

FINANCIAL MANAGEMENT IN THE HEALTHCARE INDUSTRY OF THE SLOVAK REPUBLIC

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ABSTRACT. Background: Healthcare is one of the most monitored areas of human activity. The healthcare segment, especially healthcare, drug development and manufacturing are among the defensive sectors that thrive even in times of uncertainty. **Aims:** The aim of the paper is to apply methods of financial analysis in the financial management of hospitals in NACE 861 – Hospital activities, to assess and increase competitiveness and financial performance. **Sample:** The research sample consists of medical facilities under the jurisdiction of the Ministry of Health of the Slovak Republic transformed into joint-stock companies and hospitals under the jurisdiction of the Ministry of Health of the Slovak Republic, the Ministry of Defense of the Slovak Republic, and the Ministry of the Interior of the Slovak Republic according to NACE 861 – Hospital activities. **Methods:** We use basic thought operations and selected mathematical-statistical methods in the paper. The financial analysis of the hospitals will be carried out based on the data taken from the financial statements available in the Register of Financial Statements of the Slovak Republic for the years 2007 - 2022. **Results:** The results show that the geometric mean for the period 2008 - 2020 for costs is $G = 1.01$ and for revenues is $G = 1.02$. **Conclusions:** Financial aspects are key factors in the company's development process. Knowledge regarding the financial health of the company can help the company in its competitiveness. In the framework of business management, many decisions are influenced by financial and economic analysis. Every manager should strive to understand financial theory. **Implications:** The benefit will be an evaluation of the financial situation and insight into the competitiveness of the healthcare industry.

Keywords: hospital, healthcare, financial management, financial indicators

JEL Classification: I19, G39

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Introduction

The term management was first used and defined at the turn of the 19th and 20th centuries by Taylor (1983) as: knowing exactly what you want your people to do, later investigating whether they do it best and cheapest. The person who manages is in charge of one activity or section within the company, or successfully performs one complex activity.

A healthcare manager with any specialization must be familiar with the basic concepts, principles and documents of financial management. Knowledge is necessary to ensure a sufficient amount of financial resources necessary to cover the needs of the organization as well as to ensure profit or at least to cover costs. A financial manager can suggest that financial management and its results are an important indicator for predicting whether a healthcare organization is able to remain in a competitive environment.

The management and financing of the healthcare system is largely determined by the history, cultural customs and experiences of each country, therefore there is no uniform mechanism that would represent a single adequate system suitable for all countries. Based on this argument, the financing of healthcare is exclusively within the competence of the governments of individual states.

Theoretical background

Financial management of a healthcare organization is defined as a process of providing an overview of daily financial operations, as well as planning long-term financial flows in a given organization (Jakušová, 2016). Financial management consists in choosing the optimal option for obtaining internal and external sources of financing and their use in terms of the basic financial goals of the business. Financial credibility in the field of healthcare in Slovakia was evaluated by Petruška et al. (2019), Štefko et al. (2017).

Grigoli (2012), Jourmard (2010), Luigi et al. (2014), Gavurová & Kočíšová (2018) dealt with the analysis of healthcare performance and the development of inefficiency in healthcare in OECD countries using the DEA method.

A study by Cleverley (1989) examined all hospitals in the United States and found that profitability, short-term cash holdings and capital structure were indicators with high explanatory power. Whitcomb & Cleverly (1993) emphasized working capital flow, net income to shareholders' equity and cash flow as the indicators reflecting hospital characteristics.

A study by Chu et al. (1991) provided evidence to suggest that analysts should pay more attention to the two aspects of hospital financial performance:

- a) the hospital's equity in relation to total assets, net income, working capital flow and cash flow;
- b) the flow of working capital in the hospital as a separate aspect of the flow of hospital assets, and not just cash flow and/or net income plus depreciation. In fact, hospitals' cash flow did not differ from net income adjusted for depreciation.

