

Health Care Systems: Some Comparative Analysis from Czech Perspective

Z. Tučková, S. Fialová, and J. Strouhal

Abstract—The article discusses the various selected health systems used not only in Europe but in America. Comparison of health systems is to use macroeconomic indicators between countries UK, USA, Poland, Germany and the Czech Republic for several reasons. The first is the diversity of individual systems, allowing comparison not only states but also the overall management system. It is also necessary to point out that even when and under communism in the Czech Republic was a significant decline of health system, health care is now comparable.

Keywords— GDP, Health Care Systems, Health Care System Indicators, System Performance.

I. INTRODUCTION

THE effect of medical care on the economy is as the effect of economics on health. Not only has medicine led to better health, greater longevity, and increased productivity, it has also become one of the largest businesses in the world. Investments are made in hospital bonds and biotech stocks to make people better off monetarily, not just better off in terms of health. To those who directly or indirectly earn their living from medicine (physicians, nurses, hospital administrators, and even health economists), the business aspects – the contracts that are used to allocate health services – are important. The invisible hand plays a role in creating a demand for health services – that is just as powerful, and more direct, than the desire to improve the standard of living and care for the sick.

II. LITERATURE REVIEW

The WHO defines health as: “a state of full physical, mental and social well-being, not merely the absence of disease or infirmity” [4]. The concept of health can be grasped as a specific value, which does not occur in material substance, but rather as an intangible aspect of each person only [5]. According to [6], the concept of health cannot be accurately defined, but it should be understood as a coherent state of the individual and also the whole society. Health also cannot be

bought, sold or exchanged in any way, even if the purchase is carried out indirectly e.g. buying drugs and providing health care, which is now often charged for. However, this “shopping” can never be considered as the purchase of health in the full sense of the word [7, 19].

According to [5], health can be nowadays defined by two basic approaches. There is a negative definition of health and, vice versa, a positive definition of health. Upon the original definitions of health, the negative definition views health as a static state of the organism that is not burdened with any disease. In the case of the positive definition, the term health can be characterized in two developmentally different ways. In the first phase, health was understood only as such a static state of health of an individual who is able to withstand the mental and physical load. Therefore, healthy individuals can be considered such individuals who are not suffering from any illness, disease or disorder. Today, however, this definition is overly criticized for its objectivity and individuality. But today is well known that health should be taken as a complex state of the individual.

In accordance with other authors e.g. [5, 8, 10], the newer concept of health is interpreted as a life process that is gradually changing and evolving. It is an example of the dynamic development of health, which disagrees with the older static utopian concept. All this is significantly changing during the whole human life, for instance by living, working and social conditions. [10, 18]

Pursuant to the above definitions, it is necessary to see health not only as an economic asset, but globally as a set of not only economic but also ethical, political, cultural and social values [10, 18] due to these main reasons. Health status of the population is a significant component of standard of living and is often used as a measure of maturity. It is a prerequisite and necessary condition for social use, productivity and individual satisfaction of each person [9].

A. Health care systems

The health care system is referred to the part of the social system involving measures, institutions, organizations and activities that aim to treat and prevent diseases, and to strengthen health of the society. It is a summary of a formalized effort, commitment, institutions, personnel and economic resources and research activities, by which the society focuses on the issue of illness, premature death, disability, prevention, rehabilitation and other problems connected with the health status of the population.

The health care system is characterized by the fact that

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Z. Tučková is with Tomas Bata University in Zlín, nám. T.G. Masaryka 5555, 76001 Zlín, Czech Republic. (e-mail: tuckova@fame.utb.cz)

Š. Fialová is with Tomas Bata University in Zlín, nám. T.G. Masaryka 5555, 76001 Zlín, Czech Republic. (e-mail: sfialova@fame.utb.cz)

J. Strouhal is with University of Economics Prague, W. Churchill Square 4, 130 67 Prague, Czech Republic (e-mail: strouhal@vse.cz)

patients act as consumers, they are consumers of care provided by health professionals and enjoy this care on the basis of its third party funding, which may be the government, employer, legal or private resources.

