculations were done.

Of the 33 sample companies, as many as 27 classify costs into fixed and variable; only 7 companies (18.2%) do not make such a division. Less than a half of the enterprises (13, 41.9%) identify unused capacity costs, of which a few use one of two alternative variants of cost allocation: (a) only indirect costs of used capacity are assigned to products, customers, etc. and costs of unused capacity are charged directly to income, (b) all costs, including costs of unused capacity, are allocated to products, customers, etc.

Table 13 shows how activity-based costing modifications are done in the companies concerned.

Table 13. Modifications of ABC systems in the companies surveyed

	n	%
no modification so far	7	21.9%
from time to time, as necessary	19	59.3%
at regular intervals	6	18.8%
total	32	100.0%

Source: author's research.

Nearly four-fifths of the companies (25, 88.1%) modify their activity-based costing systems: 6 do it on a regular basis and 19 – from time to time, as need arises. In 7 companies (21.9%) no modification had been done (it should be noted that in 66.7% of these firms ABC systems were not „older” than 3 years). In responding to this question several companies offered the following explanations:

1. „regular modifications are carried out once a year together with work on preparation of budget for the next year” (large foodstuffs manufacturing company),
2. „modifications are carried out regularly, but their frequency is largely connected with identification of new cost centres, projects or groups of projects; such modifications are done from two to five times per year” (medium-sized commercial company),
3. „modifications are done on an annual basis, although at times they were done more frequently, e.g. after introduction of a new division of sales segments, because of the profitability reporting to management requirement” (large telecommunications company).

4.5. Analysis of utilisation of information generated by ABC systems

The subsequent part of the survey was dedicated to the users of ABC information and the use that is made of it (see table 14).

Table 14. Utilisation of ABC information in the companies surveyed

	mean*	standard deviation	variability coefficient	dominant value
other divisions	4.50	1.00	0.22	5
management accountants	4.28	1.25	0.29	5
top management	3.71	1.22	0.33	4
sales and marketing departments	3.41	1.27	0.37	4
basic departments (e.g. production)	3.10	1.21	0.39	3
accountants	2.63	1.47	0.56	1

*The respondents were asked to assign a rating on a five-grade scale; 1 – information not used, 2 – information used sporadically, 3 – information used from time to time, 4 – information used frequently, 5 – information used very frequently.

Source: author's research.

Information from activity-based costing systems are used very frequently by such departments as the purchase department (company producing household articles) or engineering department (telecommunications company). Frequent use was reported to be made by management accountants (average rating 4.28) and top management (average grade 3.71). Occasional use is made by: (a) marketing and sales department (3.41), (b) operational departments, e.g. manufacturing department (3.10), (c) accountants (2.63).

Activity-based costing has a number of various applications, as reported below on the basis of a literature review:

- research conducted by Innes and Mitchell (1995, pp. 137-153, 2000, pp. 349-362) showed that, respectively, 24.2% (1995, pp. 137-153) and 16.1% (2000, pp. 349-362) of the companies which they studied used ABC for inventories valuation in financial statements – it is an area of the most limited of the ABC uses that were tested by these authors,
- ABC can provide a basis for determining long-term variable costs and for making decisions on the volume and structure of sales in the longer term (Johnson, Kaplan 1987, pp. 45-64),
- budgeting by activities can be used for improving responsibility accounting in a company (Brimson, Fraser 1991, pp. 42-43),

- information about costs of activities and demand for products can be used in the process of goods and services designing (Jones, Wright 1987, pp. 27-31; Dolinsky, Vollman 1991, pp. 7-19),
- customer profitability analysis is one of the most frequently used types of ABC information; for instance, research carried out by Innes and Mitchell (2000, pp. 349-362) in 1994 and 1999 revealed that the percentages of companies making use of customer profitability information were 51.4% and 51.6%, respectively for these years,
- traditional analysis of profit sensitivity, leverage analysis and breakeven analysis are based on the precept of classification of costs into fixed and variable; Cooper (1994, pp. 44-62) proposed an extension of this type of analysis by repartition of costs into four levels: unit of product, batch, type and company as a whole.

Information supplied by activity-based costing in the analysed companies is used, to a varying extent, in various areas (see table 15).

Table 15. Significance (applicability) of ABC information in the companies surveyed

	mean*	standard deviation	variability coefficient	dominant value
other	4.50	1.00	0.22	5
cost reduction	4.16	0.82	0.20	5
price decisions	3.81	1.17	0.31	5
budgeting (ABB)	3.75	1.29	0.35	5
performance measurement and improvement	3.65	1.16	0.32	4
sales plan optimization	3.56	1.01	0.28	3
customer profitability analysis	3.52	1.37	0.39	5
cost modelling (e.g. sensitivity analysis)	3.41	1.01	0.30	4
goods and services designing	2.88	1.30	0.45	3
inventories valuation (for financial reporting)	2.40	1.63	0.68	1

The respondents were asked to assign a rating on a five-grade scale: 1 – information is insignificant, 2 – information is not very significant, 3 – information is fairly significant, 4 – information is significant, 5 – information is very significant.