Trinh & O'Connor (2000) argued that profitability, fixed asset efficiency, capital structure, fixed asset purchase years, working capital efficiency, liquidity and debt service coverage ratio are the indicators that can accurately explain the financial performance of hospitals.

Goldstein et al. (2002) analyzed the differences in financial ratios between the manufacturing industry and hospitals and selected eight vital financial ratios: return on assets, cash holdings, debt structure, working capital flow, net income to shareholders' equity, short-term liquidity, debt collection and cash flow.

Eckel et al. (2002) formulated a risk model for predicting financial risk. The forecasting model combines accounting data, hospital information and changes in the macroeconomic environment to generate forecast accuracy and practical value.

Bolon (2005) argued that profitability, capital structure, working capital efficiency, fixed asset efficiency, fixed asset acquisition period, liquidity, net income to shareholders' equity and debt service coverage ratio are important financial indicators.

Encinosa & Bernard (2005) empirically studied the relationship between operating margin and patient safety and found that declining hospital profitability was negatively associated with nursing and surgical patient safety indicators, but not with mortality.

Bazzoli et al. (2007) investigated the relationship between the financial situation of individual hospitals and their business strategies. They found that increasing financial pressures, as measured by income and cash flow, lead to reduced investment in health facilities and reduced compliance. Similarly, Bazzoli et al. (2008) showed that hospitals with lower cash to revenue ratios report higher excess

incidents. In a slightly different context, Weech-Maldonado et al. (2003a, 2003b) reported a positive association between quality of care and operating profit margin in the home nursing industry.

Wagstaff et al. (2008) analyzed annual financial data of a public hospital and developed a support vector machine (SVM) model with a radial basis function (RSVM) for predicting financial distress. Empirical results show that RSVM is always better than the other models in prediction of financial risk.

In a study by Burda et al. (2009) an analysis of income and expenditure for the year 2006 was carried out in a department of general surgery in a French hospital.

Dong (2015) used panel regression to determine the relationship between hospital care quality and financial status. The research sample consisted of cardiovascular hospitals in the US between 2005 and 2010. There is a statistically significant relationship between hospital financial performance and quality of care. Hospital profitability, financial leverage, asset liquidity, operational efficiency, and costs appear to be important determinants of healthcare quality. In general, public hospitals provide lower quality care than their nonprofit counterparts, and urban hospitals report better quality scores than hospitals located in rural areas. The results suggest that when a hospital made more profit, had the capacity to finance investments with debt, paid higher wages presumably to attract more qualified nurses, its quality of care would generally improve. A lack of financial strength may result in a lower level of health services.

The study by Lee (2015) dealt with the financial analysis of national university hospitals using final accounts reports from 2008 to 2011. This study used liquidity, stability, growth, activity and profitability. A comparison of 2008 and 2011 showed that there was a general decrease in total assets, an increase in liabilities, and a decrease in total medical revenues with a continuous deficit in many hospitals.

Nakagawa et al. (2017) investigated changes in the financial indicators of 143 hospitals in Japan from 2004 to 2015. They focused on indicators of cash flow and operating profit per monetary unit of personnel costs.

Methodology

Research Aim, and Methods

The paper aims to apply methods of financial analysis in the financial management of hospitals in NACE 861 – Hospital activities, to assess and increase competitiveness and financial performance.