Health care systems in different countries vary considerably. They differ, for example, in the structure of ownership, forms of state intervention, financing arrangement, organization and management, the scope and manner of patients' financial participation, etc. These differences result from different traditions, historical development, political systems and levels of wealth of the country. However, we can identify some common characteristics:

- High availability,
- The existence of profit and non-profit organizations,
- Provision of primary care through private medical practice,
- The predominance of so-called third party payments,
- Efforts to limit growth in expenditure on health care,
- High level of regulation of the health care industry from the state.

The method of funding differs in individual countries mainly in the share of resources from the public sector in total expenditure, the extent of direct payments for services availed, the existence or absence of health insurance and its scope, the forms of reimbursement to health care providers, methods of pricing, and many other factors.

Types of Health Care Systems

- Liberal-market based largely on voluntary insurance (US, Switzerland until 1996),
- Mandatory public health insurance (Germany, France, Holland, Belgium, Austria, CR),
- National Health Service financed primarily from taxes (GB, Canada, Sweden, Norway, Finland),
- Mixed health care systems. [26].

B. Final Stage

The health care system is referred to the part of the social system involving measures, institutions, organizations and activities that aim to treat and prevent diseases, and to strengthen health of the society. It is a summary of a formalized effort, commitment, institutions, personnel and economic resources and research activities, by which the society focuses on the issue of illness, premature death, disability, prevention, rehabilitation and other problems connected with the health status of the population [11].

Before the individual health care system indicators are specified, it is necessary to identify the specific features of the health care system according to [3], which are the following:

- This regards a complex and open system with problematic behaviour prediction,
- Is one of the factors that affect the health status of the population,
- Public attitudes are very sensitive,
- There is a long span between strategic decisions and outcomes in the health status of the population,

- Resources are not in proportional relation to health indicators,
- It is difficult to establish unambiguous criteria,
 - Most diagnostic methods do not have specified procedures,
 - The consequences of bad decisions can manifest in the health care adversely. [3]

The basic criteria of the health care system are:

- Economic cost: the amount of money spent on health service / GDP * 100%, reflects both the domestic price levels, and demographic structure.
- Performance (EFFICIENCY): expressed as % of expenditure on health care spent on administration (UK 6%, US 22%).
- Access to care: taking into account barriers to health care utilization:
 - *Financial*: e.g. costs for treatment, insurance, patient's financial participation,
 - *Geographical*: it is mainly the distribution of health care in terrain,
 - *Time*: i.e. waiting time between the emergence of subjective complaints or professional indications and treatment,
 - *Organizational (administrative)*: e.g.: specialized care recommended by practitioner,
 - *Socio-cultural*: education, ethnicity, religious norms, language barriers (orientation in the system).
- Quality of care: reflects how the level of health services corresponds to the research knowledge and technology options. It depends on the country's economic situation, technological and material equipment of healthcare facilities and the level of medical education and professional supervision of doctor's performance; reflected in the indicators of population health status and patient satisfaction.
- Equality (EQUITY, JUSTICE)
 - This means equal access to treatment, the application of all necessary medical procedures for patients of all social groups regardless of ability to pay or social status.
 - However, there are tolerable differences i.e. additional and special services, the use of alternative medicines, above-standard care during hospitalization, a higher degree of free choice of doctors and medical facilities.
 - Sources of inequality such as unequal distribution of health services, increased patient's financial participation, and premium calculation according to individual risk.
- Social acceptability - balance between quality and affordability. That means the requirement for "the available care to be of high quality and affordable". [3]

Other authors say about the indicators for example [12, 13]. The health services activity is directly influenced by the following quantitative factors:

- Economic factors:

- Number and size of health units;
- Number and structure of personnel;
- Financial resources needed;
- Volume of medical services;
- Labor productivity in health field;
- Need for medicines and sanitary materials;
- The amount of expenditure required for new targets;
- Technological factors:
 - The amount and volume of financial resources for: modernizing, equipment and development;
 - Needed resources to improve professional training;
 - Needed resources for carrying out related and collateral activities (special technical facilities and assuring the microclimate conditions).
- Demographic factors:
 - Number and population density;
 - Birth rate and death rate;
 - Population structure;
 - The natural growth of population;
 - Population migration.
- Technical factors:
 - Number of conventional hospital beds;
 - Degree of density of beds and occupancy of the building;
 - Degree of beds utilization;
 - Current and future needs for hospital beds.

