Application of ABC Method in Hospital Management

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Abstract: - Paper analyses the present situation in application of Activity-Based Costing method in hospital management. Primary objective of the paper is to analyze the worldwide use of this method in healthcare sector and predict the possibilities of application of hospital wide ABC system. First part of the paper analyzes the ways of ABC implementation in published foreign studies. Second part outlines the individual steps in ABC application and discusses the differences in the application procedures in different ABC applications. Primary objective of the paper is to outline the general methodology of the ABC application in hospitals.

Key-Words: - Healthcare management, hospital management, cost management, Activity-based costing, variable costing, process.

1 Introduction
Hospital organizations have been facing difficulties and challenges in balancing limited resources and costs to provide their demand for services. Medical research has the effect in introduction of modern medical techniques and medicines, which usually causes the increase of consumed costs. Increasing costs of healthcare systems have the growing demands on the public budgets, and also the patients expenditures. Many countries start to seek the alternative sources of financing of healthcare systems, because the traditional systems of healthcare insurances are no more sufficient for covering of expansive healthcare services costs.

In face of these tendencies, many hospitals are under pressure to become more cost efficient. In this situation, attention to the acceptable accounting and costing systems is paid, in order to improve the efficiency of existing operations. [11] comments, that healthcare organizations use cost accounting to estimate the unit cost of services they provide. Such information helps establish a realistic budget; prices, identify inefficiencies and project the effect that changes in demand would have on resource requirement.

As in the case of manufacturing organizations, one of the key factors of effective company management is ability of accurate estimation of the cost of products. Product costing is an essential economic tool used to quantify the cost of individual interventions carried out.

[7] states, that most hospitals with costs management systems, use the absorption method. Traditional costs methods have caused distortions in indirect costs and financial reports normally do not provide the managers’ interpretations and actions for the control of deviations related to specific problems; also, their actions are rarely reflected in accounting reports, [2, 3, 21, 28] leading to frustration.

The difficulty inherent in choosing a proper and accurate product costing method for manufacturing enterprises has been widely discussed by academics and practitioners [9, 20]. The important limitation of traditional (absorption) costing methods had been also deeply discussed along with advantages of other costing method as Variable costing or Activity-based costing (ABC) [15].

Non-manufacturing sector [29] and the current complexity of cost structure and outputs of
organizations lead to frequent preference for modern costing methods (Variable costing method and Activity-based costing) over traditional absorption costing.

[6] states that more developed cost systems such as activity-based costing (ABC), may facilitate strive for cost efficiency. ABC provides more detailed cost information on the activities of the hospital, which could typically result into better cost reduction and cost management.

[7] supports the use of ABC in hospitals with statement, that information generated by ABC significantly contribute to hospital management in planning and managerial control, as they enable organizational behavioral changes by enhancing the attention focus for activities due to volumes.

Application of the ABC in healthcare institution entails a number of predictable benefits, especially the ability to quantify the actual costs of activities, to identify the relationship between the costs and means of carrying out these activities, to identify capacity influences on the overall costs of the organization and in the assessment of legislative issues regarding the reimbursement of particular performances to also measure the “profitability” of provided operations. It is necessary to view profitability in this case as an identified discrepancy between the amount of reimbursement for a certain performance and the actual (full) cost after taking into account all overhead costs [23].

Despite the fact that Activity-based costing methods had been originally developed for the use in the manufacturing organizations, use of the method in non-manufacturing sectors, such as services or healthcare is not unique, but relative frequent. ABC applications in manufacturing organizations have remained the focal point of interest for academics and practitioners during the 1990’s, but in the middle of the decade, we can identify the early applications of the method in healthcare institutions inurred.

2 Problem Description
Despite the proved advantages of the ABC applications in manufacturing and non-manufacturing sectors, such as: better understanding of process and activity costs correctly quantifying the costs of distinct production/service activities, some authors [8] points at the number of disadvantages, such as high complexity of the system or large amount of non-financial data requirements.

[30] states, that the most of the early applications of the ABC method in healthcare organizations focus on a narrow application of the method to a department in the healthcare organization. For instance [14] examines the application of the ABC to the costing of laboratory tests, [24] examines the application of ABC in hospital’s radiology department and a nursing station and finally [4] publicised the application of ABC in X-Ray department of the hospital. Similar narrow applications of the Activity-based costing are frequent also recently. For instance, [13] examines the use of the ABC in hematopathology laboratory, [7] report about ABC application in central sterilizing services and [25] examined the application of the method in heart centre.

These partial application of the Activity-based costing could effective solve any specific problems of the department management or support the managerial decisions on the department level, but are usually unusable for the overall hospital management.

