Utilization of process oriented costing systems in healthcare organizations

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***Abstract*—** Study analyses the present trends in cost and process management of healthcare organizations. First part of the paper describes the evolution of the costing methods from the traditional absorption costing techniques, into modern, process oriented, costing systems which is important tool for managerial decisions. The advantages and limitations of Activity-Based Costing approach are deeply discussed. Following part of the paper analyses the situation in the field of healthcare organization management. Objective of the paper is to analyze the application of the modern costing systems and process management techniques in healthcare institutions. Application of these techniques in the healthcare organizations brings number of specifics which have to be solved before the implementation. Final part of the paper outlines the benefits and information outputs of modern costing and process management systems in healthcare organizations.

***Keywords*—** Activity-based costing, BPM, healthcare management, process modeling, variable costing.

I. Introduction

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. Traditional costing is based on the experience of manufacturing organizations, but their variations used are also adapted to other sectors and areas of application, such as provision of services. Application of cost calculation in healthcare service organizations is not so common, although it would be widely usable in particular for the purposes of determining the costs of individual activities and performances in comparison to incomes from medical establishment. This would be useful especially for the management to be informed about the cost volume and structure, related to the operations carried out.

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The difficulty inherent in choosing a proper and accurate product costing method for manufacturing enterprises has been widely discussed by academics and practitioners [1,7]. The important limitation of traditional (absorption) costing methods had been also deeply discussed along with advantages of other costing method such as Variable Costing or Activity-Based Costing (ABC) [8].

Non-manufacturing sector 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 and Management) over traditional absorption costing.

Cokins [29] explains how the direct costs such as direct material and direct labour have been displaced by overhead costs between 1950´s and 1990´s from 25% to 60% portion. The technology, equipment, automation and computers are briefly considered as the main reason of change in the cost structure. However, this is only a secondary factor in the shift in organizational expanse components. The primary cause for the shift is the gradual proliferation in products and service lines. Over the last few decades organizations have been increasingly offering a greater variety of products and services as well as using more types of distribution and sales channels. The change in the cost structure, i.e. increase in the overhead cost percentage has the significant impact on the accuracy of costing system. This means that the higher portion of overheads causes the inaccuracy in overhead cost allocation more crucial.

Applications of modern costing methods would bring many benefits and additional information on cost of outputs, which is then usable to measure profitability (although this is not the main objective of providing health services), effectiveness and cost performance of provided interventions.

Application of the above modern costing methods entails a number of predictable contributions, especially the ability to quantify the actual costs of activities undertaken within the health organization, 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.

Application of modern methods of cost management, however, 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. Some applications of modern costing methods in organizations providing health services have been already performed worldwide [4,5], but without general generalization.

II. Literature review

A. Costing methods

Application of the costing methods in non-manufacturing sector or healthcare brings a lot of obstacles in comparison with traditional applications in manufacturing industries.

The basic efficiency of the operations performed can be generally measured by the quantity of output and inputs consumed, which can be quantified by the costs [1], in other words, if the activity is performed at the lowest possible unit cost [3]. Distinguishes between efficient and inefficient production and estimates the level of inefficiency by establishing the best practices in the sector as criteria for comparison.

Efficiency and costs measurement in the conditions of healthcare service companies are, despite these simple relations, restricted for several reasons. Firstly, the companies and institutions which provide the healthcare services usually work with a very complicated structure of customers, diagnoses, services and other cost objects. Secondly, the system of the payment for healthcare services, along with the ethical consequences of people´s health usually does not allow the easy estimation of revenues and consumed costs generated by individual customer. And thirdly, the government and legislative intervention in a non-competitive area usually causes the inability of management of healthcare companies and institutions to apply any progressive programs to reduce the costs or increase the effectiveness of existing operations.

The above mentioned problems related to the utilization of the costing methods in healthcare service management, lead very often to the situation, when no product costing method is practically used. The environment of the hospital management and system of the payment for healthcare service through the insurance systems causes the apparent unnecessary of the information about the accurate costs of the product [6].

While the method used for product costing purposes are usually not an object of the any regulations, companies or institutions could use any method of product costing and any type of cost allocation technique. This fact causes a high variety of used costing methods [1,9,10].

