

The Modified Activity-Based Costing Method in Universal Postal Service Area: Case Study of the Montenegro Post

Momcilo Kujacic¹, Mladenka Blagojevic², Dragana Sarac¹, Vujadin Vesovic³

¹University of Novi Sad
Trg Dositeja Obradovica 6, 21000 Novi Sad, Serbia
E-mail. momokujacic@hotmail.com, dsarac@uns.ac.rs

²University of Belgrade
Vojvode Stepe 305, 11000 Belgrade, Serbia,
E-mail. mlablag@yahoo.com

³Faculty of Transport, Communications and Logistics
Donje Luge bb, 84300 Berane, Montenegro
E-mail. vujadin.vesovic@gmail.com

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The 3rd EC Postal Directive proposes a calculation approach to separately determine the net cost of universal service obligation. Also proposes presence of liability to compensate the universal service provider. In this paper, authors have presented the necessity of compliance with Postal Directives through application of the activity-based costing method for costs calculation related to the universal postal operator. The objective of this paper is to research the possibility of modification of the existing, traditional ABC method. Method will improve the quality of cost accounting of the universal postal operators. The aim is to present the implementation of the modified activity-based cost accounting method from the point of view of a universal postal service. Conceptual framework for the modified activity-based costing in the area of universal postal service has been developed and applied in the Montenegro Post. This modification of the traditional activity-based costing, called the modified activity-based costing, for solving specific accounting problems in a universal postal service area, is the main contribution of the paper. As long as the modified ABC method is not created and implemented, the Montenegro Post has been unable to adequately respond to the established legal requirements. The presented method can be a guide for other postal companies with matters concerning the calculation of costs and revenues.

Keywords: Activity-based costing, Activity-based management, Universal postal service, Universal postal provider, Costs.

Introduction

Cost estimation is a useful tool and can provide decision bases and guidelines to the decision maker. In order to establish the cost of an object, different cost estimation methods can be used. The first decision to make is whether all costs should be included and allocated to the object or not. In literature, it is often referred to complete cost allocation, i.e. when all costs are taken into consideration (Skarvad & Olsson, 2006). Based on this basic approach there exist many different cost estimation methods. One of the most modern cost accounting methods is the activity-based costing (ABC). Emergence of ABC has made tremendous progress in the development of theory and practice of cost accounting. Shortcomings of traditional cost accounting systems were overcome by this concept (Granof *et al.*, 2000). Quality of information of the ABC underpins an activity-based management approach (ABM), which is a modern management approach, based on the monitoring of the existing set of activities and processes taking place within the company while highlighting opportunities for efficient performance (Armstrong, 2002). The ABC/M is an accounting approach which assigns, instead of allocating,

manufacturing overhead costs to the activities. This allows management to make more frequent and informed decisions about pricing, product range, design services and processes, investment in new technology, services and similar. The ABC method that describes all the resources, activities and processes in a company is a very powerful decision-making tool, particularly for a business development, pricing policies, resource allocation, investment and outsourcing. Creating and maintaining such a model can be a complex task, requiring each organization to decide on the level of applied details. Precisely these circumstances are treated in this paper. Paper proposes an innovative multi-dimensional approach of cost accounting on the principle of sustainability, through the full cost allocation. The proposed approach is tested on real data collected from the Montenegro Post as universal postal service provider.

The paper of (Gimzauskiene & Kloviene, 2011) emphasized that traditional management accounting systems/methods could not infuse all needed information for management process in an organization. They say that new business environment, which varies constantly, influenced a strong interest in modern performance measurement which covers financial and not financial measurement. According

to this, the similar scenario could be seen in postal area: universal service provider (in our case the Montenegro Post) should implement a cost accounting system to quantify both the efficiency and effectiveness of activities. Also, system should identify competitive activities, locate problematic activities, make tactical decisions and supply feedback after decisions are implemented and related to costs.

During the process of observation, three problem areas with the Montenegro Post's previous cost estimation system were identified. First, only a few properly skilled employees were actually able to perform cost estimations due to the system's user requirements. Second, management was unable to estimate the cost of transactions/services by themselves. That is significantly increased the time for price approximation in the service process. Final, they were not able to perform sensitivity analyses on the cost estimations.

Authors of the paper tried to indicate connection between activity-based costing technique and postal expenditures, with an emphasis on possibility to modify the traditional ABC concept by specific postal aspects. According to postal legislation, the Montenegro Post, as universal postal operator, is required to prepare a description of cost accounting system. System should define the main categories of grouping costs, together with the applicable rules for the cost allocation.