Source: author's research.

Activity-based costing information was found to be very important (average rating 4.50) in the following areas: (a) „*making investment decisions, setting minimum batch size, etc.*”: (foodstuffs manufacturing company), (b) „*management remuneration*” (commercial company), (c) „*establishment of break-even points in investment projects appraisal*” (telecommunications company).

Information provided by ABC systems is used in liquidation of investment expenditure, reduction of expenditure, expansion of expenditure or making new investments (see table 16).

Table 16. Types of decisions in which ABC information is used

	liquidation	reduction	expansion	new investment
products	9	12	15	12
groups of products	4	11	19	11
customers	4	3	10	5
groups of customers	2	7	12	3
sales regions	2	9	14	5
distribution channels	2	9	11	4
organisational units (e.g. divisions)	2	11	8	7
projects	3	5	7	8

Source: author's research.

Analysis of data from the table above indicates that ABC information is mainly used for making decisions concerning expansion of expenditure (96) and, to a lesser extent, reduction of expenditure (67) and new investments (55). The least use is made of this information in decisions on liquidation (28).

The degree of application of ABC information in performance measurement and evaluation was the subject of the next question (see table 17).

Table 17. Application of ABC information in performance measurement and evaluation

	mean*	standard deviation	variability coefficient	dominant value
measurement and evaluation of activities and processes	3.59	1.15	0.32	4
company performance measurement and evaluation	3.50	1.21	0.35	4
responsibility centres performance measurement and evaluation	3.15	1.52	0.48	4
management and employee performance measurement and evaluation	2.93	1.46	0.50	4

The respondents were asked to assign a rating on a five-grade scale: 1 – information is insignificant, 2 – information is not very significant, 3 – information is fairly significant, 4 – information is significant, 5 – information is very significant.

Source: author's research.

According to the respondents, activity-based costing information is often used for evaluation of activities and processes (average rating 3.59) and performance of the company as a whole (3.50). From time to time it is used for

measuring the performance of responsibility centres (3.15) and of management and employees (2.93).

The complexity of activity-based costing systems depends, apart from the number of identified elements (resources, resource drivers, activities, activity drivers and objects) on whether a given system includes activities with particular characteristics. The survey revealed that:

1. in 14 of the companies surveyed (42.4%) activities were classed into ordinary, supporting and general; this classification (Bellis-Jones, Hand 1989, pp. 48-50) can be used for estimation and then reduction of costs of activities other than ordinary,
2. in 13 companies (39.4%) were identified activities at the level of product unit, batch, type of product and company as a whole (Cooper, Kaplan 1991, pp. 341-353),
3. in 7 companies activities were divided into strategic and operational,
4. only 6 companies stated that they identified activities creating value to the customer and not creating value to the customer; this classification is related with a very important area of ABC application, namely cost reduction.

17 of the 33 companies employ activity-based budgeting. The respondents were asked to state what benefits their companies derived from this type of budgeting (see table 18).

Table 18. The benefits of using activity-based budgeting in the companies surveyed

	mean*	standard deviation	variability coefficient	dominant value
improved variance analysis	3.88	1.02	0.26	4
improved performance measurement system	3.87	1.46	0.38	5
relating costs to responsibility	3.87	1.13	0.29	4
more realistic budgets	3.80	1.08	0.28	4
identification of demand for resources	3.43	1.16	0.34	4
greater involvement of employees in budgeting	3.31	0.95	0.29	4
better acceptance of budgets	3.29	1.33	0.40	4

*The respondents were asked to assign a rating on a five-grade scale: 1 – no benefit, 2 – little benefit, 3 – moderate benefit, 4 – considerable benefit, 5 – great benefit.

Source: author's research.

It should be stressed that the great majority of the 17 companies which have implemented activity-based budgeting apply it only in certain areas of activity, while in other areas they use traditional budgeting – this is the case with

15 (88.2%) of the companies which declared the use of ABB. Only 2 of them (11.8%) gave up traditional budgeting after ABB implementation.

There are a number of ABB applications that companies can benefit from, for instance: (1) availability of historical data on the levels of resource drivers or activities will support making rational decisions on the level of resources necessary, e.g. for future expansion of the company, (2) activity-based variance analysis can be useful in monitoring the causes of variances, (3) provision of information on utilisation of production capacity through comparison of the actual level with available capacity potential (Yoshikawa *et al.* 1992, pp. 43-54; Kaplan 1994, pp. 104-109).