Traditionally, two different product costing systems are defined, the traditional absorption costing and alternative variable costing [1]. These two major costing approaches differ from one another, by the degree of costs assigned to the cost driver. Many other methods of product costing are defined in traditional management accounting. Special category of product costing method is the Activity-Based Costing, which was designed in 1980´s and became more natural part of enterprise's costing system in recent years.

Traditional costing techniques, based on the experiences from manufacturing industries, were used for the purposes of overhead cost allocation during the 20th century. These are based on simplified procedures using principles of averages. In recent decades, such conventional concepts have become obsolete due to two major phenomena. The first of these is ever increasing competition in the marketplace, the necessity to reduce costs and the effect of having more detailed information on company costs. Secondly, there has been a change in the cost structure of companies. In terms of the majority of overhead costs, traditional allocation concepts, based as they are on overhead absorption rates, can often provide incorrect information on product costs. Those shortages or limitations had been very closely described in the scientific publications [1,7]. The first criticism of traditional costing concept was published by Kaplan and Johnson in 1987 [8].

The logical solution of registered disadvantages of traditional absorption costing systems was to develop a costing method which would be able to incorporate and utilize cause-and-effect instead of widely applied arbitrary allocation principles into the company costing system [1, 7]. In situation, when the portion of overheads exceeds 50% of total company costs and the company is using single measures for allocation of overhead costs to the cost objects, the risk of an incorrect product or customer costs calculation becomes significant.

It was then, at the dawn of the 1980s that the Activity-Based Costing (ABC) method came about, being quickly adopted by enterprises of many and various types. The spread of ABC owed a significant debt to advances in computing and IT thereby permitting practical utilization of ABC principles.

Early applications in the industry sector [2,11] have been followed by many applications in the service [12], logistics [13], and also in healthcare [5]. Nevertheless the direct application of ABC in healthcare institutions is not a frequent case in the literature.

Petřík [15] describes organizations with the most to gain from ABC implementation as:

- Those with a high frequency of different cost objects – this presumption is valid for either production companies, or for service or trading companies
- Those with a large portion of indirect and supporting costs
- Those with a great number of processes and activities [15].

All these three characteristics are simply suitable for healthcare institution. Based on these experiences we can forecast high level of suitability of Activity-Based Costing approach for management of healthcare institutions. As mentioned above, ABC approach could bring many benefits for an organization. Most important are:

- better understanding of process and activity costs, enabling managers to make decisions in order to optimize the costs of an activity.
- correctly quantifying the costs of distinct production/service activities. As the production of individual products/serving an individual customers consists of different operations, the ABC system is able to precisely describe the manner in which a product/customer goes through the various operations, as well as accurately calculating the costs of those operations.

The reasons senior managers consider going ahead with implementing ABC could be discerned as the following [14].

- A high number of expensive overhead activities;
- A relatively high portion of overhead costs
- Intense competition
- Invisible relations between customers' projects and costs
- An intention to reduce costs
- Creating an effective tool for costing products

These benefits could be seen as very important for healthcare service management needs, where we can face with the limited ability of managers to properly describe the chain of the operation of procedures performed while serving the customer and estimate the cost of those operations. On the other hand ABC has several limitations:

- Firstly, the ABC application requires the large amount of non-financial data to be obtained from an organization and activities. This could cause the considerable complexity of the costing system.
- Secondly, the ABC system, have to be correctly designed in order to avoid inaccuracy of cost allocation.

Application of the ABC costing method in healthcare service provider could, beside its benefits, bring number of risks and disadvantages related to bad system construction and utilization. There are several limitations of the Activity-based costing, which is commonly presented as the most important. Most important disadvantage is the **high demand on the input data**. Traditional costing methods based on the simple overhead rates are easily applicable without need of any special data gathering. The ABC system is much more sophisticated and analyses the large amount of data from different departments and processes. These data had to be accumulated and processed. This usually makes high demands on information systems. This data processing could be very often costly. It is necessary to be very cautious. The cost of data gathering and processing could be in some instances higher than declared benefits of the systems. In such situations the application of the system is not cost-effective.

Implementation of ABC to a service organization, especially to healthcare services, poses several challenges which do not generally exist for ABC applications in manufacturing. There are several reasons for this challenge of the ABC implementation which was defined by Rotch [31]. for a logistic company, but which could be accepted also for application in healthcare services:

- Output is harder to define
- In many cases determining activities and cost drivers is not straightforward
- Data collection and measurements is more complicated than manufacturing
- Activity in response to service requests may be less predictable

B. Business process management

The main aim of process management is to develop and optimize the daily development of the company in the way that defines the work process as an integrated sequence of activities in the company, where each process has its inputs, outputs and responsibilities.

