

TECHNOLOGY FOR LIGHT-WEIGHT ABC IN SME

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Abstract. During the last 20 years most of the enterprises are adopting modern technologies – to excel in market, and to reduce costs. ABC is a method that helps to manage the costs in enterprises and to manage and understand processes of the enterprises. Traditional ABC requires an information system for finance and book-keeping. In SMEs such systems are usually not available. Therefore to do not put additional burden on SMEs book-keeping and information processing, new ways of use of ABC should be considered. Making connections between processes, cost tables and cost estimates we propose a light-weight ABC usage method, which can be implemented by using multiple non-commercial tools.

Keywords: Activity-based costing, Small and Medium Enterprises, Business Process Management.

1 Introduction

ABC method is mostly used in large companies, but in small and medium enterprises (SMEs) ABC is used in special areas, for example in wine industry [1] or cook-shops [2]. Usually when SMEs start using ABC, they change their book-keeping system to make ABC perform effectively.

Activity Based Costing is an untraditional costing method created by Cooper and Kaplan (in 1988) [3]. ABC can be considered not as a method of costing, but as a technique for managing the organization better [4]. ABC can be described as a tool used for implementing ABM – Activity Based Management [5]. This method creates objects of costs by adding the overhead costs to certain activities. ABC is used in estimation of product prices as well as in the management of quality [6]. The conditions of ABC define that the estimates include all the processes related to the production of a certain product or service, starting from the purchase of raw materials up to the moment when the result reaches the client [7].

ABC is classified as an analytical costing method [8]. Overall there are 4 divisions mentioned in literature: intuitive costing, analogical costing, parametrical costing, and analytical costing. The goal of the use of ABC method is to facilitate decision making (e.g. whether to start the production of a new product) as well as to analyze the current situation – the performance of enterprise or organization, the production of goods.

In Section 2 related work is shortly described. In Section 3 light-weight ABC is proposed. In Section 4 conclusions and future work are described.

2 Related work

There are many different issues considered by ABC research papers and applications. ABC method is used in various industries, but mostly in large enterprises. Increasing competition causes more attention on how to manage and organize processes and costs in enterprises. ABC method is used even in formation and determination of judicature's costs and other law court costs [9]. In [10] some important points on advantages of ABC are mentioned: improves accuracy and relevance of product costing; provides timely cost information suitable for decision making.

Many authors describe problems and solutions in ABC enforcement in enterprises [5][11][7], for example data gathering and model building [12]. But most of these researches describe ABC in large enterprises [7]. Several papers [12] [13] reveal discussion about business process reference models use to support business process modeling for ABC. Some of authors [10] point to shortcomings of ABC, for example, doing little to change old management behavior; not driving companies to change their fundamental views about how to organize work and to satisfy customers efficiently; requiring additional effort and expenses to obtain information needed for analysis.

Analysis of related works results in some important adjudgements, for example, ABC improves accuracy and relevance of product costing [10]. It's a big and important issue when considering feasibility of ABC for SMEs. Experience of adapting and using ABC in large enterprises can be used developing ABC for SMEs. When we see situation and scenarios of ABC use in large enterprises, we can more easily develop scenarios for future ABC mode for SMEs.

3 Light-weight ABC or SME

3.1 Activity based costing adaptation model

As it was mentioned above, ABC is used mostly in large enterprises. While implementing this method in large enterprises their book-keeping system is adjusted or changed in order to use ABC successfully. The

management processes are reorganized, and the staff is trained. This process is difficult and demands resources; see table 1 – Traditional ABC system adoption. In case of SME large expenses are not advisable. Therefore the light-weight technology was invented to achieve cheap adoption and easy use of ABC. See light-weight ABC system adoption in table 1.

Table 1. Traditional and light-weight ABC system adoption

Traditional ABC system adoption [18]	Light-weight ABC system adoption
<ul style="list-style-type: none"> • Define the scope • Establish the goal of the project • Form a project management team • Do an initial feasibility analysis • Chose one leader who possesses leadership abilities with knowledge of ABC • Form steering committee • Train – Management, Implementers and Users • Convert general ledger to a data set that can be utilized by the ABC project management team • Separate activities in to primary or secondary ones • Develop real working ABC in enterprise • Start to use ABC and put information into it • Analyze results • Take decision 	<ul style="list-style-type: none"> • Start to use light-weight ABC • Read user manual and learn how to use the system • Prepare data of costs • Create business process models • Fill activity cost tables • Create report • Analyze the report • Take decision

As seen in table 1, in order to implement the traditional ABC in an enterprise the financial as well as human resources are required; the process usually lasts for 4-6 months [18]. For a SME it is too long because of the additional costs that arise during this period. In case of SME it is advisable to use minimal amount of resources and time. The second column of the table 1 shows phases that include the acquiring of the method and the L-W ABC system, implementation of it and gaining the results. These phases can be carried out during a few days or even during one day; it is easy and does not require additional costs from the enterprise.