Analyzing the quantitative factors of health services, points out that the bearers of technical progress (economic and technological factors) are decisive in providing resources (expenditures) for health [13].

Therefore, the health economy is an important element of the health policy, both from a strategic perspective (the macroeconomics) and a tactical one (the microeconomics) [1, 2].

Current Trends in Health Care System

The first major trend is the growth of health care costs; this sector must be managed in relation to other social subsystems such as education, social services, environmental care, etc. At present, the population is aging and health care costs are therefore increasing. There is also a change in the role of a patient - the patient becomes physician's partner. The current trend lies also in an emphasis on prevention and health promotion in the broadest sense, as well as the emphasis on outpatient care. There is a shift in the focus from hospitals. The quality of provided health services is monitored, quality improvement programs are implemented. From an economic perspective is also necessary to monitor the economic efficiency of health care and to invest in training for physicians. [3].

III. PROBLEM SOLUTIONS

When examining levels of the health care system, it is important to realize that from a purely economic perspective, this level is largely dependent on the development of basic macroeconomic indicators of the state. These include: trends in GDP, inflation, unemployment, government debt, the success of tax collection, health and social insurance

payments, etc. [14, 20]. In our study, selected indicators were used, which were subsequently subjected to comparisons with other countries, so the individual health financing models would be kept during the comparison. Of course, the basic and key indicator is total expenditure on health care given as a percentage of GDP, followed by expenditure on health care per capita in USD at Purchasing Power Parity. The research results may help to determine if the planned health system reforms will bring e.g. one of the effects that are expected, i.e., to contribute to the whole system more from private sources. For comparison were selected the US, the UK, Germany and Poland. The reasons are listed below.

US

- This is a free business fragmented type, a mixture of private insurance and health care financing from public sources,
- The highest expenditure on health care in the world (13-15% of GDP),
- One of the few developed countries that still does not have a health care system that provides essential health care for the whole population,
- Has the most modern technology, but only for insured citizens,
- Insurance is mostly mediated and partially paid for by employers.
- There are groups of people who do not have commercial insurance and the state pays all health care costs for them.-Government programs
- Medicare for retirees and Medicaid for the poor; there is a smaller program for poor children (SCHIP) and a program for veterans.
- Health status of the US population is characterized by large inequalities that trace the social and ethnic composition of the population [15, 17].

Germany

- A decentralized system of national insurance has been introduced,
- The German government is responsible for the formulation of laws, health policy, legislation, but in organizing and financing health care does not enter directly,
- Patients' financial participation in health care spending has a long tradition here,
- Health insurance is integrated into a comprehensive social security system.
- In the public sector, there are more than two hundred competing health insurance companies acting as autonomous, non-profit, non-governmental bodies and these are regulated by the government.
- The system is financed primarily by taxes from employees' wages.
- Since 2009, all contributions from employees and employers to statutory health insurance flow into this fund. In addition, the contribution from taxes is added as well.
- Total 10.4% of gross domestic product goes to expenditure on health care.

UK

- A so-called model of National Health Service is applied where health care is financed mainly from public funds (income tax 80%, National Insurance payments 15% and supplementary payments for pharmaceuticals 5%).
- A significant role of physician as a “guardian of the door”. In practice, it means that free admission at the hospital specialist is subject to the recommendation of general practitioner.
- A decent standard of healthcare [16].

Czech Republic

- The standard health care is guaranteed by the state for all inhabitants,
- Inhabitants are obliged by law to pay health insurance, these funds are then administered by insurance companies,
- The principle of solidarity is applied, which means that everyone contributes to the system according to the amount of his/her income, but health care is provided to everybody as necessary,
- A method of treatment is determined by a physician,
- The basic structure of this system consists of private practicing physicians,
- In the Czech Republic (CR), there is low private expenditure on public health care from inhabitants, which is in more than 90% covered by public health insurance.

Poland

- Health care is provided upon compulsory health insurance.
- Health insurance companies in Poland are legal entities with defined regional powers.

