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MODEL OF FINANCIAL MANAGEMENT OF COMPANY AND ITS EFFICIENT IMPLEMENTATION
MODEL FINANČNÍHO ŘÍZENÍ PODNIKU A JEHO EFEKTIVNÍ IMPLEMENTACE

DOCTORAL THESIS
DISERTAČNÍ PRÁCE

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ABSTRACT

Objective of doctoral thesis is creation of model of financial management of company based on determining the optimal set of key indicators of success and their interaction principle in order to improve the efficiency of the company. Creation of a model of financial management of the enterprise is based on the study and comparison financial and managerial practices of ten large construction companies located in the Czech Republic and in Portugal. A model has been created that links the methods of financial management and analysis. The model was subsequently successfully tested on two specific companies. It was also proposed methodology, sequence of steps for its implementation and subsequent use in practice. To determine the effectiveness of decisions made, the EVA method was used. The model evaluates the financial condition of the company, determines the dependence of financial stability on external factors, determines the tasks that the company must fulfill in order to increase the company's efficiency.

KEYWORDS

Financial Management, Model of Financial Management, Return on Equity, Effective Implementation, Financial Analysis.

ABSTRAKT

Cílem disertační práce je navrhnout modelu finančního řízení společnosti na základě stanovení optimálního souboru klíčových ukazatelů úspěchu a principu jejich interakce za účelem zvýšení efektivity společnosti. Vytvoření modelu finančního řízení podniku je založeno na studii a srovnání finanční a manažerské praxe deseti velkých stavebních společností se sídlem v České republice a Portugalsku. Byl vytvořen model, který propojuje metody finančního řízení a analýzy. Model byl následně úspěšně testován na dvou konkrétních společnostech. Byla také navržena metodika, sled kroků pro její implementaci a následné využití v praxi. Ke stanovení účinnosti přijatých rozhodnutí byla použita metoda EVA. Model vyhodnocuje finanční situaci společnosti, určuje závislost finanční stability na vnějších faktorech, určuje úkoly, které musí společnost plnit, aby se zvýšila efektivita společnosti.

KLÍČOVÁ SLOVA

Finanční Řízení, Model Finančního Řízení, Rentabilita Vloženého Kapitálu, Efektivní Implementace, Finanční Analýza.

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PROHLAŠENI

Prohlašuji, že jsem disertační práci s názvem Model finančního řízení podniku a jeho efektivní implementace zpracovala samostatně a že jsem uvedla všechny použité informační zdroje.

V Brně, dne 20. 01. 2020

Ing. Tatiana Semenova
autor práce

PODĚKOVANI

Mé poděkování patří paní Ing. Evě Vítkové, Ph.D. za odborné vedení při zpracování disertační práce.

CONTENT

1 INTRODUCTION

Construction is one of the main branches of material production. Development of all sectors of material production and, as a consequence, the economic potential of the state and national income largely depends on the quantity, quality and growth rates of construction. Regarding the ratio of products and the number of employed workers, the construction industry is approximately a tenth of the country's economy [1].

Nevertheless, capital construction was and remains quite a costly business that requires a lot of investment by the owner-developer, and thus it is quite a risky financial investment. As shown by the recent years, the construction industry is the least adapted to the effects of the global economic crisis. Even organizations with significant economic and political lobbies, have experienced difficulties with the rhythm of production, and in some cases completely lost the ability to perform construction activities [2].

Moreover, today economic environment is characterized by strong competition, increasing uncertainty and discontinuity. Increasing competition on a global market forces enterprises increase the efficiency of internal processes in order to retain competitiveness. This issue is even more important in construction industry suffering from the decrement of the volume of public and private tenders.

In this regard, the key to survival and the basis for a stable position of the enterprise in the current market conditions is financial sustainability. This means that the management of a construction company should primarily resolve issues by the early detection of financial difficulties and make their diagnosis. The earlier financial problems are identified, the more painless and effective the activities necessary to overcome them will be [3].

Financial managers of companies perform a wide range of tasks, such as assessing and analyzing a company's financial activities, ensuring a balance in the movement of material and cash flows, achieving financial sustainability and financial independence of an enterprise, searching for internal and external short-term and long-term sources of financing, effective use of financial resources to achieve the strategic goals of the enterprise, the creation of development strategies and timely response to any changes, analysis and assessment of the internal and external environment, forecasting further development, analysis and risk assessment.

Implementation of these tasks and achievement of goals is impossible without the development and application of an effective, financial management model.

2 OBJECTIVE, METHODOLOGY AND HYPOTHESIS

Objective of doctoral thesis is creation of model of financial management of company based on determining the optimal set of key indicators of success and their interaction principle in order to improve the efficiency of the company.

Methodology: creation of a model of financial management of the enterprise is based on the study and comparison financial and managerial practices of ten large construction companies located in the Czech Republic and in Portugal. According to Eurostat recourses depending on the number of employees the companies are divided into four groups*:* micro firm (0-9 employees), small firms (10-49 employees), medium-sized firms (50-249 employees), and large firms (250+ employees) [4]. The process of creation of a model includes a set of methods. Primarily to review the existing situation and scientific elaboration assigned tasks is necessary to use the method of theoretical research and literature review, scientific publications, reports and analytical predictions of these countries.

The model of the financial management of the company includes the supposed following steps and methods:

1. Assessment of the external environment of the company – PESTEL analysis.
2. Rapid assessment of a company's financial health – Altman Z-score.
3. Determination of dependence of profitability indicators with indicators of the external environment - Correlation analysis.
4. Determination of recommended values of profitability indicators – Benchmarking.
5. Determination of internal indicators that have the greatest impact on profitability indicators – DuPont ROE, Logarithmic method.
6. Evaluating the effectiveness of the decisions taken – EVA model.

The following inputs are used in the model: Financial Statements and Balance sheet. The model is created using the MS Excel.

The model includes four main blocks (Fig.1):

1. Analysis of the external environment of the company.
2. Analysis of the internal financial condition of the company.
3. Correlation analysis of the external environment with financial ratios - Creating a strategy.
4. Evaluation of decisions made.

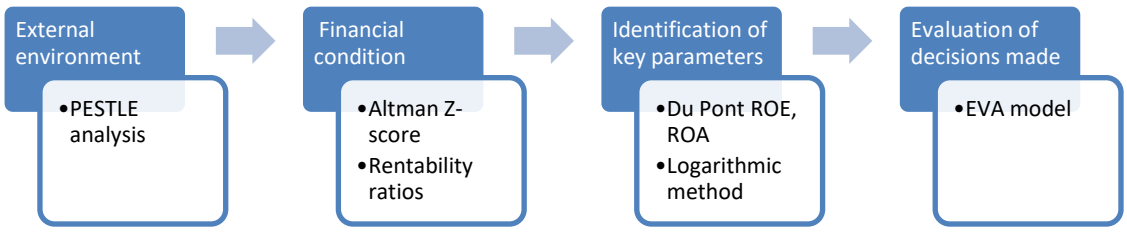


Fig. 1 Four main blocks of the model. Source: author

The methodology for evaluating the effectiveness of decisions taken is evaluated in two stages:

- Compares the profitability of the considered company with the average value of profitability indicators of similar companies in the country.