In the paper multiple research methods have been used in order to collect and process necessary data. Due to the lack of quantitative data, research method such as observation has been the predominant choice for collecting data. Internal and external documents have also been utilized in order to collect cost and revenue data and to build the theoretical foundation. It could be said that real rationale to write the paper is the state of current cost estimation system of chosen universal postal operator. In the system proposed in this paper, authors suggested implementation of the modified activity-based costing method for calculating costs relevant to the postal services. Also, listed the main categories of grouping costs, together with the applicable rules for the allocation.

The purpose of this paper is to develop the modified procedure for implementation of ABC in postal companies.

Problem Discussion

As we mentioned, previous cost estimation system at the Montenegro Post had several drawbacks. It created obvious problems with fulfilling requirements contained in the EC Postal Directives, which relate to the allocation and estimation of costs. Namely, one of the effects of the current postal legislation is a request that the public postal operators must publish accounting data on their operations while respecting a number of criteria. For postal traffic, cost allocation is the most important point because in this kind of traffic offer and perform various services using a single, common for all subjects, postal network, resulting in the creation of general expenses. Article 14 (3) of Directive 97/67/EC provides clear rules of the cost allocation of postal services, which are widely accepted by the universal service providers and national regulatory bodies (Directive 97/67/EC, Directive 2002/39/EC). As long as the modified ABC method is not created and implemented, the Montenegro Post has been unable to adequately respond to

the established requirements. According to postal legislation, the Montenegro Post, as the sole universal service provider in the Republic of Montenegro, has a legal obligation to provide universal postal service throughout the country. New operators, who would emerge in the market due to liberalization, not a priori required to provide universal service. They have opportunity to choose services and part of the market in which they operate. Because of universal service obligation, the Montenegro Post achieves financial losses. Obligation to reach any user, even those at most rural areas, creates significant costs for the public postal operator the Montenegro Post. In purpose to show to competent regulatory body properly and thoroughly cost per service, the Montenegro Post has an obligation to implement a cost accounting system tailored to own operations. Accounting system will meet requirements related to separate accounting records. Towards meeting this goal, the modified activity-based costing method introduced in this paper for the first time, offers a new possibility for postal services cost accounting. Although the literature has reported numerous implementations of ABC in many business areas, there has been limited accounting of ABC adopted by postal operators. Moreover, the outcome of the traditional theoretical ABC method is not sufficiently usable for the purpose of cost accounting in postal sector. Namely, standard and traditional steps of the ABC method are rather general for implementation on specific business of postal operator. Specificity of the postal operator is reflected in the fact that he has no classic product for which price and cost can be easily determined. As an outcome he has postal services and products, specific themselves, and for their quantification is necessary to create new or improved technique. The modified ABC method presents first attempt to show adaptation of theoretical ABC method and its modification in field of postal services. Therefore, in this paper authors wanted to go further, i.e. to describe a procedure that allows postal operators to smoothly switch from a traditional costing system to an activity-based costing system at low risk and with minimal investment.

The research problem of this paper is proposal of an innovative multi-dimensional approach to cost accounting on the principle of sustainability, through the full cost allocation.

The key objective of this paper is to research the possibility of modification of the existing ABC method. Modified ABC method should be able to improve the quality of cost accounting of the universal postal operators. In other words, authors' intention is to use the ABC/M concept mainly for accounting purposes, with modifications adapted to the postal sector. The main focus of the paper has been aimed at developing a cost estimation system that is capable to estimating the cost of postal services accurately. In paper, authors included the development and implementation of the modified activity-based cost accounting system, from the point of view of a universal postal service. The actual integration of the accounting system into the organization has been included. Namely, the activity-based costing method is significantly improved for the purpose of application in the area of universal postal service. The proposed method is tested on a real data collected from the Montenegro Post. Based on this approach, universal postal operator would maintain separate

accounting records for revenue and costs, alongside the rules for the allocation of common revenues and costs.

It should also be noted that the suggested implementation procedure for the modified ABC method has a clear delimitation. It is merely based on a single case study at one single company. On the other hand, it enables a very detailed and in-depth study of the procedure to be performed. The largest threat to the validity of the suggested implementation procedure is the generality, since it is merely based on a single case study.

The paper is structured as follows: next section presents a brief literature review. After that is given explanation of the research design. Then, section that follows contains the theoretical framework introduction, which is then used for a case study of the Montenegro Post. The key findings and a discussion are given also, as well as conclusions on the matter.

Literature Review

A bulk of papers related to the ABC and the ABC/M methods were published during a last decade. Emergence of ABC has made significant progress in the development of theory and practice of cost accounting, according to (Mishra & Vaysman, 2001). This concept, by focusing on relevant activities, greatly contributed to overcoming the all too apparent shortcomings of traditional cost accounting systems (Granof *et al.*, 2000). According to Bacon and (Coughlin, 2004) the ABC system of cost accounting provides great opportunities for a successful cost management. The authors (Gimzauskiene & Kloviene, 2008) noticed that ABC serves not only as a cost knowledge management tool but also as a process by which employees gain the opportunity to learn more about how the organization allocates its resources and creates value. In the paper of (Askarany & Yazdifar, 2007) authors have examined the level of association between attributes of innovation and the diffusion of activity-based costing. Similarly (Askarany *et al.*, 2007) researched connection between innovation, activity-based costing and satisfaction.