This style of management defines the personal responsibility for the process and for each activity, it adjusts the system of measuring process efficiency and follows and evaluates each process. These activities must be realized (implemented) so that:

- the production quality given by the measured parameters is observed;
- the available resources are utilized optimally;
- the company efficiency is continuously increased according to known and measured criteria.

Process management is an approach that has been becoming more popular recently and gets increasingly implemented in more and more companies. Process management can be understood from two perspectives. One is the process management as a managerial discipline. The second aspect understands the process management as a technology that supports process-oriented management. Process approach allows organizations to eliminate the biggest disadvantage of the traditional functional approach that cannot be considered as an approach appropriately flexible for changes in the corporate environment, variety of procedures, or excessive substitution of workers. Processes are always understood in relation to the customer. Only if the management processes are effective, then the companies can effectively manage, modify, improve efficiency, improve performance, identify and resist market risks [20,21].

BPM thus automates the company processes and is able to ensure the necessary flexibility for them. There exists an entire range of reasons for the introduction of process management; however, the practice of both productive and non-productive companies and organizations shows the following basic reasons deciding in favor of process management. These undoubtedly rank among them:

- the necessity of a reaction to basic changes in the company surroundings;
- the necessity of change in the company organizational architecture;
- assistance in exclusion of those processes which do not bring value for the customer;

- reasons for the necessity of integration (e.g. the connection of operations, the incorporation of the customer into the process of producer, the supplier to the process of producer);
- the intention of certifying the system of quality management according to ISO 9001 [18,19].

III. PROBLEM SOLUTIONS

A. Healthcare system

Cost measurement and allocation within the costing system in healthcare organizations is strongly influenced by healthcare system characteristics. Laws and regulations could have significant impact on healthcare organizations behavior and could also dramatically distort the outputs of costing system which is traditionally used in traditional private organizations. Before the deeper research into costing systems used in healthcare organizations is necessary to characterize the entire healthcare system in the Czech Republic and analyze its influence on cost and revenues of organization. As a major scale, we chose the following macroeconomic indicators:

- Expenditure on health care in total GDP (%).
- Expenditure on health care in USD at Purchasing Power Parity, per capita
- Hospital beds per 100 thousand inhabitants

Indicators	2006	2007	2008	2009
Expenditure on health care in total GDP (%).	7.0	6.8	7.1	7.6
Expenditure on health care in USD at Purchasing Power Parity, per capita	1556	1661	1839	2108
Hospital beds per 100 thousand inhabitants	741.2	727.3	715.8	*

* details are not known

Tab. 1 Selected macroeconomic indicators of health in the Czech Republic [33,34].

The Czech Republic belongs among countries with the highest proportion of public expenditure. This situation is given, inter alia, by not being allowed to use private health insurance and private expenditures consisting primarily of direct payments to doctors (e.g. dentists, plastic surgeons) by households.

Our republic has the relatively high proportion of public expenditure to the healthcare system. This situation is given, inter alia, by not being allowed to use private health insurance and private expenditures consisting primarily of direct payments to doctors (e.g. dentists, plastic surgeons) by households. For a sufficiently informative analysis of health expenditure is necessary to decipher these expenses on private and public. It shows us the following fig. 1.

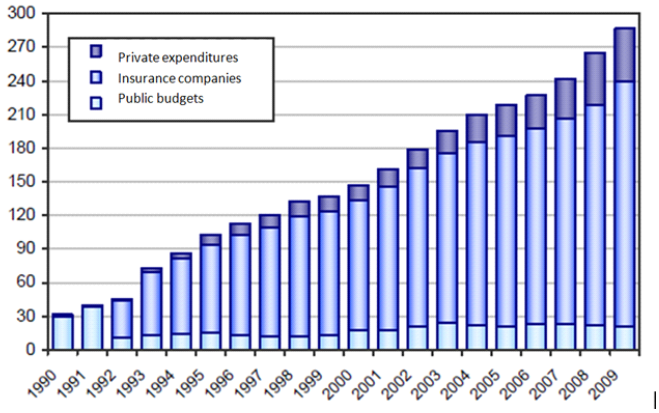

Fig. 1 Total expenditure on health care in Czech Republic [32].