- Performance evaluation using the EVA model.

Hypothesis:

H1: Model of financial management leads to increasing the efficiency of the construction company.

H2: Model of financial management is based on establishing key financial and macroeconomic indicators, as well as establishing links between them.

H3: Model of financial management of company allows considering possible scenarios of further development.

3 LITERATURE REVIEW

Theoretical and practical principles of analysis and management of the financial sustainability of enterprises already were examined by famous economists like Brealey R., Brigham Y., Van Horn J. C., Gapenski L., Myers S, Hicks J., and others since last century.

Earlier works on the financial management of companies conducted by scientists John Hicks, Brealey R. and Myers S. The authors in their research have devoted their activities to the assessment of current activities, the analysis of investment projects, the choice of sources of financing, budget planning, risk management, determination of short-term need for money, financial decision-making in the face of change [5]. Special attention to the influence of macroeconomic factors on the financial activities of enterprises was given by American researcher Van Horne J. [6].

Later, researchers Brigham Y. and Ehrhardt M. focused on deeper study of financial management, they gave a sequence of actions by corporate financial managers who plan to attract external funding, starting from the earliest stages of the company's development to its open market, or on the contrary, liquidate the insolvent corporation. They analyzed the current criteria for value-based management and the assessment of economic (EVA) and market value added (MVA). In addition, they studied various methods for calculating them and analyzed their applications in the practice of evaluating corporate management [7].

Despite the fact that this topic has long been studied by a large number of researchers, the problem of the lack of an optimal composition of indicators of financial sustainability of enterprises as well as the definition and formation of a system of financial indicators is still relevant.

According to Brigham Y. and Ehrhardt M. (2016) all companies follow the same principle [7]:

- Any company interacts with the external environment and is directly depends on the stability of the country.
- Resources come to the “system input”, and results are generated at the “output” (products, works and services).
- Inside the system there is a transformation of incoming resources into results.
- Under the influence of the external environment in the system, deviations of development indicators occur, which lead to the adaptation of the system input and output parameters.
- After adaptation, the system is able to maintain sustainable development.
- Sustainable development of an enterprise is a state in which a minimum gap is reached between its given and actual characteristics, subject to minimal costs for ensuring such a steady state.

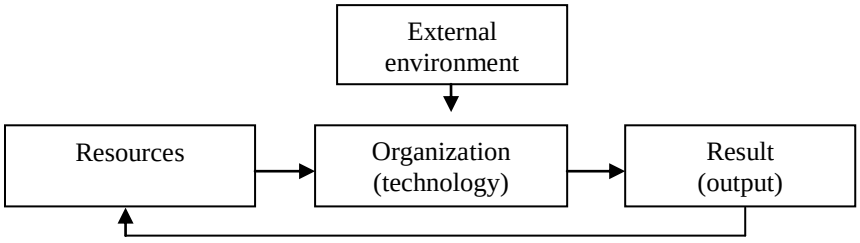


Fig. 2 Organization operation scheme. Source: Brigham Y. and Ehrhardt M. (2016)

Thus, the organization develops under the condition of ensuring sustainability.

The system for determining the financial sustainability of the organization

Financial stability is one of the most important characteristics of the financial condition of any company. The concept of financial sustainability is based on the optimal ratio between current and non-current assets and their sources of financing. As indicated by Gilyarovskaya (2003): "The concept of financial sustainability includes an assessment of various aspects of the organization's activities" [8].

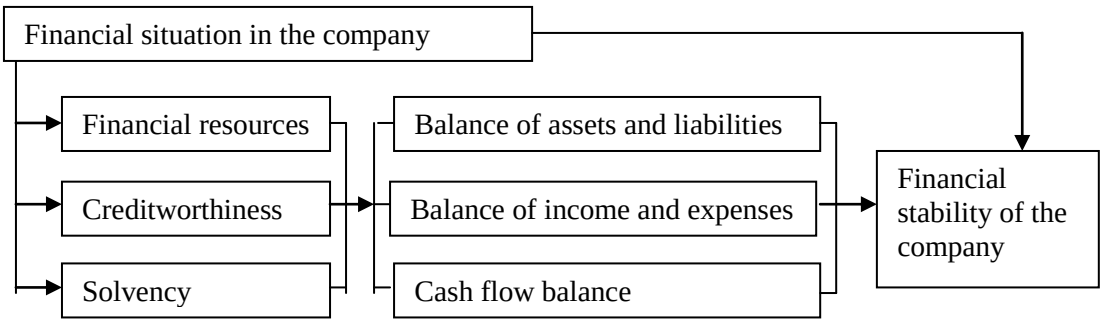


Fig. 3 Factors determining the financial sustainability of the organization. Source: Gilyarovskaya (2003)

Analysis of the financial sustainability of the organization allows evaluating:

- The degree of financial independence of the company.
- Is the organization's financial position sustainable?

According to the studies of L. A. Bernstein (2008), the method of financial indicators is one of the most well-known and widely used methods for assessing the financial sustainability of an enterprise [9]. In addition to the currently developed methods and models of analysis of the financial situation of companies on the basis of a standard set of indicators of vertical and horizontal analysis.

However, a common major problem with existing models of financial management of companies is that the financial data of companies are not provided for general review, financial stability can only be assessed by company managers. Without providing an opportunity to assess the financial condition of the company to potential investors, future partners, as well as customers. Another disadvantage of existing models is the excessive amount of calculated coefficients, which makes the assessment process time-consuming and confusing, requiring deep understanding and skills in the field of finance.

3.1 Analysis of external environment of companies – PESTEL analysis

PESTEL analysis describes a framework of macro-environmental factors used in the environmental scanning component of strategic management. It is a part of the external analysis when conducting a strategic analysis or doing market research, and gives an overview of the different macro-environmental factors that the company has to take into consideration [10].

A PESTEL analysis includes Political, Economic, Social, Technological, Environmental and Legal l factors. PESTEL analysis is important part of creation and implementation of a strategy of company and should be regularly repeated to identify changes in the macro environment.

Political Factors include political policy, stability, trade, fiscal and taxation policies and determine the extent to which government and government policy may impact on an organization or a specific industry.

Economic Factors include interest and unemployment rates, raw material costs, foreign exchange rates and effect on the economy and its performance, which in turn directly impacts on the organization and its profitability.