According to (Khataie *et al.*, 2011), the ABC/M is a relatively new cost accounting and management approach that enhances the level of understanding about business operation costs, especially manufacturing overhead costs. The ABC/M has successfully been applied to modern production environments and is compatible with a continuous improvement philosophy, in accordance to (Gupta & Galloway, 2003). (Rodriguez & Storer, 2000) explained how ABC decomposes and monitors the costs of supporting resources from individual functions and costs, through the activities, until the effects are produced, using a relatively reliable measure of their precise allocation, such as the cost drivers of activities. (Baldvinsdottira *et al.*, 2010) conclude that, in recent decades, the interest of academic researchers in the practical aspects of management accounting has waned. Authors of this paper noticed that there is still an interest in ABC/M in the last years (2002–2010), according to published papers and industry articles. This pattern of publication has been characterized by a high proportion of authorship from the accounting practitioner and from the consultancy constituencies. While much of this has been positive and promotional, it has also been

subjective in substance. Papers about ABC and ABC/M were theoretical and prescriptive (Hopper, 1994; Lukka & Granlund, 2002). Others considered that ABC promoted rationality, efficiency and ultimate profitability (Jones & Dugdale, 2002; Cohen *et al.*, 2005; Hopper & Major, 2007). However, ABC/M has, in addition, attracted an academic research interest which has brought a wide range of research methods to bear on the topic.

Considering all the facts, it can be said that literature is filled with publications and studies concerning the implementation of the ABC and the ABC/M in various sectors, such as: decision-making concerning product modularity (Thyssen *et al.*, 2006), application of activity-based costing to a land transportation (Baykasoglu & Kaplanoglu, 2008), application of activity-based costing for reengineering purposes (Tatsiopoulos & Panayiotou, 2000), organizational questions (Kallunki & Silvola, 2008), ABC for service industries (Popesko, 2009; Szychta, 2010), for manufacturing industries (Popesko, 2010).

In terms of postal sector, there is evident lack of papers, generally speaking. We find papers relating to universal postal service, some of them are: (Calzada, 2009; Mirabel *et al.*, 2009; Cetiner *et al.*, 2010) and one paper which treated question of employees' stress level, as well as quality improvement in Serbian Post (Dobrodolac *et al.*, 2012). According to the authors knowledge there are no papers concerning the implementation of ABC and ABC/M within the postal sector. Due to this fact, this paper contributes in the field of specific application of activity-based costing method.

Research Design

The research design is the overall approach that should be chosen based on the given research objectives, the extent of existing knowledge and the amount of time and other resources available. Furthermore, it is crucial for the end result that the choice of research design is clearly specified and communicated (Lewis *et al.*, 2007). In fact, this choice is usually made before the actual research begins (Denscombe, 2007).

In this paper, a single case study, as a research design, is conducted to investigate the practical procedure for modification of the theoretical ABC method. A case study is defined as (Robson, 2002):

“...a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence.”

This strategy is therefore frequently used for explanatory or exploratory research. Case studies can namely be a useful way of challenging an existing theory (Lewis *et al.*, 2007). In addition, multiple case studies are often favorable to choose compared to single case studies. This is simply because it enables more statistically correct comparisons and conclusions (Yin, 2003). However, it was merely possible to conduct a single case study in this paper, but it would be of great interest to test the procedure for the modified ABC implementation for other similar cases as well, in order to increase the credibility.

As we said, objective of conducted case study is the universal postal service and calculation of costs of universal

postal service in the area of Republic of Montenegro. The universal postal service shall represent a group of postal services of specified quality, provided for all users at an affordable price, regardless of geographic position of users in the territory.

According to the postal legislation in Montenegro, the universal postal service includes receiving, processing, transport and delivery of letters weighing up to 2 kg, parcels up to 10 kg, postal money orders, literature for the blind, the registered items in international and domestic traffic, as well as delivery of parcels weighing up to 20 kg in international postal traffic.

Under the provisions of Article 14 of Directive 97/67/EC, the universal postal operator is obliged to keep separate accounting records for services, while competent independent body must verify the selected billing system.

The essence of all methods that are used for this purpose is to allocate all the costs (direct and common) by services in order to avoid the negative phenomenon of cross-subsidy. The most suitable of all methods, which also is recommended by the Postal Directive, is the activity-based costing-ABC method. An ABC method assumes that costs are not incurred only as a consequence of productive activities but also as a consequence of supporting activities. General-common costs should be distributed to the activities of all services, based on cost drivers.