The healthcare system is characterized by the following tendencies:

- There is a tendency to increase the proportion of expenditure on health care;
- The CR has experienced rather opposite trend;
- Average spending on health care is determined primarily by national income per capita, not the health needs of individuals. Increased per capita income is also a major factor explaining increased life expectancy.
- Hospitals in the CR have a problem with waste, or more likely, with its removal, and further with the optimization, or restructuring.
- Regulatory fees are beneficial, but in about every fifth medical facility are not worth of collecting as the revenue will cover administrative costs only;
- The CR ranks among countries with the lowest proportion of private expenditure;
- Not only for this reason, patients should pay more into the system (e.g. additional insurance, above-standard care, higher patient's financial participation in treatment);
- There are considerable inadequacies regarding the patient care as well, i.e. quality [35].

B. Costing methods in healthcare system

Together with the emergence of ABC approach, issues relating to its practical utilization and implementation have been presented by both academics and practitioners. As mentioned above, the developed methodology of ABC was originally constructed for purposes of manufacturing organizations. Drury [1] 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.

The above-defined steps of system design could be considered as a very brief overview for successful implementation process. Some other authors define much more detailed application procedures. The steps in the ABC application methodology defined by Glad and Becker [2] are:

1. To determine the nature of costs and analyze them as direct traceable costs, activity traceable costs and non-traceable costs (or unallocated costs)
2. To account for all traceable costs per activity, distinguishing between primary and secondary activities
3. To identify the company's processes, activities and tasks, and create process flowcharts
4. To determine cost drivers for each activity and use output measures to calculate activity recovery rates
5. To trace all secondary activities to primary activities, so that the combined activity rates include all support costs
6. To identify which cost objects are to be priced. Compile the bill of activities for each cost object
7. To multiply the activity recovery rates by the quantity of output consumed as specified in the bill of activities. The sum of these calculated costs will give the activity-traced cost of the cost object
8. Direct costs and non-traceable costs should be added to the cost calculated above to give the total cost of the cost object

It is obvious that the application of the ABC in healthcare institution will be specific 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.

Udpa [5] 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 [5] 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-homogenous.
- 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 Lin [17] 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 [17] was use of the individual patient as the cost object. Study uses also strict separation of the defined activities into primary and secondary (support).

Activities defined within the ABC system are classifiable as either primary or secondary (support) activities. 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, as described in further. In healthcare organizations, we can expect the higher importance of support activities, which could consume also the higher portion of costs.

Activities form the basis of measurement of all relevant information in an ABC system. Several procedures defining activities may be used [14].

- Analysis of the organizational structure of an enterprise;
- Analysis of the workplace;
- Analysis of personnel costs.

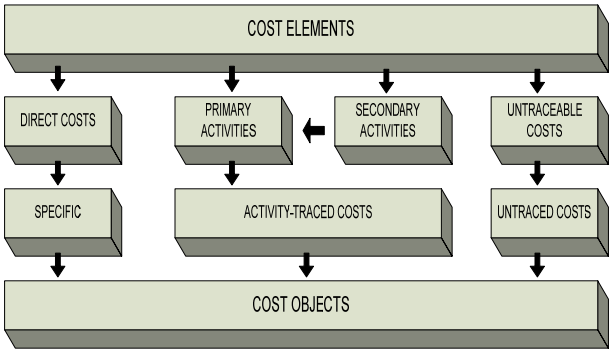

Fig. 2 Cost allocation in ABC system

[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 classication 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.

Generally the principles of activity definition in healthcare organizations are similar to the activity definition in manufacturing organizations. Number of activities or level of detail of the system is one optional issue within the ABC application. 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.

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 centers 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.

Applying all three ensures that no activity is overlooked.

Second step in ABC application is the assigning costs to cost pools/cost centers for each activity. Assigning costs to activities represents the first stage of the allocation process within the ABC system. Firstly, not all company costs will be allotted to the activities defined. Company costs could be classified according to their nature under [1]:

- Direct traceable costs – those allocated directly to a cost object using the same principles as traditional costing methods
- Activity-traceable costs – those allocated to identified activities
- Non-traceable costs (or unallocated costs), which could be allocated to a cost object in proportion to other costs, or may be covered by a small increase in the target margin
- Estimation

Third step of the ABC application is the determining the cost driver for every activity [1].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:

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. Cao et al. [30] 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.