Research conducted by Innes and Mitchell (2000, pp. 349-362) found that about 60% of the largest British companies using ABC had implemented ABB as well. The following benefits deriving from ABB have been identified:

- better identification of centres' demand for resources,
- preparation of more realistic budgets,
- greater involvement of employees in budgets preparation,
- improved systems of performance measurement,
- improved connection between costs and responsibility,
- better acceptance of budgets,
- enhanced quality of variance analysis.

Information from activity-based costing systems is used in relations with customers in a variety of ways (see table 19).

Table 19. Application of ABC information in customer relations

	mean*	standard deviation	variability coefficient	dominant value
improves customer service cost control	3.35	1.35	0.40	4
provides information for price policy formulation	3.23	1.21	0.37	4
provides information for marketing strategy development	3.08	1.20	0.39	3
provides information for customer policy formulation	3.04	1.22	0.40	4
provides a basis for negotiations with customers	2.73	1.25	0.46	4
provides a basis for giving up customers	2.60	1.29	0.50	4

Source: author's research.

Analysis of data in table 19 shows that as regards customer relations, ABC information is used to a moderate extent in all the areas specified. It is interesting to note that the majority of the respondents stated that ABC

information is used in customer relations to a considerable extent (predominant rating – 4); only for development of marketing strategy the rating was 3.

The enterprises which have implemented activity-based costing also use other advanced management methods (see table 20).

Table 20. Application of advanced management methods in the companies surveyed

	n	%
just in time	3	9.1%
business process reengineering	7	21.2%
continuous improvement	9	27.3%
benchmarking	12	36.4%
target costing	5	15.2%
life cycle costing	4	12.1%
balanced scorecard	10	30.3%
economic value added	6	18.2%
other	2	6.1%

Source: author's research.

Some of the sample companies made use of advanced management methods in addition to ABC – some used many such methods while others only a few. It was found that:

1. one company used six methods and one company five methods,
2. six companies used three methods,
3. seven companies used two methods and seven used one method,
4. ten companies did not use any advanced management methods other than ABC.

5. Conclusion

Management accounting practice in Poland is in the development phase. At the beginning of the 21st century an acceleration in the introduction of changes in costing systems could be observed. The evolution of management accounting in Poland proceeds in the same general direction as management accounting practice in the world. It draws on practices followed in different countries, as indicated by the techniques, methods and terminology, and the major reasons for this situation are: transfer of management accounting practices used by transnational companies, implementation of new information technology and activity of global consulting firms. One of the new accounting

methods used more and more often in Polish companies is activity-based costing. On the basis of research exploring the functioning of activity-based costing in companies operating in Poland the following general conclusions can be formulated:

1. In more than a half of the companies analysed (54.5%) the idea to implement ABC came from the owner/head office/management, in 13 cases (49.4%) it was the initiative of the economic section, and in 2 companies adoption of ABC was stated: (a) to have been the consequence of implementing SAP/R3 (b) to have been postulated by the Purchasing Department.
2. The activity-based costing systems functioning in the companies in question were implemented at various times. In 22 companies (66.7%) they had been functioning no longer than three years (in 7 of them – for less than a year, and in 15 – between 1-3 years). Only 11 companies (33.3%) had been using ABC for longer than three years.
3. As far as problems with ABC implementation are concerned, high labour input in implementation and maintenance were named as considerable problem (this was also observed by Innes and Mitchell (2000, pp. 349-362). None of the problems listed in the survey questionnaire was assessed as significant. The respondents named four problems, assessed by them as moderately important: insufficient knowledge of ABC among employees, difficulties with model designing, e.g. choice of activities, drivers, etc., other problems, such as resistance to change or mutual antagonism, inadequate IT resources. Problems evaluated as insignificant included: high costs of ABC implementation and maintenance, lack of management/headquarters, etc. support, and other priorities, e.g. adoption of ISO, TQM or ERP.
4. Activity-based costing systems functioning in the companies covered by the survey vary widely in respect of the elements identified, but in most of the companies, ABC has the following numbers of elements: 6 – 100 resources (76.1% of companies), 1 – 20 resource drivers (81.0% companies), 6 – 100 activities (72.4%), 6 – 100 activity drivers (73.1%) and over 500 cost objects (37.9%). Only 4 companies identified more than 100 activities, and only 1 company – more than 100 various activity cost drivers.
5. An important part of ABC system are cost calculations done for different objects (products, customers, etc.). The highest proportion of the companies (72.7%) calculate costs for products and groups of products, cost calculations are made for customers (39.4%) and groups of customers (48.5%). Based on ABC systems calculations are also done for sales regions, distribution channels and projects (45.5% each).