All universal postal operators have to demonstrate a complete distribution of overhead costs based on accepted methods of distribution. In relation to the internal system of tariffs they have to govern the principle of avoiding transmission costs and revenues between service areas or between postal sector and other sectors such as financial services, logistics and so on. Approach that represents the association between activity-based costing and improvement in financial sector is taking into account the additional costs of operators. Those are fixed and variable, direct and indirect costs of all services that are included in liabilities, and costs of implementing operational and administrative activities on the whole territory covered.

Activities are fundamental in activity-based costing method. An important starting point is: activities consume resources, i.e. activities cause costs and postal operator, for production services, consume activities. Therefore, this approach includes (Narayanan, 2003):

- Identifying activities that consume resources;
- Identifying the cost drivers relating to activities;
- Allocation of overhead costs to activities;
- Allocation of activities on the effects of operator in production of services.

In this paper, an original ABC method (which contains four steps) has been modified and innovated by introducing three additional steps. In our case study of the Montenegro Post, application of the ABC method showed in detail the main categories of costs by grouping processes or activities and rules that manage the cost allocation for services. That served as the basis for software solutions design for managing the cost of internal accounting. It was necessary to identify all operators' resources and identify expense categories. Identified activities were involved and the resource's costs were assigned to the activities. At the end, activities were associated with the costs of services through

the cost drivers and ratios which were used for obtaining monetary value of services. Described model was applied to the public/universal postal operator the Montenegro Post, and the implementation was described in seven steps (Blagojevic *et al.*, 2010):

1. *Operator's infrastructure and human capacities identification* - includes the outline of capacity and employees that the operator has;

2. *Identification of resources (expense) categories* - includes all operators' expenditures (business, financial and other) for the reference year. A resource can be seen as one or the sum of a few belonging expenses from the income statement. Operator's expenses have been categorized into different resources;

3. *Defining activities by technological process and services* - the authors made the identification of activities for all types of services and summarized them by the basic technological processes in the postal traffic. Each process may consist of one or more activities. The ABC method identifies a group of referent activities within the organization. Each service is related to the set of activities and during the provision of services all those activities has to be done. Based on obtained data related to activities and services, authors made a table that presents the relationship of activities and services in the form of the ASD (Activity-Service-Dependence) matrix;

4. *Defining the cost drivers of expenses and activities* - once the main activities have been defined, a total cost of each activity can be calculated. First, the expense categories related to each activity are identified by steps 2 and 3. Traceability from expenses to activities and to services can be done by cost drivers. To properly trace the expenses to each activity, cost drivers have to be identified for each cost/expense category. Then, activities are traced to services using new level of cost drivers;

5. *Attributing cost to activities and services* - cost attribution to activities (services) were done by using cost drivers. Appropriate expense categories were assigned to each activity and, in that way, the cost for each service was calculated. The CAD (Cost-Activity-Dependence) matrix is a matrix of depending costs and activities. Each activity consumes the ratio of an expense category. Also, each service consumes the ratio of an activity. There are many ways to obtain these ratios and the selected procedure will impact the desired accuracy. In approach presented in this paper desired accuracy is achieved through the systematic evaluation based on the actual collected data. Each column of the CAD matrix must add up to 1, i.e. 100 %;

6. *Determining monetary value of activities*

To determine the monetary value of each activity the following equation is applied:

$$TCA(i) = \sum_{j=1}^M Cost(j) \times CAD(i, j) \quad (1)$$

where:

$TCA(i)$ = Total cost of activity i ;

M = Number of expense categories;

$Cost(j)$ = Monetary value of expense category j ;

$CAD(i,j)$ = Ratio/Entry i, j of Cost-Activity-Dependence matrix from step 5.

The CAD matrix gives consumption of resources by each activity. Together with the value of each expense category, it is now possible to obtain the values of the activities as the sum of all the expenses on a given row in the CAD matrix. These calculated costs for activities can serve to operator for individual service pricing and providing discount to "big customer";

7. Determining monetary value of services

To determine the monetary value of each service authors proposed following equation:

$$OCP(i) = \sum_{i=1}^N TCA(i) \tag{2}$$

where:

OCP(i)=Overhead cost of service i;

N= Number of activities;

TCA(i)=Monetary value of activity i.

Now it is possible to obtain the values of the services, based on the previously calculated values of the activities, by summing up all the activities on a given row in the CAD matrix.