Cao et al. [30] further concludes 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 [3] is then focused on cost drivers reducing.

Final step in ABC application is the assigning the costs 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?

ABC system in healthcare institution could be described in following figure.

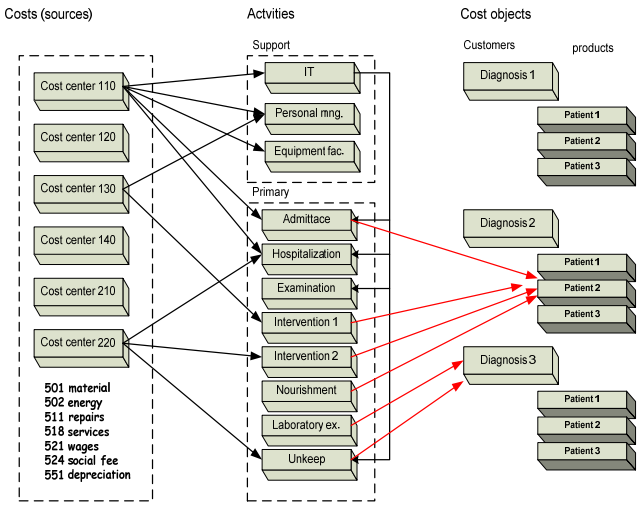

Fig.3 Outline of the ABC model in healthcare institution

Activity-Based Costing method was originally constructed for purposes of product cost calculation. The volumes and the extent of the data which are processed within the ABC could be used for several different purposes such as activity analysis, wastage reduction or process optimization. These

extended objectives of ABC are defined as the features of Activity-Based Management.

Cokins [29] defines the Activity-based management (ABM) as a method of identifying and evaluating activities that a business performs using activity-based costing to carry out a value chain analysis or a re-engineering initiative to improve strategic and operational decisions in an organization. Activity-based costing establishes relationships between overhead costs and activities so that overhead costs can be more precisely allocated to products, services, or customer segments. Activity-based management focuses on managing activities to reduce costs and improve customer value.

Activity-based management uses the outputs of ABC for the several purposes related to improve company performance. Analysis of the activities and optimization of the performed processes in the healthcare organizations could be very beneficial. One of the most important reasons is that healthcare organizations has the very complex structure of performed activities and products, which makes the analysis and cost allocation very complicated. One of these issues, which could dramatically improve the performance of these organizations, is the business process management, which has close links with cost calculation.

C. Process modelling

Because most of the key processes in organizations providing health care is not effectively managed (i.e. including the establishment of metrics and definition of process interface) the next step will be the process modelling in that ways [18]:

1. Identification of the processes
2. Description of the context of the processes
3. Establishing a map of the processes
4. Description of the processes (Fig.4)
   - Identification of the sequence of the events and functions (activities)
   - Division of the process into sub-processes
   - Detailed description of the functions
5. Collecting metrics (duration of activities, frequency of activities)
   - Analysis of the data (FTE, pie charts).
6. Analysis of value-added in processes
7. Improvement suggestions and recommendation
   - Controlling the consistency and legitimacy of the process model
   - Controlling of the relationships between models
   - Controlling of the rules for creating models (syntax)
   - General controlling of models and objects

We need to gather all the information about the processes up to the level of activities and events, in order to create the required process maps. We will be particularly interested in the inputs and outputs of processes, their performers and IS systems that are used in the department. For subsequent quantification of the results, we have to obtain the information about the time demand factor of all the processes. The analysis will be conducted directly on workplace through interviews with workers. The general structure of the questionnaire is outlined in the following table (see Table 2.). The validity of necessary information obtained through the questionnaire will be connected with risk of the workers' subjective responses. We eliminate this risk with cross talks, where information from one employee will be verified by another one [37].