Table 1. Basic financial indicators

Relationship	Calculation (line number of financial statement)	Required trend
Cash Ratio	l. 51 (l. 052 until l. 056)/ l. 87 (l. 088 until l. 096)	<0,2 – 0,8>
Quick Ratio	l. 55+l. 42 (l. 043 until l. 050)/ l. 87 (l. 088 until l. 096)	<1,2 – 1,5>
Total liquidity	l. 29 (l. 030+l. 037+l. 042 + l. 051)/l. 87 (l. 088 until l. 096)	<2,0 – 2,5>
Total Debt	l. 30 l. 031 until l. 036 l. 074 (l.075 + l.079 + l.087 + l.097)/ l. 60 (l. 001 + l. 029 + l. 057)	decline
Times-Interest-Earned	l. 75+ (l. 74 – l. 38)/l. 19	increase
Financial Leverage	l. 60 (l. 001 + l. 029 + l. 057)/ l.61 (l. 062+l. 068 + l. 072 + l. 073)	decline
Total Assets Turnover	(l. 39+l. 40+l. 41+l. 59+l. 61)/ l. 60 (l. 001 + l. 029 + l. 057)	increase
Turnover time due payment of current liabilities	l. 30 (l. 031 until l. 036)/ (l. 39+l. 40+l. 41+l. 59+l. 61)	decline
Daily Sales Receivables	l. 37+l. 42/(l. 39+l. 40+l. 41+l. 59+l. 61)	decline
Wage demands to performance	l. 8/l. 74	decline
Return on Assets	l. 75+ (l. 74 – l. 38)/ l. 60 (l. 001 + l. 029 + l. 057)	increase
Return on Equity	l. 78 (l. 75 - (l. 76 + l. 77)) (+/-)/ l. 61 (l. 062+l. 068 + l. 072 + l. 073)	increase
Return on Salles	l. 75+ (l. 74 – l. 38)/ (l. 39+l. 40+l. 41+l. 59+l. 61)	increase

Source: own processing

When processing data within the healthcare industry and its decision-making units, the data are obtained from the Ministry of Health of the Slovak Republic; National Center for Health Information; Statistical Office of the Slovak Republic, based on data from the STATdat, Slovstat, DATAcube databases; FinStat Premium databases; Health Yearbooks 2009 – 2022; The Cribis database, which will be used to process the values of financial metrics for the healthcare industry. The financial analysis of the hospitals is carried out on the basis of data taken from the financial statements available in the Register of Financial Statements of the Slovak Republic for the years 2007 - 2022. The state indicators were obtained from the Financial Statements of the Slovak Republic. Financial ratios were calculated based on absolute indicators. Table 1 shows the relationships for the calculation of the basic financial indicators. The software excel was used for calculations.

Research Sample

In the conditions of the Slovak Republic, there are 115 hospitals, of which 11 are large state hospitals and 33 are private hospitals in section NACE 861 - Hospital activities. The research sample consists of medical facilities under the jurisdiction of the Ministry of Health of the Slovak Republic transformed into joint-stock companies and hospitals under the jurisdiction of the Ministry of Health of the Slovak Republic, the Ministry of Defense of the Slovak Republic, and the Ministry of the Interior of the Slovak Republic according to NACE 861 – Hospital activities. The research sample consists of 28 largest non-financial corporations of the Slovak healthcare industry.

Results

The healthcare industry in Slovakia belongs to the so-called strongly feminized industries. In 2021, the share of women was 78.1%, while the share of female doctors was 58.9% of the total number of doctors and dentists. The number of workers in the healthcare sector in 2015 was 181,000 persons (27.4 thousand men; 153.6 thousand women), in 2016 it was an increase of 500 persons (30.5 thousand men, 151 thousand women). Employees in the healthcare sector (numbering 107.9 thousand in 2011) made up approximately 4.6% of the total number of employees in the Slovak economy.

In 2021, 20,667 doctor and dentist jobs were created in health facilities of the Slovak Republic. It was a year-on-year growth of 2.9%. There were 8,411 doctor positions in general hospitals and 1,637 doctor positions in specialized hospitals. There were 23,653 beds in general hospitals and 6,121 beds in specialized hospitals. For comparison, in 2014, 19,685 jobs were created in medical facilities (42.3 thousand beds), 7,785 jobs were created in general hospitals (24.351 thousand beds), and 1,157 jobs were created in specialized hospitals (5.754 thousand beds).

There were 273 inhabitants per doctor in 2021, compared to 296 inhabitants in 2007 and 303 inhabitants in 2011. The number of residents per doctor has been decreasing since 2000. In 2021, there were 1,891 inhabitants per dentist. Reaching the EU average of 3.9 doctors per 1,000 inhabitants; 8.4 nurses per 1,000 inhabitants would require 1,200 new doctors and 14,000 new nurses.