Case study: The Implementation of the Modified ABC Method to the Universal Postal Operator the Montenegro Post

The Montenegro Post is the most important business network in the Montenegro with a social mission to organize postal traffic as universal operator, with a continuous development of new, profitable services in accordance with the modern market demands. The aim of the Montenegro Post is the satisfaction of customers with the service quality. The Montenegro Post is granted a license to provide universal postal service. As the national postal operator and full member of the global postal network, the Montenegro Post has an important role in the provision of fast and reliable communication between individuals and institutions in the country and abroad. With 129 post offices, 92 being of a contractual character, 294 forward areas and 285 counters the Montenegro Post have the most expanded business network in Montenegro. Represents a company which provides easily accessible services to all citizens of Republic of Montenegro. Almost 900 employees work in the Montenegro Post and fully achieve their rights stipulated by the labor law.

In this paper authors suggested implementation of the modified activity-based costing method for calculating costs relevant to the postal services. The actual implementation of the modified ABC method begins by collecting appropriate cost estimation information, which becomes the foundation to the subsequent allocation procedure. The identification of resources and activities are treated similarly, i.e. these contain equivalent stages, but these are not necessarily strictly separated in time. It is certainly more adequate to perform some of these stages more in parallel, due to their close relations; although it is difficult to suggest a general approach.

Practical application of the method was carried out over the public postal operator’s services (provider of universal postal service). The resulting services classifications are

obtained by the expert’s opinions and knowledge. Year 2010 was randomly chosen as referent.

Brief facts related to the Montenegro Post for 2010 year, according to previously described seven steps of application of the modified ABC method are:

- Identification of resources categories is done through the 129 postal network units (77 regular and 52 franchised outlets). The present tendency is turning unprofitable units in the "contracting-mail units";

- The Montenegro Post identified expenditures up to 14,856.206€ in 2010. Expenditures were lower than those achieved in 2009 year by 2,3 % and 8,2 % higher than planned one. The biggest share in total expenditures were the costs of employees (65,4 %), which were by 1,4 % lower than the costs of employees in 2009;

- The ASD (Activity-Service-Dependence) matrix is given in Table 1, where examples for certain types of services are presented. Table 1 shows the relationship between activities and services in the form of the ASD matrix. The columns present some activities which are identified during provision of postal services, and rows are categories of particular postal services. The original sample for 2010 year counts 35 types of services but because of practical and technical reasons authors presented here only seven services. √ mark indicates that the particular activity is involved in provision of certain services;

Table 1

Activities and services in the form of the ASD matrix

	ACTIVITY										
	Collection	Sorting	Transport	Delivery	Collection of telegrams	Sorting of telegrams	Delivery of telegrams	Preparation of hybrid mail	Discharge	Sale	Calculation
SERVICE											
Letter up to 50 g – domestic traffic	√	√	√	√							
Letter up to 50 g – international traffic	√	√		√							
Direct mail up to 50 g	√	√	√	√							
Parcels up to 10 kg – domestic traffic	√	√	√	√							
Parcels up to 10 kg – international traffic	√	√		√							
Literature for blind in domestic and international traffic	√	√	√	√							
Express mail	√	√	√	√							
Hybrid mail								√			

- The CAD (Cost-Activity-Dependence) matrix, as way for connecting activities with services by using the categories of costs, is given in Table the CAD (available upon request). Each column of the CAD matrix must add up to 1, i.e. 100 %;

- To obtain the monetary value of each activity and monetary value of each service the equations (1) and (2) were applied.

Results

Results obtained by using the modified ABC method for the Montenegro Post cost accounting are presented in this section. Because of the extensiveness of the data, only some of them are shown in the paper. The rest of the results is available upon request.

In this case study the identification of all activities through technological processes has been made. Then, as it is shown in Table 1, authors connected activities and services in the form of ASD matrix. Next, for each type of service a certain number of active workers were determined, as well as the percentage of each service in the total Montenegro Post's income. Because of size, the Table named The relations between services, workers and income are available upon request.

Next step in the modified ABC method is cost driver determination for each cost/expense category. By combining different approaches, authors defined the cost/expense categories and cost drivers:

1. Purchasing price of sold goods

This cost category belongs only to commercial services. The ratios for this cost category are expressed as a percentage share of any specific services in income (e.g., in the Montenegro Post ratios for purchase price of sold good in parcels for international traffic from 10 to 30 kg are 0.0011 because the percentage of these services in income is 0,0011);

2. Costs of materials

First it is necessary to define percentage of each technological phase in the entire technological process of provision of services, based on studies and recommendations of the EC Postal Directive. For the letters the following apportionment is established:

- collection 15 %;
- sorting 22 %;
- transport 10 %;
- delivery 53 %;

Apportionment for the parcels is given below:

- collection 13 %;
- sorting 22 %;
- transport 24 %;
- delivery 41 %.