The phase of traditional ABC – formation of the system for cost converting from the general ledger to the respective format of data – is not carried out. The amount of data in SME is comparatively small. And the fact that light-weight ABC system is used by the management of the enterprise reduces the necessity for a specified accounting system because the manager can use the method manually by following the existing financial and book-keeping data as well as by monitoring the practical progress of the process.

3.2 Light-weight ABC

The costs in ABC model are created by attaching resources to certain activities that characterize a certain process in the enterprise. By attaching these resources to the activities we get a cost object. A cost object is anything for which the cost data are desired including products, product lines, customers, jobs, and organizational subunits [14]. For the purpose of assigning costs to cost objects, costs are classified as direct cost and indirect cost [14]. The traditional cost forming model can be seen in figure 1. In light-weight ABC (L-W ABC) this structure is preserved while additionally modeling processes that are detailed in activities and to which the resource costs will be tied.

As it was mentioned above, the traditional ABC model is shown in figure 1. But the structure of the L-W ABC model is shown in figure 2.

As seen on figure 2, the business processes lead us to the costs where the linkage between the activities and resources is preserved as in the traditional ABC model. In L-W ABC model we get cost objects when we develop a business processes model and then link costs to the process. In traditional ABC model we identify all activities (mostly it's an activity list), and create a cost table, then resource table from which the resources will be taken and added to activities. These processes of identifying all activities are built during business process modeling.

Business process modeling and management (BPM) currently is very topical. Business process management (BPM) is a management approach focused on aligning all aspects of an organization with the wants and needs of clients. It is a holistic management approach [15] that promotes business effectiveness and efficiency while striving for innovation, flexibility, and integration with technology. Business process modeling (BPM) in systems engineering and software engineering is the activity of representing processes of an enterprise, so that the current process may be analyzed and improved [16]. This article will illustrate proposed approach by business process of a small dairy farm.

The spectrum of available non-commercial tools at the moment is very wide; these tools can be especially effective in small projects. Also open-source tools [17] as ARIS Express, BizAgi Process Modeler, Process Maker etc. are available. For calculation and tables there are open-source tools as OpenOffice spreadsheet and others. The goal is to find a scenario that would describe the performance of the system, and the links between the tools in order to provide wholesome performance of the L-W ABC system. It is possible to find such a scenario, and that provides a possibility to use ABC in a different way than before.

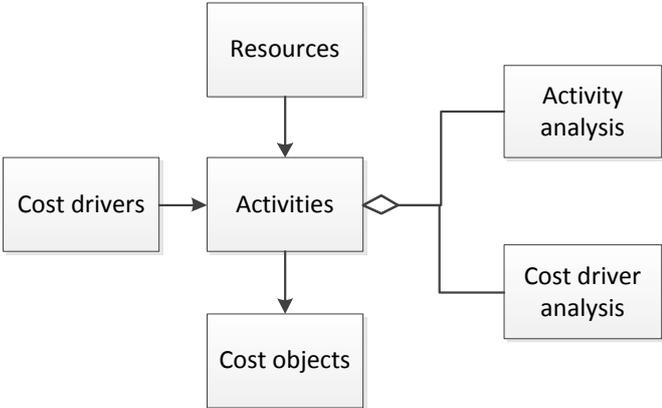


Figure 1. Traditional ABC model [10]

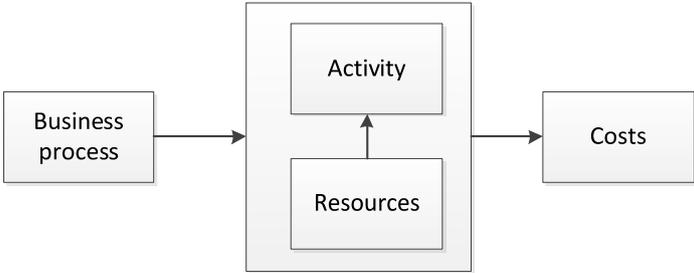


Figure 2. Light-weight ABC model

L-W ABC solution should provide a simplified performance of the user’s actions, and valuable results for the analysis. The user is offered guidelines on usage of ABC and the system; these guidelines include models of standardized processes that can be modified optionally in accordance to the requirements of the user. It should be noted that while implementing L-W ABC it is advisable to work with a single field at a time, e.g. dairying. Formation of standardized models for several fields at a time can be a labor-consuming task. In figure 3 L-W ABC system is an L-W ABC specified functions in tool/tools.