Table 1 shows the share of expenditure on health care in total GDP (%).

Table 1. Total expenditure on health care in % of GDP

	2006	2007	2008	2009
CR	7.0	6.8	7.1	7.6
Poland	6.2	6.4	7.0	7.1
Germany	10.5	10.4	10.5	11.3
US	14.8	14.9	15.2	16.2
UK	8.5	8.4	8.7	9.3

Source: Own analysis based on [21, 24]

The table shows that the US and UK have a tendency to increase the expenditure on health care in GDP over the years, which is in the US by virtue of high volume, intensity, and especially the price of medical services. Unfortunately, the trend in the Czech Republic is the opposite - to reduce expenditures and it takes place in Poland as well. The main reason may be constant and very slow transition from centralized to market health care system with elements of public insurance.

Table 2. Expenditure on health care in USD at Purchasing Power Parity, per capita in 2007

Year	CR	Poland	Germany	US	UK
1998	925	559	2,480	4,303	1,551
1999	938	573	2,581	4,528	1,671
2000	981	583	2,669	4,793	1,828
2001	1,081	642	2,797	5,146	1,996
2002	1,195	733	2,934	5,578	2,184
2003	1,338	748	3,097	5,986	2,317
2004	1,387	807	3,170	6,336	2,540
2005	1,475	857	3,364	6,700	2,735
2006	1,556	934	3,565	7,073	3,006
2007	1,661	1,078	3,724	7,437	3,051
2008	1,839	1,265	3,963	7,720	3,281
2009	2,108	1,394	4,218	7,960	3,487

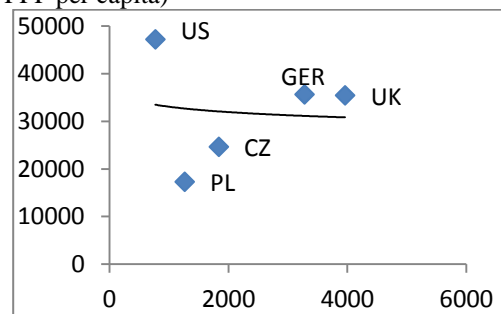
Source: Own analysis based on [21, 24]

The highest expenditure on health care was in the US. The lowest spending was in Poland. It is clear that if we compared them with e.g. less developed countries, expenditures would be even lower. This shows that the more developed country, the higher expenditure on health care. The figure also illustrates the distribution of public and private sources. 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.

Due to the fact that there are differences in the amount of wages and price levels in individual states such as Poland, the Czech Republic, etc., it is not possible to objectively compare the actual amount of money spent per person there. International comparisons, however, allow us to use the so-called purchasing power parity, which eliminates these differences. In our case it is given in units of national currency per US dollar.

It is logical and from the above analyses clear that the more developed and richer country, the higher investments in health and health care. With the help of regression analysis it was possible to create a function that shows us the dependence of expenditure on health care on the size of GDP at PPP per capita and also individual deviations.

Figure 1: Expenditures on health care in GDP in 2008 (in US dollars PPP per capita)



Source: Own analysis based on [21, 24]

From the above graph is visible the dependency of expenditure on health care in GDP at PPP per capita in USD

in 2008. Of course, there are larger or smaller deviations, however, the US deviate from this trend fundamentally – the country spends about \$ 2 500 per person more than would be expected according to income. The Czech Republic and Poland, on the contrary, spend less, unlike Germany and the UK.

Table 3. Hospital beds per 100 thousand inhabitants

Year	CR	Poland	Germany	US	UK
1998	793.7	530.0	929.3	440.0	370.0
1999	774.0	510.0	920.2	420.0	360.0
2000	779.1	490.0	912.2	410.5	350.0
2001	777.5	n/a	901.9	404.5	350.0
2002	776.0	560.0	887.8	398.9	340.0
2003	771.9	667.7	874.4	396.2	330.0
2004	763.2	666.7	857.6	387.6	n/a
2005	724.2	651.9	846.4	374.4	n/a
2006	741.2	646.9	829.1	356.7	n/a
2007	727.3	642.3	823.4	341.9	n/a
2008	715.8	662.1	820.3	336.7	n/a

Source: Own analysis based on [21, 22, 23]

As another criterion for assessing the level of health care systems was chosen indicator of hospital beds per 100 thousand inhabitants belonging to the quantitative group - technical factors. In comparison to selected countries for the time period of 10 years, we see that the number of beds in the CR gradually decreases, while the same trend is also similar to Germany, which has on average nearly 100 beds more than the CR. Conversely, there are almost half beds per 100 thousand citizens less in the UK than in the CR and Germany. This is reflected by the fact that e.g. people in the UK quite often wait a long time for non-urgent operations.