The ratios for this cost category are calculated as the ratio of percentages of each service revenue participation and particular representation of phases (e.g., ratio of the cost of materials for letter in domestic traffic up to 50 g for each phase of the technological process is obtained by multiplying the percentage of representation of these phase and the percentage share of service in the revenue, i.e. collection for the letter in domestic traffic up to 50 g is calculated as $0,15 \times 0,00587$ and it is 0,0088 (Table The

Cost-Activity-Dependence (CAD) matrix, available upon request));

3. Production material costs

This cost category belongs only to commercial services. The ratios for this cost category are expressed as a percentage share of any specific service in income (e.g., ratio of production materials cost for of packages in international traffic from 10 to 30 kg is 0,0011 because the percentage of these services in income is 0,0011);

4. *Fuel and energy costs* – these costs are discussed from the aspects of costs of motor vehicles' fuel and heating costs. Ratios for the costs of motor vehicles' fuel are 27 % for letters, 63 % for packages, 0 % for financial services, 10 % for commercial services, in relation to cargo space needed to particular types of items. The ratios for the heating costs are treated as ratios for amortization, i.e. 24 % of letters, packages 23 %, 44 % of financial services, 10 % commercial;

5. *Employee and representation expenses* – in the Montenegro Post these costs are calculated as a product of percentage share of workers in each phase of provision of postal service and percentage of representation each observed phase. So, for example, for letter in international traffic up to 50 g ratio for sorting phase is $0,22 \times 0,1353$, i.e. 0,029766 (Table The Cost-Activity-Dependence (CAD) matrix, available upon request);

6. Amortization

- Letters 24 % ;
- Packages 23 % ;
- Financial services 44 % ;
- Commercial services 10 % ;

7. *Transport costs* – ratio for this cost category is calculated as the ratio of workers at each service and total number of workers. E.g., for packages in international traffic from 10 to 30 kg this ratio is 0,0055;

8. *Rental and fixes assets maintenance* – authors used the same percentages as in enumeration 6 for calculation of this category of cost (24 % of the letter, package 23 %, financial 44 %, commercial 10 %);

9. *Non-production services, taxes, contributions and other intangible costs* – ratios for this cost category are calculated in the same way as the ratios for material costs;

10. *Financial and other non-regular expenses* – these categories of costs are related to the percentage of particular postal services participation in total income.

As a result of the previously described procedure, which consists of categorization of activities, services, expenses/costs, cost drivers, and, most important, the determination of ratios for each type of costs, authors obtained the CAD matrix (Table Cost-Activity-Dependence (CAD) matrix, available upon request) for each type of service. Due to the CAD matrix, the exact value of each activity cost can be calculated. According to this value it is possible to get the cost of each service. Ratios are the essence of the matrix. After calculating these ratios, we can obtain monetary value of activities, monetary value of service and cost of each activity contained in the provision of services.

Table 2 contains amounts in euro for every type of previously explained cost/expense categories.

Table 2

Amount of every type of cost

Period	Year	Type of cost	Amount (€)
Annual	2010	Purchasing price of sold goods	312.83
Annual	2010	Costs of materials	3,873.00
Annual	2010	Production material cost	49,223.00
Annual	2010	Fuel and energy costs	543,592.00
Annual	2010	Employee and representation expenses	9,717,110.00
Annual	2010	Amortization	814,954.00
Annual	2010	Transport costs	209,566.00
Annual	2010	Rental and fixes assets maintenance	285.04
Annual	2010	Non-production services, taxes, contributions and other intangible costs	2,404,738.00
Annual	2010	Financial and other non-regular expenses	25,482.00

Table 3 shows DS1 form. This DS1 form contains 35 services that the Montenegro Post offers to customers. These services were identified by authors of the paper for case study purpose.