6. Information provided by ABC systems is used in making a wide range of decisions including: cost reduction, price decisions, budgeting, performance measurement and improvement, sales plan optimization, etc. ABC information is mainly used for making decisions concerning expansion of expenditure and, to a lesser extent, reduction of expenditure and new investments, the least use is made of this information in decisions on liquidation. According to the respondents, activity-based costing information is often used for evaluation of activities and processes (average rating 3.59) and performance of the company as a whole (3.50). Information provided by ABC systems in analysed companies is also used (to a considerable extent) in customer relations, especially to: improve customer service cost control, provide information for price policy formulation, for marketing strategy development and customer policy formulation.
7. The enterprises which have implemented activity-based costing also use other advanced management methods. 36.4% of companies surveyed use benchmarking, 30.3% balanced scorecard, 27.3% continuous improvement, 21.2% business process reengineering, 18.2% economic value added and 15.2% target costing. Some of the sample companies use many such methods (one company five, one company even six).

Several limitations of this research should be considered in interpreting the results. First, the results are based on a limited sample of companies (33 companies). Therefore, care should be taken in generalizing the results. Additionally, there are limitations in the questionnaire method used in the research, which unfortunately do not make possible very detailed analysis of ABC models used.

The research carried out makes it possible however to formulate some conclusions about future possibilities and directions of research:

1. First, questionnaire research carried out can be continued. It could be interesting to conduct similar research in a few years which could make the results more representative on one hand and on the other could make it possible to analyse the changing practice of management accounting in Poland, i.e. implementation, functioning of activity-based costing models and use of information generated by these models (Innes, Mitchell 1995, pp. 137-153, 2000, pp. 349-362).
2. Second, more detailed analysis of ABC models functioning and use on information generated by these models could be possible by using case study method. This method, although having its own limitations (Hopper *et al.* 2001, pp. 263-291; Zimmermann 2001, pp. 411-427) can offer possibility to analyse in detail how activity-based costing systems are

implemented and used and how they are perceived, meaning was an ABC implementation a success or not (Swenson 1995, pp. 167-180; Shields 1995, pp. 148-166; McGowan, Klammer 1997, pp. 217-237).

3. Third, as was mentioned before, a lot of companies is now considering ABC adoption. Some of these companies will actually implement ABC and some will not. Companies which will reject ABC will be a very interesting sample based on which reasons of ABC rejection could be analysed as well as directions in which they will develop they costing systems. It would also be interesting to compare after some years companies which decided to implement ABC with those which decided to reject the system (Krumwiede 1998, pp. 239-277).

In conclusion, findings of the research have both practical and theoretical implications. First, from the practical point of view, future implementers of ABC systems should be aware of factors influencing ABC implementation as well as problems which can be encountered during the implementation process. Managers considering activity-based costing implementation may see level of detail and methods of construction of an ABC information model. They may also benefit from the knowledge of how information generated by an ABC systems is actually used by companies. All this may help to make better decision about ABC implementation and if the decision is yes, it may help to implement ABC successfully. From the theoretical point of view the research carried out makes it possible to establish a general tendency: modifications in costing systems applied in Polish enterprises and development of management accounting practice such as ABC, although delayed, follows the same general direction as management accounting practice in the world.

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Streszczenie

ZASTOSOWANIE RACHUNKU KOSZTÓW DZIAŁAŃ W PRZEDSIĘBIORSTWACH W POLSCE

Celem niniejszego artykułu jest analiza stanu rozpowszechnienia rachunku kosztów działań w przedsiębiorstwach w Polsce, w szczególności zaś analiza problemów

pojawiających się w procesie wdrożenia, struktury systemów ABC oraz sposobów wykorzystania informacji z systemów rachunku kosztów działań.

Wnioski z przeprowadzonych badań mają znaczenie zarówno teoretyczne jak i praktyczne. Z praktycznego punktu widzenia, przedsiębiorstwa rozważające implementację ABC w przyszłości powinny mieć świadomość czynników wpływających na implementację ABC jak również problemów, które mogą się w procesie implementacji pojawić. Menedżerowie rozważający implementację ABC muszą zdawać sobie sprawę z poziomu szczegółowości i sposobów budowy systemu informacyjnego rachunku kosztów działań. Mogą oni również skorzystać z wiedzy o sposobach wykorzystania informacji z systemów rachunku kosztów działań. Wiedza ta może sprzyjać podejmowaniu lepszych decyzji odnośnie implementacji systemów ABC, a jeżeli decyzja o implementacji zostanie podjęta, może się przyczynić do zwiększenia prawdopodobieństwa zakończenia procesu wdrożenia sukcesem. Z teoretycznego punktu widzenia, przeprowadzone badania mogą się przyczynić do określenia ogólnej tendencji: modyfikacje systemów rachunku kosztów w przedsiębiorstwach w Polsce oraz wdrażanie nowoczesnych metod rachunkowości zarządczej takich jak ABC, zmierza w podobnym kierunku jak praktyka rachunkowości zarządczej na świecie.