Social Factors include changing family demographics, education levels, cultural trends, attitude changes and changes in lifestyles with focus on the social environment and identify emerging trends.

Technological Factors consider the rate of technological innovation and development that could affect a market or industry. Factors could include changes in digital or mobile technology, automation, research and development, methods of distribution, manufacturing and also logistics.

Legal Factors include employment legislation, consumer law, healthy and safety, international as well as trade regulation and restrictions.

Environmental Factors include climate, recycling procedures, carbon footprint, waste disposal and sustainability and relate to the influence of the surrounding environment and the impact of ecological aspects [11].

3.2 Financial management

The importance of the analysis and assessment of financial management have been disclosed in a publication "Model of finance management at enterprise and the effectiveness of its implementation" in 2014 [12]. As highlighted in the article, previously, managers focused mainly on maximizing sales and revenues, these values then automatically bring profits to them. Today the situation has changed; we live in a volatile environment where we cannot know what changes are waiting for us, which of course can lead to trouble. That is why today managers in companies focus on financial analysis indicators, forecasting future needs, measuring company performance and deciding on a company's financial management strategy.

Moreover, the construction industry is characterized by high sensitivity to any changes in external and internal environment. Each year, under the influence of various factors a large number of companies go out of business. The construction industry has a number of features:

- Building a project at a different location each time.
- Heavy reliance on subcontractors to complete the projects.
- Constantly building unique projects.

As a result, the construction industry operating a successful construction company needs a certain set of financial management skills.

The traditional approach to the definition of the essence of financial management considers as objects of control the:

- Operating assets and capital investment.
- Structure of the capital and the attraction of the sources of financing [13].

As, for example, John K. Van Horn and J. M. Vahovich suggest that financial management is the act of acquisition, financing and asset management services, which are aimed at the realization of a particular purpose. Consequently, management

decisions in the area of financial management can relate to the main areas of transactions in assets: investment, financing and management [14].

Financial management consists of long-term, medium-term and short-term financial planning, financial decision-making and financial analyzes. Financial management takes place at all management levels of the company in the appropriate detail and time impact. The main postulates of financial management are the active control of the future and the long term horizons for evaluating and planning business operations [15].

3.3 Financial analysis

As a present economic environment is constantly changing, a successful company cannot maintain its position in the market without analyzing the financial situation of the company. To identify the needs for setting up a model of financial management is necessary to determine its effective implementation.

Financial analysis is a systematic analysis of the data obtained, which is mainly contained in the accounts in the financial statements. Financial analysis involves assessing the company's past, present and forecasting future financial conditions.

The main purpose of financial analysis is to prepare the basis for quality decisions on the functioning of the company, to identify financial health, weaknesses that could lead to further problems and strengths what the company could improve.

The basic objectives of financial analysis include the achievement of financial stability, which can be evaluated using two basic criteria:

- Ability to generate profits, hedge assets, and capitalize on invested capital.
- Ensuring the solvency of the company.

Financial analysis has its meaning from the time point of view in two levels: the first level is the fact that we look back and have a chance to evaluate how the company has developed until now; the second level is the fact that financial analysis serves as a basis for financial planning at all time levels. Therefore, we will be able to plan both short-term planning associated with the normal operation of the company and strategic planning related to the long-term development of the company.

3.3.1 Accounting standards in the Czech Republic and in Portugal

Accounting in the Czech Republic is regulated primarily by [16]:

- Act No. 563/1991 Coll., on Accounting, as amended.
- Decree no. 500/2002 Coll.
- Czech Accounting Standards.

It is also influenced by the following laws, for example:

- Act No. 586/1992 Coll., on Income Taxes.
- Act No. 89/2012 Coll., Civil Code.
- Act No. 235/2004 Coll., on Value Added Tax.
- Act No. 90/2012 Coll., on Business Corporations.

International Financial Reporting Standards (IFRS), which were created by the International Accounting Standards Board (IASB), were applied to accounting policies in the Czech Republic which is a non-profit independent public interest organization. Only publicly traded companies in the Czech Republic must proceed in the preparation

of their consolidated or individual financial statements. Other companies may choose to apply IFRS or Czech Accounting Standards (CAS).

In Portugal IFRS Standards apply to all domestic and foreign public companies. SMEs (Non-subsidiary, independent firms) may choose between IFRS Standards and Portuguese national accounting standards. Subsidiaries of foreign non-IFRS companies must use Portuguese accounting standards [17].

3.3.2 Resources of financial analysis

Financial analysis requires large amount of relevant information obtained from different sources. The main sources of data for financial analysis by IFRS standarts are Balance Sheet, Income Statement, Cash Flow and Statement of changes in equity [18]. According to Act No. 563/1991 Coll., on Accounting, as amended data for financial analysis is presented in Balance Sheet and Income Statement [16].

In book „Business Analysis Valuation: Using Financial Statements" Krishna G. Palepu and Paul M.Healy claim that „*One of the primary purposes of the financial statements is to inform current or potential investors about management's use of their funds, such that they can evaluate management's actions and value their current or potential claim on the firm»* [19].

On the other hand, according to Koen and Oberholster there are some limitations in financial statements. One of the major limitations is that the financial statements only reflect part of the total picture without including operational information. In addition the information does not reflect the future. Another important limitation is that the data are presented in monetary terms, excluding the possibility to provide information that cannot be expressed in monetary form [20].

The financial performance of the enterprise over a certain period of time is presented in the income statement. According to § 18 of Act No. 563/1991 Coll. the financial statements consist:

a) Balance sheet;
b) Profit and loss statement;
c) An ANNEX explaining and supplementing the information contained in the parts referred to in points (a) and (b) [21].

The financial condition of the enterprise as of particular date can be determined by information presented in balance sheet. The balance sheet consists of assets, equity and liabilities.

One of the main reports for financial analysis is the statement of cash flows. The information in cash flow gives to managers, investors, analysts and potential partners the explanation of the changes in the firm's cash balances, provides opportunity to assess the company's ability to pay debt, dividends and other liabilities [18].

Another resource of information for financial analysis is profit and loss statement. This statement includes reserves and retained earnings, common and preferred stocks.

3.3.3 Balance sheet (Statement of financial position) by IFRS

A balance sheet is a financial statement that reports a company's assets, liabilities and shareholders' equity at a specific point in time, and provides a basis for computing rates of return and evaluating its capital structure. It is a financial statement that provides a snapshot of what a company owns and owes, as well as the amount invested by shareholders [22].