Table 3

DS1 form

ID	NAME OF SERVICE	PERIOD	YEAR	REVENUE (€)	PIECES
1	Letter up to 50 g – domestic traffic	Annual	2010	4,030,178.08	7,259,758.00
2	Letter from 51 to 100 g – domestic traffic	Annual	2010	886,407.6	3,408,566.00
3	Letter up to 50 g – international traffic	Annual	2010	294,158.34	9,243.00
4	Letter from 51 to 100 g – international traffic	Annual	2010	141,377.44	11,706.00
5	Imprimee up to 50 g – domestic traffic	Annual	2010	61,301.40	1,532.00
6	Imprimee from 51 to 100 g – domestic traffic	Annual	2010	265.67	129
7	Imprimee up to 50 g – international traffic	Annual	2010	1,191.28	455
8	Imprimee from 51 to 100 g – international traffic	Annual	2010	3,408.16	452
9	Postal money orders	Annual	2010	45,114.00	29,732.00
10	Direct mail up to 50 g	Annual	2010	75,313.00	43
11	Direct mail from 51 to 100 g	Annual	2010	0	0
12	Letter of court	Annual	2010	501,574.50	477,967.00
13	Letter from 101 to 2000 g – domestic traffic	Annual	2010	69,399.11	170,428.00
14	Letter from 101 to 2000 g – international traffic	Annual	2010	3,830.16	616
15	Imprimee from 101 to 2000 g – domestic traffic	Annual	2010	797	388
16	Imprimee from 101 to 2000 g – international traffic	Annual	2010	893.46	341
17	Parcels up to 10 kg – domestic traffic	Annual	2010	1,405.94	315
18	Parcels up to 10 kg – international traffic	Annual	2010	5,185.96	89
19	Packages for delivery in international traffic up to 2	Annual	2010	0	0
20	Literature for blind	Annual	2010	0	0
21	Parcels from 10.001 to 30 kg – domestic traffic	Annual	2010	2,583.33	937
22	Parcels from 10.001 to 30 kg – international traffic	Annual	2010	15,841.55	467
23	Indivisible imprimee in domestic and international	Annual	2010	0	0
24	Express mail	Annual	2010	103,644.00	0
25	Financial services	Annual	2010	2,240,646.00	0
26	Telegraph and telephone services	Annual	2010	982,879.00	0
27	Unaddressed mail	Annual	2010	95,504.18	2,331,419.00
28	Hybrid mail	Annual	2010	341,708.00	0
29	Courier services	Annual	2010	0	0
30	Other services	Annual	2010	0	0
31	Philately	Annual	2010	490	1,075,637.00
32	Post shop	Annual	2010	192,304.00	0
33	Sale of packaging and forms	Annual	2010	73	0
34	M bags	Annual	2010	0	0
35	Package delivery	Annual	2010	36,471.00	0

In this paper, the basic ABC method has been modified and innovated by introducing three additional steps. Authors called this the modified ABC method. By implementing the modified ABC method to the Montenegro Post, authors got, first, the cost allocation by activities and services, and therefore a new accounting system that satisfied requirements of the Directive 97/67/EC.

Table 4 contains results after application of the modified ABC method to the Montenegro Post. This Table represents the sublimation of all previous matrixes (the ASD and CAD). In the Table 4 the loss of Montenegro Post can be noticed and, as we can see, this loss for 2010th year is 1,639.702.46€. It is a consequence of providing universal postal service. According to (Jaag & Trinkner, 2011), the need for alternative funding sources has increased the interest of regulators and public in the cost of providing universal service. Furthermore, the universal service provider may require to be compensated for its burden. In order to overcome showed deficiency domestic regulatory body for postal services has the obligation to refund this amount to the Montenegro Post.

Table 4

The cost of universal postal service

Cost of universal postal service (Year 2010)			
Name of service	Revenue (€)	Cost (€)	Difference (€)
Letter up to 50 g (domestic traffic)	4,030,178.08	1,010,076.17	3,020,101.91
Letter from 51 to 100 g (domestic traffic)	886,407.60	351,770.38	534,637.22
Letter up to 50 gr (international traffic)	294,158.34	1,725,646.51	-1,431,488.17
Letter from 51 to 100 g (international traffic)	141,377.44	70,231.90	71,145.54
Imprimee up to 50 g (domestic traffic)	61,301.40	11,300.59	50,000.81
Imprimee from 51 to 100 g (domestic traffic)	26,567.00	302,826.38	-302,560.71
Imprimee up to 50 g (international traffic)	1,191.28	11,300.59	-10,109.31
Imprimee from 51 to 100 g (international traffic)	3,408.16	22,601.18	-19,193.02
Postal money orders	45,114.00	1,095,837.16	-1,050,723.16
Direct mail up to 50 g	75,313.00	939,848.20	-864,535.20
Direct mail from 51 to 100 g	0	350,026.47	-350,026.47
Letter of court	501,574.5	506,221.59	-4,647.09
Letter from 101 to 2000 g (domestic traffic)	69,399.11	308,488.78	-239,089.67
Letter from 101 to 2000 g (international traffic)	3,830.16	208,055.11	-204,224.95
Imprimee from 101 to 2000 g (domestic traffic)	797	246,707.35	-245,910.35
Imprimee from 101 to 2000 g (international traffic)	893.46	20,234.6	-19,341.14
Parcels up to 10 kg (domestic traffic)	1,405.94	177,900.80	-176,494.86
Parcels up to 10 kg (international traffic)	5,185.96	73,340.28	-68,154.32
Packages for delivery in international traffic up to 2 kg	0	318,170.19	-318,170.19
Literature for blind	0	10,919.34	-10,919.34
Grand total	6,121,801.10	7,761,503.56	-1,639,702.46

Discussion

Relating cost allocation approach, it might be justifiable to ask why the complete cost allocation approach was chosen in this case study. Based upon the pricing strategy that the Montenegro Post currently applies, this can be justified. As the estimated costs are supposed to act as a base for pricing decisions, it becomes obvious that a complete cost allocation, through the modified ABC necessarily has to be applied in order to ensure that all the costs in the postal company will be allocated to the cost objects.