Table 4: Density of physicians, nursing and midwifery personnel and dentistry personnel, per 10 000 population

Member state	Physicians	Nursing and midwifery personnel	Dentistry personnel
	Density (per 10 000 population) 2000-2007		
CR	36	89	7
Poland	20	52	3
UK	23	128	10
US	26	94	16
Germany	34	80	8

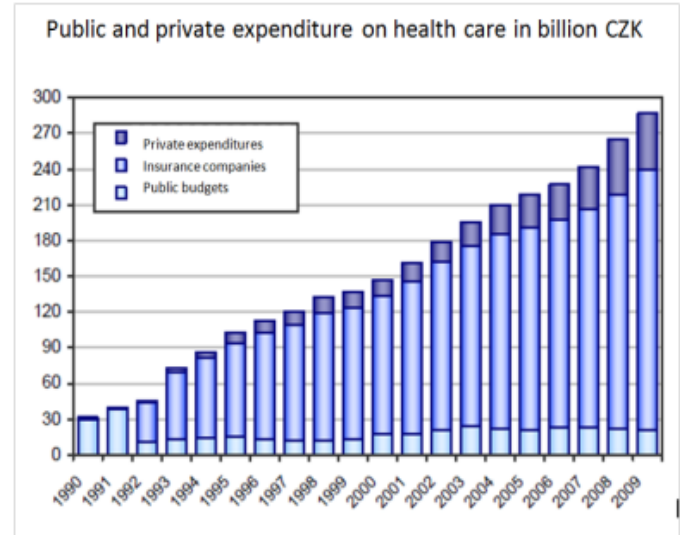
Source: Own analysis based on [25]

Other criteria when comparing health care include the number of physicians, nurses, dentists, etc.; these indicators for selected countries are shown in Table 4. The data are converted to 10 000 inhabitants and illustrate the period 2000-2007. The data show that the numbers of physicians are approximately comparable in Poland, the UK and the US. On the contrary, there are higher numbers in the Czech Republic and Germany. Regarding the nurses and midwifery personnel, there are considerable differences. If we compare the UK with others states, we see that the disparity here is relatively high

and it is obvious that far more people in the UK work in this area of health care than in Poland. As for the CR, the results are comparable with Germany or the US. Regarding the number of dentists, relatively few work in Poland, which is up to four times less than, e.g., in the US. In comparison with other countries, there are relatively fewer dentists in the Czech Republic as well.

The following figure illustrates an overview of the trend of expenses on health care, both public and private sources of financing from 1990 to 2009, therefore, even after the introduction of regulatory fees.

Figure 2. Total expenditure on health care



Source: Own analysis based on [27]

As can be seen in Figure 2, total expenditure on health care increased from 1990 every year. Compared to 1990, expenditures on health care in 2009 are almost 10 times higher and reached almost CZK 287 billion.

Figure 2 also shows the proportion of representation of the individual sources of health care financing. It is obvious that costs barely exceeding CZK 30 billion in 1990 were almost all covered from public budgets and participation of patients as causes of private expenditures was minimal. This proportion was drastically changed in 1993 when the majority of expenditures were transferred under the administration and authority of insurance companies, especially General Health Insurance Company (GHIC). The representation of the so-called patients' financial participation steadily increased over the years. In 2000, this participation was 9.4 percent, but more than 16 percent in 2008. On the contrary, the representation of resources from public budgets is still on the downward trend, so it fell to about 7 percent of all expenditures in 2008. [27]

IV. ACCOUNTING ISSUES

Measurement, or more precisely value expression, can be called a common accounting language, which records the ongoing economic events of an accounting entity [30, 36]. Accounting theory puts certain requirements on the measurement, especially

- fair value measurement so the monetary expression corresponds to the actual resources spent;
- uniformity measurement that should ensure the comparability of measurement of the same resources both within one entity and among enterprises and in time;
- reliability measurement is a requirement that the value of a certain item can be reliably determined [35];
- stability measurement which requires that the measurement has not been influenced by insignificant temporal fluctuations.