One of the earliest studies, examining the organization wide application of ABC in hospital, was published by [30]. His study examines the hospital inpatient services. He states that outpatient care generally involves the much larger number of units of service with relatively small cost per unit. ABC can nonetheless be applied to a few selected high-volume and high-cost-low-profit outpatient services. Some of the more recent studies focus on more detail features of ABC in hospitals [19, 27], and connections of ABC with other managerial techniques such as benchmarking [12], process management [25] or management systems [26]. No relevant regional specifics of ABC application in hospitals could be identified. The published studies reports about successful applications in USA [30], Sweden [25], Belgium [27], Turkey [1], Japan [5], Taiwan [19], India [13], Spain [12] or Brazil [7].

As stated above, most of the studies focus on specific parts of the healthcare organizations or individual departments. Most important reason for those partial applications is high difference between the activity, product and cost structure in specific parts of organizations. ABC application in individual parts of the hospital could also lead to different managerial objectives.

Despite the relatively high number of existing applications use of the Activity-based costing method in hospital management still entails a number of issues related to the practical applicability of costing for the health organization environment, and its further practical usefulness for decision-making bodies and characteristics of specific information outputs of such methods.
especially for the specific conditions of national legislative environment.

As stated above, application of the ABC method in healthcare service provider could bring a lot of benefits for an organization, but brings also large number of risks related to bad system construction and utilization.

[27] states that while several articles have advocated the use of ABC by service organizations in general and healthcare organizations in particular, there is, nevertheless, need for some degree of caution. [17, 18] argue that a potential drawback of ABC systems lies in the time and resource consumption associated with the development and management of these systems. [16] note that the high time and cost to estimate an ABC model and to maintain it through re-interviews and re-surveys – has been a major barrier to widespread ABC adoption. In a similar vein, [10] claim that many managers who have tried to implement ABC in their organizations, including healthcare managers, have abandoned the attempt in the face of rising costs and employee irritation.

3 Problem Solution

Together with the emergence of ABC methodology in 1980’s, issues relating to the practical application in different types of organizations have been presented by both academics and practitioners. [9] defined the necessary steps to set up an ABC system as follows:

1. Identifying the major activities taking place in an organization
2. Assigning costs to cost pools/cost centers for each activity
3. Determining the cost driver for every activity
4. Assigning the costs of activities to products according to their individual demands on activities

It is obvious that the application of the ABC in healthcare institution will have a lot of specifics especially in the first step of application, where the individual activities are defined. Despite the fact, that the healthcare institution provides the oppositely different activities and tasks, logically the system construction could be similar to the manufacturing organization.

[30] defines the seven steps in ABC application in hospital management, which focuses more on practical application procedure of the system than on the system structure:

1. Form a cross functional steering committee
2. Identify case types/DRGs\(^1\) for analysis
3. Profile the health care delivery system
4. Aggregate activities
5. Analyze cost flow using cost drivers
6. Educate hospital staff about ABC
7. Evaluate and analyze data and results

Interesting issue of this application is the fact that cost object definition is made before the activity analysis. Udpa’s study [30] results showed the several important characteristics of ABC application in healthcare institutions:

- Key cost object, which is used for cost allocation are DRGs. In some situations use of the DRGs as the cost object could lead into distortions when DRGs are broad based and includes case types that are non-homogeneous.
- Number of performed actions is too detailed for effective use in ABC system. Performed actions had to be aggregated.

Different approach to ABC application was published by [19] who used the following steps:

1. Activity analysis
2. Cost structure analysis
3. Identification of cost object
4. Data collection for activity analysis
5. Data collection of cost assignment

Specific of the Lin’s study [19] was use of the individual patient as the cost object. Study uses also strict separation of the defined activities into primary and secondary (support).

Primary activities might relate to actions which the organization performs to satisfy external demands, while secondary refers to those performed to serve the needs of internal “customers”. This classification is essential for cost allocation procedures. In healthcare organizations, we can identify the higher importance of support activities, which could consume also the higher volumes of costs, than in manufacturing organizations [23].

[7] use the application procedure, which is very similar to traditional procedure presented by [9]. The study defined the following steps:

1. Institutional and analysis unit diagnosis

\(^1\) Diagnosis-related group (DRG) is a system to classify hospital cases into one of originally 467 groups. The 467th was "Ungroupable." The system of classification was developed as a collaborative project by Robert B Fetter, PhD of the Yale School of Management, and John D Thompson, MPH of the Yale School of Public Health. The system is also referred to as "the DRGs," and its intent was to identify the "products" that a hospital provides.
2. Processes mapping and activities identification
3. Activities and resource drivers cost
4. The cost of cost objects and activity drivers

Costs objects or costs objectives in their study are costing sterilization and disinfection by cycle/load and by the groups of products performed in this CSS. They were grouped considering the type of processing; physical chemical disinfection and pressurized and LTSF steam sterilization.