Before developing the cost estimation system for the Montenegro Post, status of that operator was considered carefully and it was found that the most important of all the problems was failure to meet requests for cost accounting prescribed by Postal Directives.

The seven steps procedure described in section Research design covers a great part of the possible actual implementation procedures that may be applied in specific postal area. It is important to accent that there is an iterative nature between the steps. It can be difficult to reach a satisfying result if the iterative procedure is neglected, especially if the implementation task is performed in a larger and thus more complex company. It is also crucial to pointed out that ABC implementation requires much effort compared to other cost estimation methods, in order to become the superior alternative.

Numerical results of case study are shown above. One again we want to emphasize that results present sublimation of postal activities, postal services, expenses/costs, revenue and cost drivers. Outcome is grand total which presents cost of universal postal service. Main results of this paper, which are, actually, part of complete case study are highlighted below:

Postal companies require cost estimation systems

In postal companies that offer very specific products, i.e. services, the number of different services can be infinitely large. It is therefore not meaningful to estimate the cost for every individual cost object on beforehand, since it would be far too time consuming. This issue was experienced at the Montenegro Post and therefore another solution for activities and costs allocation to the cost objects is required. The suggested procedure was presented in sections Research design and Case study and includes the identification of the cost object components, finding the relations between activities and cost object components, developing a cost estimation system and validation of this system.

The developed modified ABC method

Within this paper authors developed the modified ABC method for universal postal service provider. The modified ABC contains additional three steps compared to basic, traditional ABC method. Then, the modified ABC method was applied for accounting in postal sector. Authors used real data from the Montenegro Post and provided evidence from a single case study as a first related empirical contribution. This addressed the main objective and goal given in the Introduction. Taking this approach to empirical research, it was possible to get deep and detailed insights into the problems of cost accounting in postal sector. The activity-based costing framework for universal postal service provider outlines the single steps that are required to be taken. This is not the case in any of the related

publications reviewed and discussed in the literature review. The presented method is able to integrate all aspects covered in previous frameworks and offers opportunities in applying the activity-based costing to a postal context. In proposed model, authors listed the main categories of grouping costs, together with the applicable rules for the allocation of them. According to Table 4 revenue and expenses of universal service can be seen. Authors previously identified activities that are indispensable in performing services and theoretically and numerically defined drivers/ratio who connect them with the costs and services. For the losses incurred as a result of providing universal service the Montenegro Post seeks reimbursement of regulatory agency, according to postal legislation.

Conclusions

The 3rd EC Postal Directive proposes a calculation approach to separately determine the net cost of universal service obligation and also proposes presence of liability to compensate the universal service provider.

The differences between the previous and the developed, the modified ABC cost estimation system, also as suggested procedure for the modified ABC method's implementation in postal companies has been presented and discussed throughout the previous sections. Generally, it can be concluded that the costing system at the Montenegro Post was transformed from being rather non-standardized to become more standardized and to rely more on structural capital. The developed cost estimation system is already an improvement for the Montenegro Post, although more aspects can favorably be added into the system. Linked to the integration, the credibility of the cost estimation system also has been proven. This is performed by using it in the daily business. Any eventual necessary adjustments can consequently be identified and solved properly in this manner.

To conclude some important differences between general ABC implementation literature and the suggested, improved and modified ABC procedure, it should be highlighted that:

- postal companies require a cost estimation system to enable allocation of activities to cost objects,
- for purpose to deal with, calculate and distribute costs of postal services the modified activity-based costing method is developed and used,
- the modified ABC contains three additional steps compared to basic, traditional ABC method,
- proposed method is suitable because it provides a smooth transition from a traditional costing system to the ABC, it does not require a high investment in sophisticated data collection systems, and it does not require a serious organizational restructuring,
- based on this method, the Montenegro Post is able to reflect revenue and expenses for each service from universal postal service domain,
- according to the daily, monthly and annual recordings, it is easy to calculate the operator's loss which faces due to the obligation of providing universal service,
- as long as the modified ABC method is not created and implemented, the Montenegro Post has been unable to adequately respond to the established requirements,

- practical guidelines and tools are provided, that may be useful in ABC implementation projects.

The suggested procedure for ABC implementation has been especially developed for postal companies and the paper presents a part of that project. Effects of application of presented method in the Montenegro Post are entirely positive. Application of the modified ABC method provides modernization of accounting system and simultaneously meeting the requirements of the Postal Directives in terms of separation and transparency of cost accounting of postal services. Presented method is general and it could be applied

for different types of postal organizations. It would also be of interest to test the suggested procedure in other similar case studies and ABC implementation projects, in order to increase the credibility.

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