Focus of questions	Proposal of question	Purpose of question
the aspect of processes level	What group of activities do you do? How does a usual work shift look? What does it precede and what comes next?	Identification of the main processes and their interface
Level of detailed process	What are the steps of the process? What does happen if ...? What does not happen if ...? What scenario does process have? What are the inputs you need? Which outputs occur? Who needs these outputs? What do you need to decide? Who performs each activity? Who is responsible for the output? Who participates in the exercise? Who decides in case of problems?	Define all the entities of each activity, the role of workers, sequence of activities
Collecting metrics (duration and frequency of activities)	How often does this event occur? Per shift? A week? A month? Per year? How long does it take? How long does the repair of this equipment take? How many workers are involved in it?	Get information to quantify the volume of work in FTE (man-years)

Tab. 2 Framework questionnaire [37]

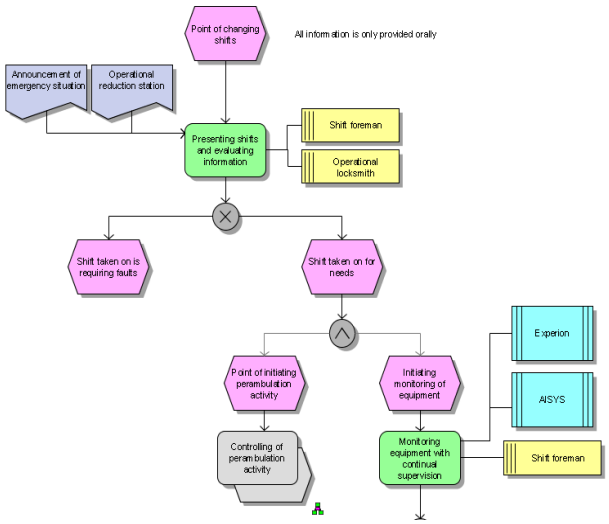

Fig. 4 Sample of a detailed description of the processes [16].

To quantify the results of the analysis we use an indicator of FTE (Full Time Equivalent) (1), (2) - equivalent of working time, expressed as the coefficient, when 1 FTE expresses 1 employee during the reporting period. E.g. 0.5 FTE means an

allocating 50% of the worker's time in the process per year (if the period is 1 year) [16]. FTE in the aggregate data indicates how many workers are needed to perform each activity. Using collected data of the duration of each activity in hours and frequency of their occurrence per year, we have quantified the duration of all activities for the year [36].

$$1\ \text{FTE} = \frac{\text{worked hours per year}}{\text{number of employees}} \quad (1)$$

$$\text{FTE} = \frac{\text{duration of activities[hours/year]}}{1\ \text{FTE}} \quad (2)$$

Despite fact, that the healthcare institutions are not common objects of application of Activity-based techniques or process management, several experiences from the world could help us to judge the efficiency of the implementation of such systems.

Udpa [5] 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 Chan [22] examines the application of the ABC to the costing of laboratory tests, Ramsey [23] examines the application of ABC in hospital's radiology department and a nursing station and finally Canby [24] publicized the application of ABC in X-Ray department of the hospital. Similar narrow applications of the Activity-based costing are frequent also recently.

One of the earliest studies, examining the organization wide application of ABC in hospital, was published by Udpa [5]. 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.

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.

Stouthuysen [25] 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. King et al. [26], for example, argue that a potential drawback of ABC systems lies in the time and resource consumption associated with the development and management of these systems. Kaplan and Anderson [27] 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, Everaert et al. [28] 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.

IV. CONCLUSION

As already mentioned, the application of modern costing methods in healthcare organizations is very topical. These modern methods, particularly represented by process calculations (Activity-Based Costing) offer a wide scope of information outputs for management decision-making not only on costs but performance and capacity management as well [2].

Health organizations, however, are increasingly facing the pressure to improve the effectiveness of outputs and cost savings. Although several applications of modern costing methods have already been successfully implemented in the world, the application of management and economic tools in the Czech environment is not so common and on the theoretical level is not prepared at all.

The benefits of this research can be viewed especially in the ability to use the results in specific health organizations, which can on the basis of expected project outcomes apply modern costing methods or their main principles. Thanks to the application of these methods, a positive impact on the efficiency of performance of organizations can be assumed. The fundamental prerequisite for the project success is the ability to present a comprehensive methodology for the application of modern costing methods in a health organization.

The description of relationships between costs and revenues is a basic prerequisite for studying the behavior of costs in organizations providing health services. These findings may be further elaborated into a special costing methodology for health organizations and definition of procedures for costs optimization and efficiency increase.

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