Table 1 Example of Balance Sheet for the Year Ended by IFRS. Source: IFRS

Balance Sheet for the Year Ended			
Name of company	**Note**	**Resent Year**	**Previous year**
ASSETS			
Non-current assets			
Property, plant and equipment			
Investment properties			
Intangible assets			
Deferred tax assets			
Other assets			
Investments accounted for using the equity method			
Financial assets at fair value through other comprehensive income			
Financial asset at fair value through profit or loss			
Financial assets at amortised cost			
Derivative financial instruments			
Held-to-maturity investments			
Available-for-sale financial assets			
Other loans and receivables			
Total non-current assets			
Current assets			
Inventories			
Other current assets			
Contract assets			
Goods			
Trade receivables			
Other financial assets at amortised cost			
Other receivables			
Derivative financial instruments			
Cash and cash equivalents (excluding bank overdrafts)			
Assets classified as held for sale			
Total current assets			
Total assets			
LIABILITIES			
Non-current liabilities			
Borrowings			
Deferred tax liabilities			
Employee benefit obligations			
Provisions			
Total non-current liabilities			
Current liabilities			
Trade and other payables			
Contract liabilities			
Current tax liabilities			
Borrowings			
Derivative financial instruments			
Employee benefit obligations			
Provisions			
Employee benefit obligations			
Total current liabilities			
Total liabilities			
Net assets			
EQUITY			
Share capital and share premium			
Other equity			
Other reserves			
Retained earnings			
Capital and reserves attributable to owners of VALUE IFRS			
Non-controlling interests			
Total equity			

Assets

In general assets can be defined as resources that a company owns and controls as a result of past business transactions, which will produce financial benefits in future. According to IFRS there are two groups of assets: non-current (long-term) and current (short-term) assets.

Non-current assets are a long-term tangible piece of property that a firm owns and uses in its operations to generate income. Non-current or fixed assets are not expected to be consumed or converted into cash within a year. According to Czech Accounting Standards fixed assets can be also divided into tangible, intangible assets and financial assets [16]. A tangible asset is an asset that has a physical form. Tangible assets include fixed assets, such as machinery, buildings and land and etc. The opposite of a tangible asset is an intangible asset. Nonphysical assets, such as patents, software, trademarks, copyrights, goodwill and brand recognition, are examples of intangible assets.

According to Skanska Annual Report *current asset* is expected to be realized during twelve months from the closing day or during the company's operating cycle [23].

The general order of accounts within current assets:

- Accounts receivable;
- Cash and cash equivalents;
- Inventories;
- Prepaid expenses for future services that will be used within a year;
- Marketable securities.

Accounts receivable is claim for payment held by a business for goods supplied, services that are already ordered but not yet paid. These are usually in the form of invoices raised by a business and delivered to the customer for payment within an agreed time frame [24].

In a balance sheet cash and cash equivalents are the most liquid current assets. Cash equivalents are short-term obligations "with temporarily idle cash and easily convertible into a known cash amount" [25]. If cash usually includes coins, currency, bank overdrafts, cash in saving accounts, cash in checking accounts, money order, and petty cash, cash equivalents includes commercial paper, bills, marketable securities, money Market funds, short-term government bonds.

Inventories can be defined as goods available for sale, valued at the lower of the cost or market price.

Prepaid expenses represent costs that have already been paid. It can be rent, insurance or advertising contracts [26]. *Marketable securities* are liquid financial instruments that can be fast converted into cash and include commercial paper, common stock, banker's acceptances, treasury bills, and other papers. Usually the maturities are less than one year [27].

Liabilities

According to Framework 2010 liability is "a present obligation of the entity arising from past events, the settlement of which is expected to result in an outflow from the entity of resources embodying economic benefits" [28]. Liabilities include obligations to customers that have paid in advance for products or services (in construction industry typically overbilling); commitments to public and private providers of debt financing; obligations to federal and local governments for taxes; commitments to employees for

unpaid wages, pensions, and other retirement benefits; and obligations from court or government fines or environmental cleanup orders [29]. There are two types of liabilities: *Short-term liabilities* (current) and *long-term liabilities* (non-current) liabilities.

Short-term liabilities might include:

- Current portion of long-term debt;
- Bank indebtedness;
- Trade payables;
- Rent, tax, utilities;
- Wages payable;
- Customer prepayments;
- Dividends payable and others.

Long-term liabilities can include:

- Long-term debt: interest and principal on bonds issued;
- Pension fund liability: the money a company is required to pay into its employees' retirement accounts;
- Deferred tax liability: taxes that have been accrued but will not be paid for another year.

Some liabilities are considered off the balance sheet, meaning that they will not appear on the balance sheet.

Equity

Equity represents the customer’s perception of the quality received of goods and services and the price paid for them [30].

Shareholders' equity comprises:

- Share capital what is the portion of a corporation's equity that has been obtained by the issue of shares in the corporation to a shareholder [31].
- Contributed capital is the cash and other assets that shareholders paid the company for the shares [32].
- Retained earnings are the earnings that a company has earned to date, less any dividends or other distributions paid to investors. If company has a large retained earnings balance it means that company is in good financial situation [33].
- Reserve funds, non-distributable reserves and other reserves.

Shareholders' equity is part of the liabilities of the company or funds owing to shareholders after payment of all other liabilities.

3.3.4 Balance sheet by Czech Accounting Standards

According to Czech Accounting Standards companies must submit a balance sheet and a profit and loss account at the pertinent court. The balance sheet and the profit and loss account must be prepared in accordance with the model available in the ANNEX of the Czech Act on Accounting [16].

Table 2 Example of Balance Sheet for the Year Ended by Czech Accounting Standards.
Source: by Czech Accounting Standards

Balance Sheet for the Year Ended						
			Resent Year			Previous year
Ref.	**Name of company**	**L.**	**Gross**	**Provision**	**Net**	**Net**
	ASSETS					
	TOTAL ASSETS	1	L.2+3+37+74	L.2+3+37+74		L.2+3+37+74
A.	Receivables from subscribed capital	2				
B.	**Fixed assets**	3	L.4+14+27	L.4+14+27		L.4+14+27
B.I.	**Intangible fixed assets**	4	L.5+6+9+10 +11	L.5+6+9+10 +11		L.5+6+9+10 +11
B.I.1	Intangible results of research and development	5				
B.I.2	Valuable rights	6	L.7+8	L.7+8		L.7+8
B.I.2.1	Software	7				
B.I.2.2	Other valuable rights	8				
B.I.3	Goodwill	9				
B.I.4	Other intangible fixed assets	10				
B.I.5	Advance payments for intang. fixed assets and intang. fixed assets in progress	11	L.12+13	L.12+13		L.12+13
B.I.5.1	Advance payments for intangible fixed assets	12				
B.I.5.2	Intangible fixed assets in progress	13				
B.II.	**Tangible fixed assets**	14	L15+18+19 +20+24	L15+18+19 +20+24		L15+18+19 +20+24
B.II.1	Lands and buildings	15	L.16+17	L.16+17		L.16+17
B.II.1.1	Lands	16				
B.II.1.2	Buildings	17				
B.II.2	Fixed movables and the collections o fixed movables	18				
B.II.3	Valuation adjustment to acquired assets	19				
B.II.4	Other tangible fixed assets	20	L.21+22+23	L.21+22+23		L.21+22+23
B.II.4.1	Perennial corps	21				
B.II.4.2	Full-grown animals and groups thereof	22				
B.II.4.3	Other tangible fixed assets	23				
B.II.5	Advance payments for tang. fixed assets and tang.fixed assets in progress	24	L.25+26	L.25+26		L.25+26
B.II.5.1	Advance payments for tangible fixed assets	25				
B.II.5.2	Tangible fixed assets in progress	26				
B.III.	**Long-term financial assets**	27	L.28+29+30+31 +32+33+34	L.28+29+30+ 31+32+33+34		L.28+29+30+ 31+32+33+34
B.III.1	Shares – controlled or controlling entity	28				
B.III.2	Loans and credits – controlled or controlling person	29				
B.III.3	Shares - significant influence	30				
B.III.4	Loans and credits – significant influence	31				
B.III.5	Other long-term securities and shares	32				
B.III.6	Loans and credits - others	33				
B.III.7	Other long-term financial assets	34	L.35+36	L.35+36		L.35+36
B.III.7.1	Another long-term financial assets	35				
B.III.7.2	Advance payments for long-term financial assets	36				