In L-W ABC systems implementation, it is necessary to define standard business process models, where business processes suit the subjacent business process with defined costs included in the current industry. Those standard business process models with defined costs will perform instructor’s role for user to let them understand how to form the business process model and how to work with this system. It illustrates also how “standard” processes look like in this industry. L-W ABC systems and user action scenario is shown in figure 3. There is a difference in scenarios, when the user chooses to use standard business process model or chooses to create a new model. Users in this process need simple visual user interface with most important functions – delete, save, etc. That offers an effect of an easily understandable system.

ABC system in figure 3 shows a technological solution: how non-commercial tools need to perform in order to implement the idea and goals of ABC. ABC system is a compilation of technical activities for the tool. There is a scope of functions that are to be realized, if we want to have L-W ABC as the result. Figure 3 shows that user has to perform only a few steps to achieve the result, all technical and informative work is done by the L-W ABC system of the tool.

While creating BPM the system automatically forms the tables of corresponding costs. The system provides a cost table for each activity as well as the connection between the activity and the other cost tables corresponding to the links of BPM activities (see figure 4).

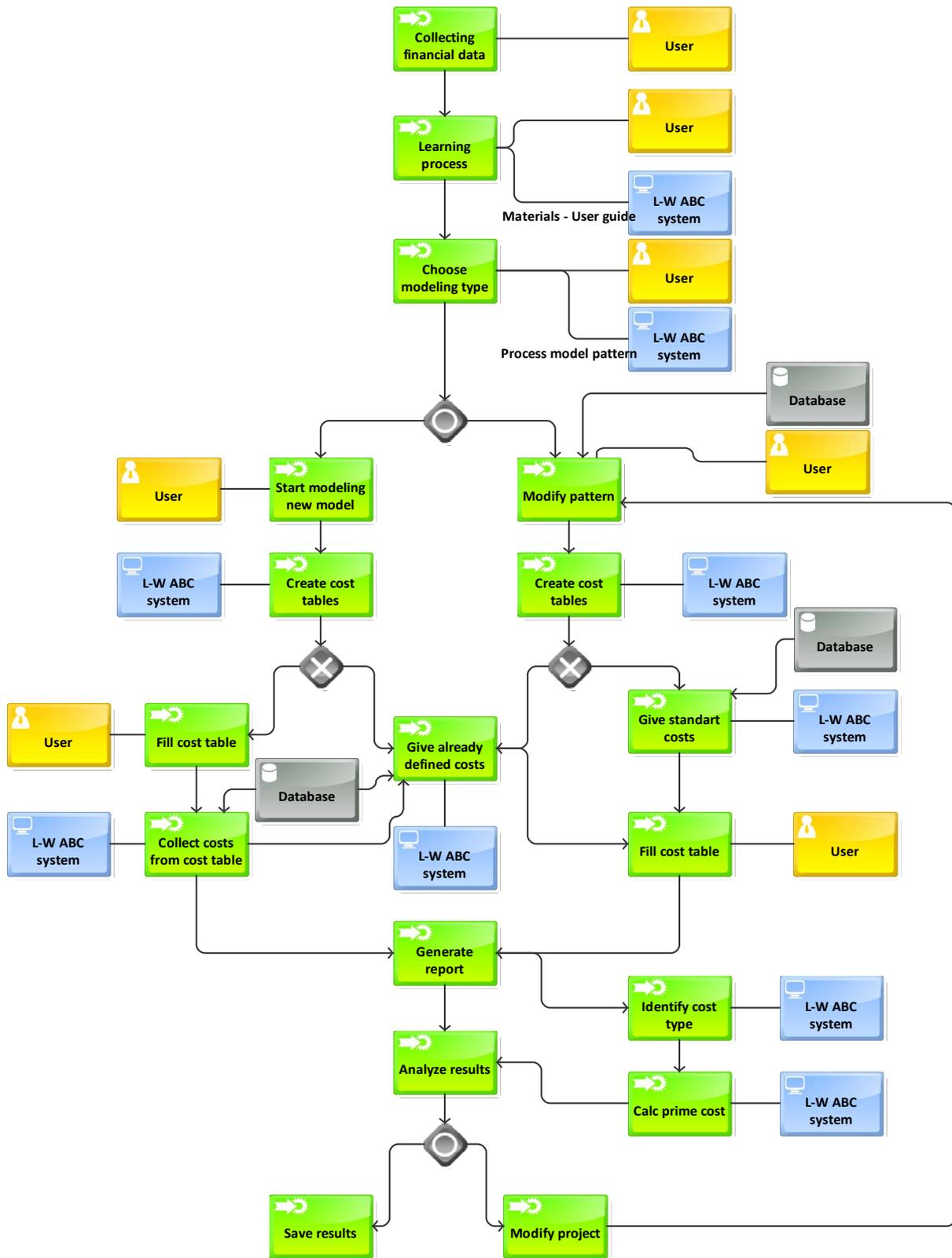


Figure 3. Light-weight ABC systems and user work model

Connection between BPM model and the database tables is dynamic. When the user creates a new process or activity, system creates new record in database and offers the most appropriate data for the user, in order to fill all the necessary information. It is required in order to estimate precise total costs, and to handle separate phases while preserving the overall context.

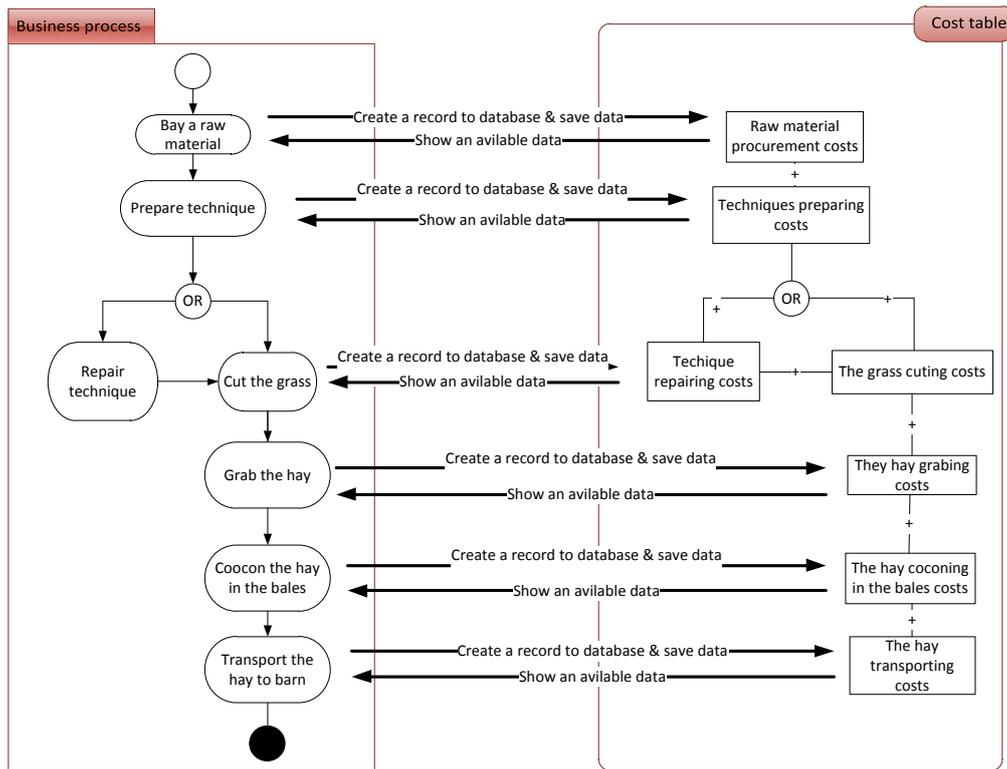


Figure 4. Model of connection between the Business process and the cost table

The transition to the cost tables is done graphically – the table is opened by double clicking on the name of the process/activity. Accordingly the return from the table to the process model should be provided. Therefore there is an impression that the user is working with small graphic tables.