Changes in the number of workers have been influenced by several factors. These are primarily: changes related to the restructuring and change in the number of healthcare facilities, migration of healthcare workers, remuneration conditions (and the differentiation of wages in individual healthcare facilities), efforts by healthcare facilities to comply with the minimum standards of staffing in direct relation to the limits regulated by the Labor Code (labor time, work availability, provision of rest), but also the simultaneous conclusion of several employment relationships with different employers.

The average nominal monthly wage of an employee in the industry in 2021 was 1,211 euros, which is an increase of 78 euros compared to the previous period. For comparison, in 2015 it was 858 euros. In 2020, the index of real wages grew the most since 2007 (1.13); since 2012 it has been around 1.26. The average rate of growth of the share of the nominal monthly wage in the healthcare sector on the monthly wage in the economy expressed by the geometric mean is $G=1.061$.

Since 1990, payment for performance or the use of the DRG classification system of "groups of related diagnoses" has been increasingly promoted in hospital care. The DRG (Diagnosis-Related Groups) system is gradually becoming the main tool for financing acute hospital care. The system is an objective and transparent mechanism for improving the management and financing of provided institutional health care. It contributes to ensuring fairer financing of inpatient health care and to comparing the overall performance of hospitals.

Healthcare financing is regulated and defined by legal standards. The cardinal source of funding for healthcare in Slovakia is public health insurance. In connection with the financing of healthcare facilities, in addition to the main operating income of most healthcare facilities (except private

specialized ones, e.g. aesthetic surgery), which are payments from health insurance companies, each healthcare facility also has other sources, namely: sales for medical procedures paid for by direct payments from patients or businesses; sales for the so-called above-standard care; income for special operations for insurance companies; income from sales of non-health care services (e.g. rental of premises); income from the sale of goods (e.g. buffets); sponsorship gifts; grants; subsidies (Ozorovský & Vojteková, 2016).

In 2019, the revenues of the healthcare sector amounted to 6.3 billion euros (6.7% of GDP), which was an increase of 0.4 billion euros compared to the year 2018. In the Slovak healthcare system, the capital income offered by the European funds, or the recovery plan is calculated. For the period 2016, the revenues of medical facilities were approved at 1,344.375 million euros, expenses of medical facilities total 1,273.551 million euros. The total surplus represents 70.824 million euros, but after considering the year-on-year change in the state of liabilities, the total deficit of medical facilities was -50.16 million euros.

Table 2. Development of expenditure in the healthcare sector (million euros)

Year	a = b + e	b	c	d	e	f	g	h
2004	3 197.08	2 317.50	267.14	2 050.36	879.58	708.66	137.86	33.06
2005	3 326.35	2 504.28	253.86	2 250.42	822.07	785.34	1.66	35.08
2006	3 861.19	2 702.16	246.89	2 455.27	1 159.03	1 026.62	31.38	101.03
2007	4 533.46	3 141.66	285.28	2 856.38	1 391.79	1 240.82	20.06	130.91
2008	5 102.10	3 595.87	319.37	3 276.50	1 506.23	1 333.67	26.92	145.65
2009	5 408.70	3 743.56	359.02	3 384.53	1 665.15	1 456.52	53.21	155.42
2010	5 589.80	3 790.82	356.32	3 434.50	1 798.98	1 520.01	90.75	188.22
2011	5 239.36	3 865.62	379.30	3 486.32	1 373.74	1 235.00	52.20	86.54
2012	5 550.07	4 005.45	376.89	3 628.56	1 544.62	1 289.45	84.95	170.22
2013	5 583.37	4 143.16	371.58	3 771.58	1 440.21	1 302.13	81.78	56.30
2014	5 256.33	4 217.01	210.27	4 006.74	1 039.32	946.56	71.29	21.48
2015	5 418.25	4 319.22	234.86	4 084.35	1 099.03	999.32	83.87	15.83
2016	5 666.47	4 669.45	151.76	4 401.84	1 112.87	1 030.95	47.24	34.69
2017	5 721.14	4 573.41	138.32	4 435.09	1 147.73	1 070.56	53.24	23.93
2018	5 991.41	4 801.14	137.89	4 663.25	1 190.26	1 132.84	46.32	11.10
2019	6 534.21	5 213.86	158.49	5 055.38	1 320.34	1 251.91	55.64	12.79
2020	6 659.30	5 345.51	301.96	5 043.54	1 313.79	1 248.73	51.73	13.33
2021	6 858.00	-	-	-	1 231.20	-	-	-