C.	**Current assets**	37	L.38+46+68 +71	L.38+46+68 +71		L.38+46+68 +71
C.I.	**Inventories**	38	L39+40+41 +44+45	L39+40+41 +44+45		L.39+40+41 +44+45
C.I.1	Raw materials	39				
C.I.2	Work in progress and semi-finished products	40				
C.I.3	Finished products and goods	41	L.42+43	L.42+43		L.42+43
C.I.3.1	Finished products	42				
C.I.3.2	Goods	43				
C.I.4	Young and other animals and groups thereof	44				
C.I.5	Advanced payments for inventory	45				
C.II.	**Receivables**	46	L.47+57	L.47+57		L.47+57
C.II.1	Long-term receivables	47	L.48+49+50 +51+52	L.48+49+50 +51+52		L48+49+50 +51+52
C.II.1.1	Trade receivables	48				
C.II.1.2	Receivables – controlled or controlling entity	49				
C.II.1.3	Receivables - significant influence	50				
C.II.1.4	Deferred tax receivable	51				
C.II.1.5	Receivables - others	52	L.53+54+55 +56	L.53+54+55 +56		L.53+54+55 +56
C.II.1.5.1	Receivables from equity holders	53				
C.II.1.5.2	Long-term advanced payments	54				
C.II.1.5.3	Estimated receivables	55				
C.II.1.5.4	Other receivables	56				
C.II.2	Short-term receivables	57	L.58+59+60 +61	L.58+59+60 +61		L.58+59+60 +61
C.II.2.1	Trade receivables	58				
C.II.2.2	Receivables – controlled or controlling entity	59				
C.II.2.3	Receivables - significant influence	60				
C.II.2.4	Receivables - others	61	L.62+63+64 +65+66+67	L.62+63+64 +65+66+67		L.62+63+64 +65+66+67
C.II.2.4.1	Receivables from equity holders	62				
C.II.2.4.2	Social security and health insurance	63				
C.II.2.4.3	State - tax receivables	64				
C.II.2.4.4	Short-term advanced payments	65				
C.II.2.4.5	Estimated receivables	66				
C.II.2.4.6	Other receivables	67				
C.III.	**Short-term financial assets**	68	L.69+70	L.69+70		L.69+70
C.III.1	Shares - controlled or controlling entity	69				
C.III.2	Other short-term financial assets	70				
C.IV.	**Funds**	71	L.72+73	L.72+73		L.72+73
C.IV.1	Cash	72				
C.IV.2	Bank accounts	73				
D.	**Accrued assets**	74	L.75+76+77	L.75+76+77		L.75+76+77
D.1	Prepaid expenses	75				
D.2	Complex prepaid expenses	76				
D.3	Accrued incomes	77				

	LIABILITIES	**Line**	**Resent Year**	**Previous year**
	TOTAL LIABILITIES	78	L. 79+100+140	L. 79+100+140
A.	**Equity**	79	L. 80+84+92+95 +98+99	L. 80+84+92+95 +98+99
A.I	**Registered capital**	80	L. 81+82+83	L. 81+82+83
A.I.1	Registered capital	81		
A.I.2	Company's own shares(-)	82		
A.I.3	Changes of registered capital	83		

A.II.	**Capital surplus and capital funds**	84	L. 85+86	L. 85+86
A.II.1	Capital surplus	85		
A.II.2	Capital funds	86	L. 87+88+89+90+91	L. 87+88+89+90+91
A.II.2.1	Other capital funds	87		
A.II.2.2	Gains and losses from revaluation of assets and liabilities (+/-)	88		
A.II.2.3	Gains and losses from revaluation in the course of transformations of business corporations (+/-)	89		
A.II.2.4	Differences resulting from transformations of bussiness corporations (+/-)	90		
A.II.2.5	Differences from the valuation in the course of transformations of business corporations (+/-)	91		
A.III.	**Funds from profit**	92	L.93+94	L.93+94
A.III.1	Statutory reserve fund	93		
A.III.2	Other reserve funds	94		
A.IV.	**Net profit or loss from previous years (+/-)**	95	L. 96+97	L. 96+97
A.IV.1	Retained earnings from previous years	96		
A.IV.2	Accumulated losses from previous years (-)	97		
A.V.	Net profit or loss for the current period (+/-)	98		
A.VI.	Decided about the advance payments of profit share(-)	99		
B+C	**Liabilities**	100	L. 101+106	L. 101+106
B	**Provisions**	101	L. 102+103+104+105	L. 102+103+104+105
B.1	Provision for pension and similar payables	102		
B.2	Income tax provision	103		
B.3	Provisions under special legislation	104		
B.4	Other provisions	105		
C.	**Payables**	106	L. 107+122	L. 107+122
C.I.	**Long-term payables**	107	L.108+111+112+ 113+114+115+116 +117+118	L.108+111+112 +113+114+115+116 +117+118
C.I.1	Bonds issued	108	L. 109+110	L. 109+110
C.I.1.1	Exchangeable bonds	109		
C.I.1.2	Other bonds	110		
C.I.2	Payables to credit institutions	111		
C.I.3	Long-term advance payments received	112		
C.I.4	Trade payables	113		
C.I.5	Long-term bills of exchange to be paid	114		
C.I.6	Payables – controlled or controlling entity	115		
C.I.7	Payables - significant influence	116		
C.I.8	Deferred tax liability	117		
C.I.9	Payables - others	118	L. 119+120+121	L. 119+120+121
C.I.9.1	Payables to equity holders	119		
C.I.9.2	Estimated payables	120		
C.I.9.3	Other liabilities	121		
C.II.	**Short-term payables**	122	L.123+126+127+128 +129+130+131+132	L.123+126+127+128 +129+130+131+132
C.II.1	Bonds issued	123	L.124+125	L.124+125
C.II.1.1	Exchangeable bonds	124		
C.II.1.2	Other bonds	125		
C.II.2	Payables to credit institutions	126		
C.II.3	Short-term advances received	127		
C.II.4	Trade payables	128		
C.II.5	Short-term bills of exchange to be paid	129		
C.II.6	Payables – controlled or controlling entity	130		
C.II.7	Payables - significant influence	131		
C.II.8	Other payables	132	L.133+134+135+136 +137+38+39	L.133+134+135+136 +137+38+39
C.II.8.1	Payables to equity holders	133		
C.II.8.2	Short-term assistance	134		
C.II.8.3	Payroll payables	135		
C.II.8.4	Payables - social security and health insurance	136		