During the practical enforcement of these requirements various problems may occur; the stated principles, in particular, may get into disagreement with each other. Under certain conditions, stability measurement may be subject to contrary to the fair value measurement; the uniformity may not respect the individual conditions and may become unreliable [29, 31, 32]. Therefore, we cannot say that there is only one correct method of measurement, which ensures compliance with all such requirements.

The objective of measurement is essentially to provide users of accounting with two basic groups of information:

- information on the financial position of an accounting entity that demonstrates the ability to optimally allocate assets and resources of financing, which the entity has. At the same time, this gives information about its financial position and also the ability to continue its work in the future;
- information on profit/loss achieved during the reported financial year, which characterizes how effectively the entity used its resources and sources [28, 34].

Both these groups of information are linked together and should be considered as interrelated. Under certain circumstances, positive financial results can be temporarily achieved, however, at the expense of the financial structure or financial equilibrium, possibly at the expense of the future development of accounting entity. On the contrary, a short-term adverse loss may not necessarily represent a threat to its future.

In the year 2002, the European Parliament and the Council of the European Union issued Regulation 1606/2002 whereby it stipulated certain duties on the part of companies listed on European stock exchanges to compile their consolidated financial statements in accordance with IFRS. Therefore, beginning from 2005, a large number of listed enterprises, exhibiting significant heterogeneity in size, capital structure, and ownership structure and accounting sophistication, started to apply international standards for the first time [33, 37].

In the Czech Republic IFRSs could be also applied voluntarily from the beginning of 2011. However, majority of companies tend to use local accounting principles as a general reporting framework. There can't be expected in a near future that companies from healthcare industry shift towards this globalization phenomenon.

V. CONCLUSION

The evaluation of the quantitative factors for the healthcare system is more complex than we think. For people to get what they want from the system, exchanges between patients and

providers must be made. Health economics is the study of how those transactions are made and the bottom line results.

Our comparisons resulted in the following conclusions:

- There is a tendency to increase the proportion of expenditure on health care in the US, and UK;
- 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.
- Compared with other countries, there are a low number of expert health professionals such as dentists in Czech health care.
- The Czech Republic invests fewer finances in health care in comparison with Germany and the UK.
- To set the calculation method for example.

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 health service 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.

The difficulty inherent in choosing a proper and accurate product costing method for manufacturing enterprises has been widely discussed by academics and practitioners [38, 39]. 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) [40].

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 [42].

Application 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.

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 [41].

Last but not least, it is necessary to remember that the hospital management and lack of economists such as graduates who already have some experience. As indicated Tuček, Mikeska[43]. The benefits for the employer in the area of education are the fact that students are well informed about the labour market needs. Based on that they can decide effectively on which field to study in. That has an impact on their professional profile which they put in practice when entering the labour market. In this way the costs related to training a graduate newcomer with no work experience are lowered. These costs are substantial company expenditures especially in the time of crisis. More than 95% of companies train their graduate newcomers within the first year of employment. The investment in their further development and professional growth is thus marred.

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Z. Tučková is Lecturer at Tomas Bata University in Zlin, Czech Republic, Department of Enterprise Economics. Her major research interest is knowledge management and services.

Š. Fialová is Ph.D. student at Tomas Bata University in Zlin, Czech Republic, Department of Enterprise Economics. Her major research interest is health care systems and costing in healthcare organization.

J. Strouhal is Senior Lecturer at the University of Economics Prague, Czech Republic. He published more than 400 research outputs (among them 20 books, 9 ISI papers and around 30 SCOPUS papers). He is a reputed practitioner currently also being President of Chamber of Certified Accountants Czech Republic. His major is international accounting harmonization and its impact on financial decisions.