Source: own processing based on data from the ŠÚ SR

Note: a - Current expenditure on health care, b - Government institutions total, c - Government institutions, d - Social security funds, e - Private sector total, f - Direct expenditure of private households, g - Non-profit institutions serving households, h - Businesses (other than health insurance companies)

Total current expenditures on health care in 2020 reached 6.66 billion euros, in 2015 they reached 5.418 billion euros, in 2014 they reached 5.25 billion euros and in 2013 (5.7 billion euros) compared to 2004, they increased by an index of 1.65. The development of total expenditure on healthcare in the Slovak Republic is shown in Table 2.

State hospitals increased the negative economic results. By the end of 2016, overdue liabilities reached over 442 million euros, overdue liabilities of faculty and university hospitals reached 527 million euros, even though at the end of 2011 they were debt free. Regardless of how much money goes to healthcare, hospitals increase their debt by an average of 100 million euros per year. The consequence is inefficiency in purchases, in the organization of work, in management, in the number of people.

Financing of hospitals is still carried out through prospective budgets, where the amount of monthly payment for inpatient care is contractually agreed in advance for the following period. The prospective budgets reimbursement mechanism is suitable for a transitional period.

Costs within the entire industry grew year-on-year until 2015, when costs decreased from 2,741.85 million euros in 2014 to 1,205.15 million euros for the year 2015. The base index in 2014 in relation to the base year 2008 reached 1.42. The revenue change index is 1.07 in 2014 and 0.48 in 2015. Since 2016, costs have been increasing and in 2020, they reached 2,094.57 million euros. The geometric mean for the period 2008 - 2020 for costs is G = 1.01 and for revenues is G = 1.02.

Liabilities in the healthcare sector as of 31 December 2020 amounted to 450.06 million euros, inventory 50.99 million euros. Liabilities in the entire industry at the end of 2014 amounted to 1,136.53 million euros, in 2015 they amounted to 276.83 million euros. Inventory grew from 31.94 million euros in 2008 to 56.66 million euros for the year 2014, then a decrease to 22.23 million euros was recorded in 2015 and from 2016 growth to 50.99 million euros in 2020.

In terms of ratio financial indicators, the industry in 2015 achieved a level of total liquidity of 2.16. The median maturity of liabilities was 65.89 days and the total indebtedness was 38.68%. Within the NACE 861 – Hospital activities, on average, 93 cents of current assets accounted for one euro of short-term liabilities, so that the financial indicator of total liquidity reached low values based on the trend analysis. The maturity period of receivables was 66.5 days and liabilities 78.15 days. 88 cents of foreign resources were allocated for one euro of total capital, in 2014 it was up to 93 cents. The share of value added in sales was almost 63% and the share of EBITDA in sales was 4.09%.

The development of the median values of the ratio financial indicators in NACE 861 – Hospital activities is shown in Table 3. The negative status of the indicators is shown in bold. The industry's profitability had a variable tendency, the median asset profitability indicators reached a negative value in 2010 and 2011. On the contrary, the largest asset profitability was 6.63% in 2019 and 6.02% in 2020. The operating profit margin (ROS) reached almost 4.6% in 2020 followed by an undesirable drop in the indicator. The share of value added in sales reached 62.26%. In the analysis of indebtedness, the median for the industry reached a total indebtedness of 74.97%. Almost seventy-five cents of foreign resources accounted for one euro of total capital. In the years 2007 - 2021, total liquidity is not in the range of recommended values (Table 3, bold). Figure 1 shows the development of the average values of the indicators of the maturity period of receivables and liabilities, the turnover period of receivables and liabilities from trade relations of the NACE 861 – Hospital activities.