C.II.8.5	State - tax liabilities and grants	137		
C.II.8.6	Estimated payables	138		
C.II.8.7	Other payables	139		
D	**Accrued liabilities**	140	L. 141+142	L. 141+142
D.1	Accrued expenses	141		
D.2	Deferred revenues	142		

According to Czech Accounting Standards Balance Sheet is divited into two parts: Assets and Passive. *Assets* are divided into fixed assets, current assets and accruals in assets.

Fixed assets are divided into tangible assets, intangible assets and long-term financial assets. *Long-term financial assets* are assets in which an entity invests free funds for more than one year. Long-term financial assets can include equity securities and investments, debt securities, loans and advances, pledges and other financial assets.

Current assets are divided into inventories, receivables (current and long term), short-term financial assets, funds.

Passive consist of own capital (equity), liabilities (provisions and payables) and accued liabilities. Own capital (equity) is the foundation of business. The value of equity represents how much of the assets reported in the assets of the balance sheet belong to the owner of the entity. *Equity* is divided into registered capital, capital surplus and capital funds, funds from profit and net profit or loss from previous years. *Liabilities* can be divided into provisions, long-term and short-term payables.

Resolution items in the liabilities of the balance sheet allow the entity to fulfill the so-called accrual principle. Accruals in the liabilities of the balance sheet include expenses and revenues of the next periods.

3.3.5 Statement of income by IFRS

The income statement shows revenues for a specific period and expenses charged against these revenues, as amortization, depreciation and taxes. The income statement reflects the effect of management's operating decisions on business performance and the resulting accounting profit [34].

According to the requirement of IFRS of the income statement to be published least the following information:

- Revenue;
- Financial expenses;
- Profit/loss shares of associates and joint ventures presented using the equity method;
- Pre-tax result arising from the disposal of assets or from discontinuing operations;
- Tax expense;
- Net profit / loss for the accounting period;
- Minority interests [21].

Example of the most common income statement is presented in Table 2:

Table 3 Example of income statement for the Year Ended by IFRS. Source: IFRS

Income Statement for the Year Ended			
Name of company	**Note**	**Resent Year**	**Previous year**
Revenue			
Cost of sales			
Gross profit			

Other operating income			
Administrative expenses			
Distribution expenses			
Other expenses			
Profit from operations			
Finance expense			
Finance income			
Loss from disposal group			
Share of post-tax profits of equity accounted investments			
Profit before tax			
Tax expense			
Profit from continuing operations			
Profit on discontinued operation, net of tax			
Profit for the period			
Other comprehensive income			
Items to be reclassified to profit or loss in subsequent periods			
Cash flow hedges			
Exchange gains arising on translation of foreign operations			
Income tax - items reclassified to profit or loss			
Net other comprehensive income to be reclassified to profit or loss in subsequent periods			
Loss on property revaluation			
Gains/losses on equity investments			
Actuarial gains on defined benefit pension schemes			
Income tax - items not reclassified to profit or loss			
Net other comprehensive income not being reclassified to profit or loss in subsequent periods			
Total other comprehensive income for the period			
Total comprehensive income for the period			

Income statement usually includes:

Gross profit (Profit margin) is a way to evaluate how well the cost of goods sold category of expenses was controlled [35].

Revenue is the company's revenue from sales or service which can be found at the top of the statement. This value will be gross of the costs associated with creating the goods sold or in providing services [36].

Cost of Sales aggregates the direct costs associated with selling products to generate revenue. Direct costs generally include materials, services and an allocation of other expenses such as depreciation.

Operating profit/loss is the profit before any non-operating income, non-operating expenses, interest or taxes are subtracted from revenues. Operating profit/loss shows what company has earned from regular business operations [37].

Other comprehensive income is revenue that a company derives from any source other than its operations. Other financial expenses include fulfillment, technology, research and development, stock based compensation, impairment charges, gains/losses on the sale of investments, foreign exchange impacts, and many more expenses that are industry or company-specific [38].

Profit/loss for the year is the amount of accounting profit a company has left over after paying off all its expenses. This indicator is very important to investors as it represents the profit for the year attributable to the shareholders. *Profit/loss before tax* is a measure that looks at a company's profits before the company has to pay corporate income tax. It deducts all expenses from revenue including interest expenses and operating expenses except for income tax [37].

3.3.6 Statement of income by Czech Accounting Standards

According to Czech Accounting Standards the idea behind the ranking of the results in all patterns is to give the profit / loss information for the learning period by:

- Profit / loss from operating activities;
- Result from financial activity;
- Result from extraordinary activity [21].

Table 4 Example of income statement for the Year Ended by Czech Accounting Standards. Source: by Czech Accounting Standards