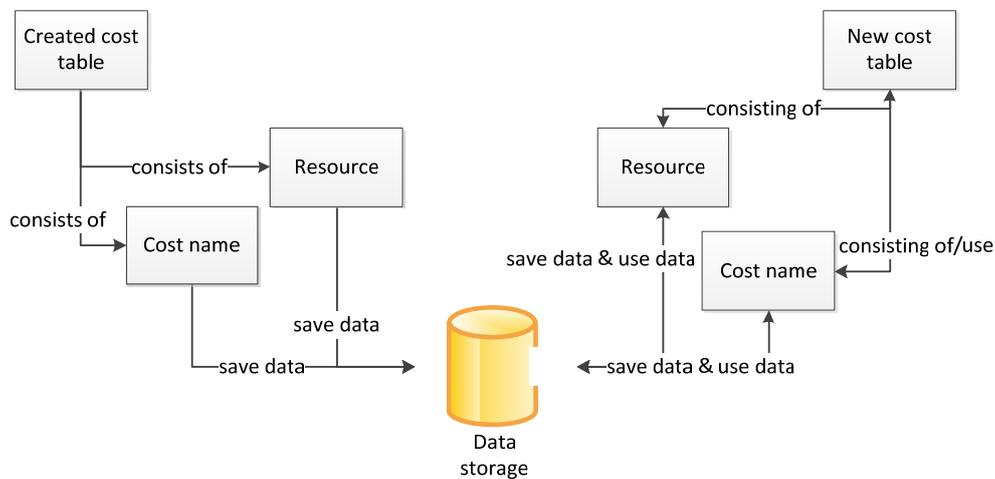


Figure 5. Model of Costs Resource storage and use

In case of the standard model the cost tables are formed in shape that reflects the space for the standard costs and resources, and the user inserts only the cost sums and units.

Formative model of costs collection is illustrated in figure 5. Existing patterns or standard business process models include self defined costs. For defining a new cost, it will be saved in internal data base and when the user fills cost table next time this cost will be available using drop-down function.

In the report user can see a united costs table and the results of analysis. User generates the report when process model and all costs tables are completed. After report is generated, user can analyze – which process consumes most of the financial resources and so on. The user can make a decision to change the business process model or cost tables. If he chooses to do it, he goes back and does it. When he generates a new report, he can compare two reports. It's very helpful when making important decisions in process control or financial questions.

To show full view of costs, system must divide the costs in direct costs and indirect costs, to let the user make better decisions in the enterprise management strategy. But to do it, all traditional costs types in cost collections need to be identified and defined. Unfortunately, in traditional ABC system they use only indirect costs, because it's more difficult to divide them between processes. In this model we take both – direct and indirect costs, to give an exact product prime cost. To know their costs and to manage them SMEs don't use many different tools. They need one and complete tool to identify costs and to manage the processes. Therefore it was decided to include direct costs into L-W ABC.

The first goal in this research is to create L-W ABC in SMEs model, which gives instructions, and show how this L-W ABC works and what functionality for SMEs it gives. This model is created and allows us to discuss the details of user instruction and system usage.

During the project, some tests of tools were taking place, for example a test of Open Office Base. This tool gives a good opportunity to model a database with calculations, but it does not support modeling options. To show the results, we used the opportunity to model data base in Open Office Base; to model a BPM, we used ARIS Express tool. The question what technology should be used to connect tools, for example Open Office Base and some modeling tool, remains open. The result of this project was a prototype, which shows how this idea works – what will the user do to find the cost of a product or service.

4 Conclusions

Technology for light-weight ABC in SMEs is a simple ABC method, which is more simple than traditional ABC in use and does not need a lot of financial resources to be adapted in SMEs. It gives the users a possibility to work with processes in graphical mode and with only one cost table at time. A traditional ABC method is very complex and requires a special knowledge from the users. Light-weight ABC method is for enterprises owners or managers, who know the processes and need to make strategic decisions.

This kind of technology is a step forward, because it helps SMEs to manage enterprises better and let them think about enterprise management. Today it's very usual that SMEs do not use economical knowledge or control knowledge to manage their enterprises. This situation needs to be changed, if we want to improve the situation of SMEs.

This simple ABC method was studied during a one year project. It's not a long period, but it's a beginning for future work – light-weight ABC in SMEs implementation in a tool. In this studied period, only a model for Technology for light-weight ABC in SMEs was developed, but it gives a theme and real situation in ABC usage. Initially only one industry was studied– milk manufacturing industry, where the insight was experimented with real financial data and researched standard processes of the possibilities in SMEs use in this business

This research lets us consider non-commercial tools. Tools may be one of the key factors in making progress in SMEs businesses, since their use does not require extensive financial resources, usually they are free of charge and in current economical situation it's a very important fact for L-W ABC implementation.

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