Table 3. Development of the median of financial indicators

FI 861	L_3 (coef.)	TA (coef)	TI (%)	E/L	ROE (%)	ROA (%)	ROS (%)	VA/S (%)	EBITDA/S (%)
2007	1.05	2.7	67.78	-	21.29	3.57	1.72	58.91	5.03
2008	0.99	2.1	72.23	-	3.68	0.68	0.62	59.55	2.61
2009	1.04	2.16	68.5	0.07	0.20	0.29	0.48	57.60	4.85
2010	0.80	2.16	93.66	0.12	-9.31	-1.80	-1.14	60.27	3.50
2011	0.82	2.61	91.93	0.30	-14.56	-1.45	-0.30	60.45	2.78
2012	1.02	2.16	81.10	0.30	15.17	2.22	0.96	59.72	5.49
2013	0.98	1.9	79.86	0.25	26.74	3.29	3.09	65.37	7.78
2014	0.85	2.64	92.14	0.11	11.19	3.69	2.02	65.69	3.85
2015	0.93	2.59	88.00	0.14	17.12	3.68	2.02	62.89	4.09
2016	0.91	2.51	88.78	0.13	23.97	4.81	2.05	64.92	4.15
2017	1.07	2.15	84.49	0.25	24.52	5.63	3.48	67.08	4.79
2018	1.17	1.87	78.44	0.44	15.58	5.66	3.36	66.13	4.67
2019	1.31	1.85	79.55	0.31	25.77	6.63	3.62	64.85	5.94
2020	1.34	1.68	74.27	0.58	13.56	6.02	4.56	66.75	5.76
2021	1.30	1.62	74.97	0.59	15.48	5.33	3.49	62.26	4.28

Source: own processing

The analysis of activity indicators generally points to an unfavorable financial situation within the entire industry, which caused that the efficiency of the hospital process has an immediate reflection in the economic result and in the basic production power of the decision-making unit. However, on the other hand, it is necessary to continue to monitor the indicators of the maturity period of short-term trade receivables (DSL), where the median in the section reached a positive decrease from 61 days in 2019 to 53.37 days in 2020. On the other hand, hospitals pay their liabilities earlier (27.19 days).