Income Statement for the Year Ended				
Ref.	**Name of company**	**L.**	**Resent Year**	**Previous year**
I.	Revenues from own products and services	1		
II.	Revenues from merchandise	2		
A	**Consumption for products**	3	L.4+5+6	L.4+5+6
A.1	Costs of goods sold	4		
A.2	Material and energy consumption	5		
A.3	Services	6		
B.	Changes in inventory of own products (+/-)	7		
C.	Capitalization (-)	8		
D.	**Personal costs**	9	L.10+11	L.10+11
D.1.	Wages and salaries	10		
D.2.	Social security and health insurance costs and other costs	11	L. 12+13	L. 12+13
D.2.1	Social security costs and health insurance	12		
D.2.2	Other costs	13		
E.	Operating part adjustments	14	L. 15+18+19	L. 15+18+19
E.1.	Intangible and tangible fixed assets adjustments	15	L. 16+17	L. 16+17
E.1.1	- Intangible and tangible fixed assets adjustments - permanent	16		
E.1.2	- Intangible and tangible fixed assets adjustments - temporary	17		
E.2.	Inventories adjustments	18		
E.3.	Receivables adjustments	19		
III.	Other operating revenues	20	L. 21+22+23	L. 21+22+23
III.1.	Revenues from sales of fixed assets	21		
III.2.	Revenues from sales of material	22		
III.3.	Another operating revenues	23		
F.	Other operating costs	24	L. 25+26+27 (+/-)28+29	L. 25+26+27 (+/-)28+29
F.1.	Net book value of fixed assets sold	25		
F.2.	Net book value of material sold	26		
F.3.	Taxes and fees in operating part	27		
F.4.	Provisions in operating part and complex prepaid expenses	28		
F.5.	Other operating costs	29		
*	**Operating profit/loss**	30	L.1+2-3(+/-)7+8-9 (+/-)14+20-24	L. 1+2-3(+/-)7+8-9 (+/-)14+20-24
IV.	Revenues from long-term financial assets - shares	31	L. 32+33	L. 32+33
IV.1.	Revenues from shares - controlled or controlling entity	32		
IV.2.	Other revenues from shares	33		
G.	Costs of shares sold	34		
V.	Revenues from other long-term financial assets	35	L. 36+37	L. 36+37
V.1.	Revenues from other long-term financial assets - controlled or controlling entity	36		

V.2.	Other revenues from other long-term financial assets	37		
H.	Costs related to other long-term financial assets	38		
VI.	Interest revenues and similar revenues	39	L. 40+41	L. 40+41
VI.1.	Interest revenues and similar revenues - controlled or controlling entity	40	L. 44+45	L. 44+45
VI.2.	Other interest revenues and similar revenues	41		
I.	Adjustments and provisions in financial part	42		
J.	Interest costs and similar costs	43		
J.1.	Interest costs and similar costs - controlled or controlling entity	44		
J.2.	Other interest costs and similar costs	45		
VII.	Other financial revenues	46		
K.	Other financial costs	47		
*	**Profit / loss from financial operations (+/-)**	48	L. 31-34+35-38+39(+/-) 42-43+46+47	L. 31-34+35-38+39(+/-) 42-43+46+47
**	**Profit / loss before tax (+/-)**	49	L. 30+48	L. 30+48
L.	Income tax	50	L. 51+52	L. 51+52
L.1.	Income tax - due	51		
L.2.	Income tax - deferred (+/-)	52		
**	**Profit / loss after tax (+/-)**	53	L. 49-50	L. 49-50
M.	Increase (+)/decrease (-) in financial provisions and complex prepaid expenses	54		
***	**Profit / loss of accounting period (+/-)**	55	L. 53(+/-)54	L. 53(+/-)54
*	**Net turnover of accounting period**	56	I.+II.+III.+IV.+V.+VI.+VII	I.+II.+III.+IV.+V.+VI.+VII

3.3.7 Cash flow statement

Cash Flow Statement shows how much cash is generated and used during a certain period [39]. The main categories found in a cash flow statement are:

- Operating activities - refers to the cash received or loss because of the internal activities of a company such as the cash received from sales revenue or the cash paid to the workers.
- Investing activities - refers to the cash flow which related to the company's fix asset such as equipment building or the cash used to buy a new equipment or a building.
- Financing activities - cash flow from a company's financing activities like issuing stock or paying dividends.

The total cash provided from or used by each of the three activities is summed to arrive at the total change in cash for the period, which is then added to the opening cash balance to arrive at the cash flow statement’s bottom line, the closing cash balance [36].

Comprehensive analysis of the income statement and statement of cash flow can help company management, analysts, and investors to gauge how well a company is running its operations.

3.4 Methods of financial analysis

Manner of evaluation and interpretation of the indicators depends on the used methods of financial analysis. In financial analysis, in general, are three main groups for assessment of economic effects:

- Analysis of absolute indicators
  - Horizontal analysis (trend analysis)
  - Vertical analysis (percentage analysis)

- Financial ratio analysis
  - Profitability ratios
  - Liquidity ratios
  - Solvency ratios
  - Activity ratios
- Analysis of systems of indicators
  - Pyramidal decompositions
  - Prediction models

At the same time, in connection with the development of technologies, high dynamism of the market, a model of comparative analysis was distributed, one of which is benchmarking.

3.4.1 Analysis of absolute indicators

Horizontal analysis compares financial information over time, typically from past quarters or years. Horizontal analysis is performed by comparing financial data from a past statement, such as the income statement. When comparing this past information one will want to look for variations such as higher or lower earnings [40].

The results of horizontal analysis are most often presented in percentage form [21].

$$Percentage\ change = \frac{Amount\ in\ comparison\ year - Amount\ in\ base\ year}{Amount\ in\ comparison\ year} * 100\% \qquad (1)$$

Unlike horizontal analysis, vertical analysis allows to evaluate items of the financial statements expressed on a percentage basis, what includes volume of sales in the income statement and value of total assets in the balance sheet [41].

Vertical analysis follows the Golden rules of financing: non-current assets should be financed by equity or long-term liabilities and current assets ought to be financed by current liabilities.

However, since horizontal and vertical analysis evaluates financial results for past periods, it is possible to estimate only the current financial condition, without the possibility of evaluating future development.

3.4.2 Financial ratio analysis

Financial ratio analysis is most popular way to perform some quick analysis of financial statements. Ratio analysis allows determining weaknesses in financial management of the company and identifying problems that need to be addressed to improve the enterprise efficiency. Financial ratios can be divided into 4 main groups [41]: Profitability ratios, Liquidity ratios, Activity ratios and Solvency ratios.

Profitability ratios. As the main goal of any company is maximization of profit, profitability ratios are one of the most popular ratios [42]. Profitability ratios estimate the company's ability to generate profit and show company’s profitability. Using these ratios, managers and investors can evaluate how effectively the company is being managed.

Return on Assets (ROA). The asset's return indicator shows the overall efficiency of the company. Profit is measured by the total invested assets invested in the business regardless of the sources from which the activity was financed. Asset profitability is calculated by dividing EBIT (profit before tax and interest) and total assets of the company. This indicator is very important for company managers [43].

$$ROA = \frac{EBIT}{Total\ Assets} \quad (2)$$

Where EBIT - Earnings before Interest and Taxes.

Return on Equity (ROE). ROE measures how much the shareholders earn from their investment in the company. Higher ROE means higher return to investors [50]. The Return on Equity Indicator is calculated as the share of profit after tax and equity. The pointer is important especially for owners and future investors [44].

$$ROE = \frac{Net\ Income}{Shareholders' Equity} \quad (3)$$

Return on Investment (ROI). Return on Investment (ROI) is a performance measure used to evaluate the efficiency of an investment or compare the efficiency of a number of different investments. ROI measures the amount of return on a particular investment, relative to the investment's cost. To calculate ROI, the benefit (or return) of an investment is divided by the cost of the investment.

$$ROI = \frac{Net\ Income}{Cost\ of\ investment} \quad (4)$$

Return on capital employed (ROCE). ROCE indicates the efficiency and profitability of a company's capital investments. Financial analysts consider the ROCE measurement to be a more comprehensive profitability indicator because it gauges management's ability to generate earnings from a company's total pool of capital.

$$ROCE = \frac{EBIT}{Total\ Assets - Current\ Liabilities} \quad (5)$$

Where EBIT - Earnings before Interest and Taxes.