Based on the other published studies, there is possible to define the general specifics of the ABC application in healthcare institutions:

Identifying the major activities
Most of the studies define the activity definition as the default step of application. Activities form the basis of measurement of all relevant information in an ABC system. Several procedures defining activities may be used [22]:
- Analysis of the organizational structure of an enterprise
- Analysis of the workplace
- Analysis of personnel costs

Applying all three ensures that no activity is overlooked.

Generally the principles of activity definition in healthcare organizations are similar to the manufacturing organizations. Number of activities or level of detail of the system is the optional issue. In case of organization wide application, there is important to keep the limited number of activities in order to avoid the data overload. Partial applications could work with more detailed structure of activities.

Assigning costs to cost pools/cost centers for each activity
Second step in ABC application is the assigning costs to cost pools/cost centres for each activity. Assigning costs to activities represents the first stage of the allocation process within the ABC system. Cost allocation to defined activities might prove very complicated in practice and eventually take up an important amount of the implementation process time. The reason is that the structure of activities and structure of a company’s department usually clash somehow. The activity cost matrix could be invaluable for assigning company costs classified in company cost centres to activities. Very often it is necessary to define a resource cost driver in order to effectively allocate such costs. Resource cost drivers help to assign costs to a specific activity, when the cost in evidence is aggregated in general book entries. The following resource cost drivers were used in the case studies:
- Personnel workload – for allocating personnel costs to activities
- Square meters – for allocating rent, premises depreciation, heating, and indirect electricity to activities
- The quantity of machines, tools, etc.
- Estimation

Accurate allocation of the costs to defined activities is the one of the crucial points of ABC application.

Definition of activity cost drivers
Third step of the ABC application is the determining the cost driver for every activity [9]. Within this step of the application it is necessary to calculate the primary rates of individual activities. Following steps have to be done:

Calculating the primary rates of individual activities can be conducted in four steps [22]:
1. Setting appropriate activity cost drivers for individual activities
2. Determining the output measures of individual activities
3. Calculating the primary rates of individual activities
4. Assigning the costs of support activities to primary activities

Performing of this step of ABC application in healthcare institutions could have a lot of specifics. The setting the appropriate cost drivers may be questionable and the measuring the output rates could also be complicated.

Many studies of ABC application in hospitals deal with the problem of selecting the appropriate cost drivers, and collection of data about volumes of each activity output which is defined as output measures. [5] states, that the workload for collecting data of cost drivers is not easy, even if integrated hospital information systems are introduced; labour hours for which hospital staffs are engaged in some medical services are generally difficult to collect.

[5] further states that the resolution for simple and accurate cost accounting is to reduce the number of cost drivers based on logical procedure. These cost drivers are often selected based on experiences and recommendations of experts of hospital management. Some cost drivers have very high correlation with each other, and therefore one cost driver among them may be used for these activities. Cao’s study [5] is then focused on cost drivers reducing.
[27] describes in detail obstacles existing in procedures of accurate cost driver selection and the data collection. The possible way of the simplification of the system is the application of time-driven activity-based costing system (TDABC).

Assigning the costs of activities to products

Final step in ABC application is the assigning the cost of activities to products according to their individual demands on activities. In case of ABC implementation in healthcare institution this step could be crucial, because the management have to decide, what the final product is or cost object of the healthcare institution. Is it the patient as the customer or the type of diagnosis?

As mentioned above different published studies on ABC application uses various types of cost objects. It starts with types of diagnosis or individual patients and finishes with the specific cost objects in the narrow applications of ABC, in specific healthcare areas. Cost object definition is based on managerial requirements of the system. Another important issue is to collect the accurate information about the volume of activities consumed by the cost objects.

4 Conclusion

When we analyse studies of ABC applications in healthcare, we can observe that they differ a great deal in methodology, data collection technique and the setting. There are many studies focusing on just one treatment procedure and there are also studies focusing on departments. Because of the important differences between the individual procedures and departments in hospitals, the complex applications of ABC, which could replace the obsolete costing and accounting systems are very unique.

Hospital managers, who consider the ABC utilization as the support tool for more effective operation of hospitals, have to face a number of obstacles. Hospital as the object of ABC application has usually much more complex structure of outputs (products), customers, performed activities and financial flows, than an ordinary manufacturing enterprise. The setting the appropriate cost objects, suitable structure of activities and relevant and simple cost drivers requires the detailed future studies. Ultimate objective of the research in this area should be defining the general methodology for the ABC application on the organization wide level. Deeper level of knowledge in the area could facilitate the hospital managers to use the limited resources more effectively and save the increasing costs of healthcare services.

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