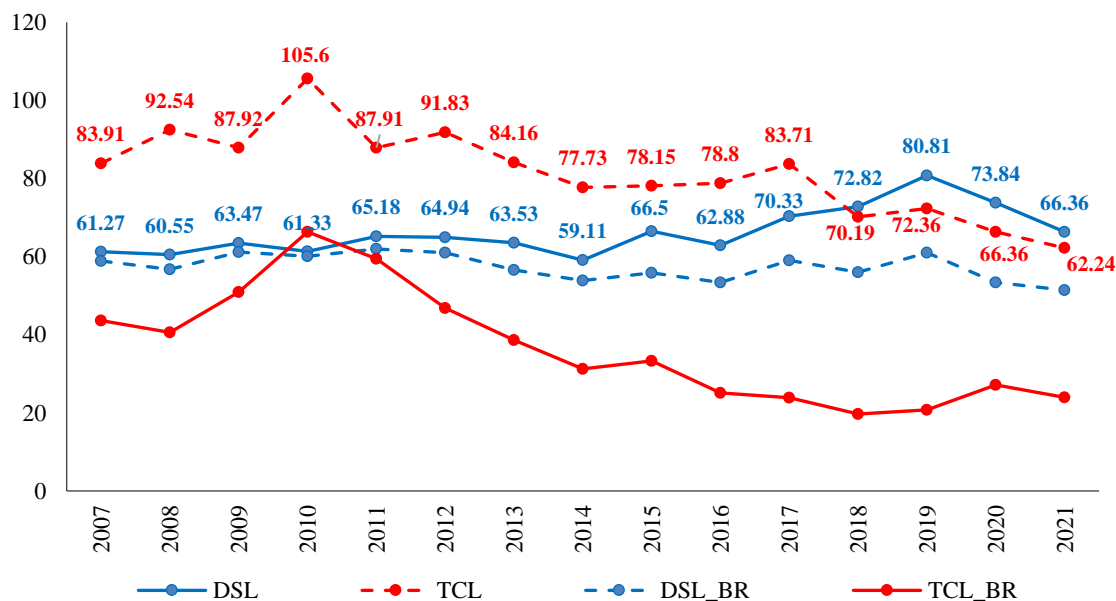


Figure 1 Development of the mean values of activity indicators (days) of NACE 861
Source: own processing based on data from the Slovak Credit Bureau 2007-2021

Based on publicly available information, FinStat (2022) evaluates the financial health of companies using its own credit model for assessing the risk of bankruptcy in the next accounting period, called the FinStat score. The model includes total indebtedness, degree of self-financing, financial accounts/assets, return on assets and the period of repayment of liabilities in relation to sales. For the year 2021, out of the total number of enterprises in the Slovak Republic, 8% of companies show a high probability of bankruptcy. Based on the evaluation of companies in individual sectors according to the share of FinStat score categories, we can say that the largest representation of financially stable companies is in public administration (88%), information technology (80%), **healthcare** (77%), design and engineering (76%), but also in education and training (75%). These are mainly industries that are financed by long-term income and are not largely affected by seasonality.

As part of our analysis, we focused on the most important financial indicators that most affect the financial position and competitiveness of hospitals in Slovakia. We analyzed liquidity, specifically the indicator of total liquidity, similarly to studies by Petruška et al. (2019), Trinh & O'Connor (2000), Bolon (2005), Dong (2015), Lee (2015). Further, we analyzed the activity, specifically the turnover of assets (Štefko et al., 2017), the turnover period of receivables and liabilities. We also analyzed the indebtedness of hospitals, where we focused on the indicator of total indebtedness (Cleverly, 1989; Trinh & O'Connor, 2000; Goldstein, 2002). As part of the profitability, we examined the indicators ROA (Goldstein, 2002), ROS (Štefko et al., 2017), ROE (Štefko et al., 2017).

Conclusion

Financial aspects are key factors in the company's development process. Knowledge regarding the financial health of the company can help the company in its competitiveness. In the framework of business management, many decisions are influenced by financial and economic analysis. Every manager should strive to understand financial theory.

We aimed to apply methods of financial analysis in the financial management of hospitals in NACE 861 – Hospital activities, to assess and increase competitiveness and financial performance. The research sample consisted of medical facilities under the jurisdiction of the Ministry of Health of the Slovak Republic transformed into joint-stock companies and hospitals under the jurisdiction of the Ministry of Health of the Slovak Republic, the Ministry of Defense of the Slovak Republic, and the Ministry of the Interior of the Slovak Republic according to NACE 861 – Hospital activities. We used basic thought operations and selected mathematical-statistical methods in the paper. The financial analysis of the hospitals was carried out on the basis of data taken from the financial statements available in the Register of Financial Statements of the Slovak Republic for the years 2007 - 2022.

This paper has several limitations because we do not consider all companies from Healthcare sector in the Slovak Republic. Besides that, we can consider the regional segmentation of companies and other qualitative data. We could also take into account the size of companies. In further research, we could divide the sample of companies into small, medium and large and find differences in the results.

Knowing the financial situation allows for more effective business management. This paper can be a starting point to improve financial health, prosperity, and competitiveness of analysed businesses. Our analysis is an important prerequisite for developing a realistic financial plan for companies operating in the NACE 861 – Hospital activities. The presented results are the basis for further modelling and at the same time a source of stimulus for further discussion.

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