Return on sales (ROS). This ratio expresses the ability of an enterprise to achieve profit at a given level of revenue, how much the plant can produce an effect on 1 euro of sales. This indicator varies by industry and ranges from 2% to 50%. ROS is very important for comparing with competitors [44].

$$ROS = \frac{Operating\ Profit}{Net\ Sales} \quad (6)$$

Liquidity ratios

Liquidity in the business represents the ability of the enterprise to pay over time its obligations. Too low liquidity means that the company cannot fulfill its obligations and as a result there is a high risk of bankruptcy. Therefore, liquidity is an important indicator for assessing the financial balance of an enterprise, since only a sufficiently liquid enterprise is able to fulfill its obligations. However, too high level of liquidity is also an unfavorable phenomenon for the owner of the company, since the available funds are not fully utilized, which reduces the percentage of profitability [44].

Liquidity ratios represent link of current assets with current liabilities of the entity and measure how quickly a company's assets can be converted to cash. There are three types of liquidity ratios: current ratio, quick ratio and cash ratio [45].

Current ratio, also known as the working capital ratio, expresses the extent to which the current liabilities are covered by current assets. Current liabilities usually include accounts payable, accrued wages, taxes, current portions of non-current liabilities etc. A general rule of thumb is that current assets should be double than current liabilities. While a lower current ratio indicates that the entity may not be able to pay its bills on

time, a higher ratio might show that the company has excessive cash or marketable securities that could be instead invested more effectively.

$$Current\ Ratio = \frac{Current\ Assets}{Current\ Liabilities} \quad (7)$$

The higher the value of the ratio, the more likely the firm's stability will be. Current ratio range from 1,5-2,5 [44].

Quick ratio or acid-test ratio, expresses a company's ability to meet its short-term obligations with its most liquid assets. Since this ratio excludes inventory from current assets, it is more conservative, than current ratio.

$$Quick\ Ratio = \frac{(Current\ Assets - Inventories)}{Current\ Liabilities} \quad (8)$$

The optimal range should be 1:1 or 1,5:1. It is clear from the recommendation that if the ratio is 1:1, the company would be able to cope with its obligations without selling its stock. Higher ratio means that the company may have too much cash; while the lower one may give a signal that the organization relies too heavily on the inventory to meet its obligations [44].

Cash ratio only looks at the proportion of company's most liquid short-term assets - cash and cash equivalents to current liabilities, thus, indicating immediate liquidity of the firm.

$$Cash\ Ratio = \frac{Cash + Cash\ Equivalents + Invested\ Funds}{Current\ Liabilities} \quad (9)$$

According to the Ministry of Industry and Trade, a value 0,6 is recommended, the lowest limit is 0,2 [44].

Activity Ratios

Activity ratios include total asset turnover, receivables turnover, working capital turnover and inventory turnover and define the number of rotations of the items during the year [44].

Total asset turnover measures how productively the firm’s assets are working by defining how much revenues are generated by each monetary unit of total assets [47].

$$Total\ Asset\ Turnover = \frac{Revenue}{Average\ Total\ Assets} \quad (10)$$

The normative of the asset turnover ratio should not be less than 1. Generally low asset turnover ratio means that the company has too much capital in its asset base [48].

Inventory turnover ratio determines how effectively inventory is managed using comparison cost of goods sold with average inventory during an analyzed period. As inventory is usually the largest component of a company’s working capital and if company did not manage to use the inventory by operations at a reasonable pace, then the company has invested a large part of its cash in an asset that may be difficult to liquidate in short order [49]. The aim of each company is to minimize inventory to its possible minimum to maintain meeting customers’ demand and maintain continuous production [50].

$$Inventory\ Turnover = \frac{Revenue}{Average\ Inventory} \quad (11)$$

Accounts receivable turnover ratio represents how effectively the company can obtain payments for its products. The higher the value of the turnover ratio of receivables means the higher the ability of quick collection, which can be seen in the formula (11).

$$Recievable\ Turnover = \frac{Revenue}{Average\ Receivables} \tag{12}$$

Fixed asset turnover ratio measures how efficiently a company can generate net sales from its fixed-asset investments [51].

$$Fixed\ Asset\ Turnover = \frac{Revenue}{Average\ Net\ Fixed\ Assets} \tag{13}$$

Working capital turnover ratio measures how efficiently a company can generate revenue by using its working capital (13).

$$Working\ Capital\ Turnover = \frac{Revenue}{Average\ Working\ Capital} \tag{14}$$

The higher Working capital turnover ratio is better, but if the ratio is above 30, may indicate a need for increased working capital to support future revenue growth [52].

Accounts Payable Turnover ratio measures how quickly the company's payables are repaid [21].

$$Accounts\ Payable\ Turnover = \frac{Revenue}{Aaverage\ Payables} \tag{15}$$

Solvency ratios

Solvency ratios measure the overall debt load of a company and focus on assesment of long term ability to finance its obligations. In order to determine what extent the assets of the company are financed by foreign resource, debt analysis compares the balance sheet items [44].

Total debt ratio represents relationship between what a company owns and how much resources were borrowed to purchase it.

$$Debt\ Ratio = \frac{Total\ Debt}{Total\ Assets} \tag{16}$$

Values for the debt ratio range from 0 (no debts) to 1 (all assets are covered by debt). In case, if the debt ratio of examining company is higher than debt ratio competitors, this can lead to the price increase of the financial resources attraction [46].

Recievable Turnover ratio is a measure used to quantify a company's effectiveness to use customer credit and collects payment on the resulting debt.

$$Recievable\ Turnover = \frac{Total\ Debt}{Total\ Debt + Total\ Shareholders' Equity} \tag{17}$$

Debt-to-equity ratio shows the extent to which management of the company is ready to fund its operations with debt.

$$Debt\ to\ Equity = \frac{Total\ Debt}{Total\ Shareholders' Equity} \tag{18}$$

Debt-to-equity ratio should be analyzed in conjunction with ROE. As the company can obtain more debt and then use to buy back shares what leads to a decrease of equity hence increase of ROE without changes in income [53].

Interest payment expense shows how many times the profit higher than its interest payments.

$$Interest\ payment\ expense = \frac{EBIT}{Interest\ Expense} \quad (19)$$

Where EBIT - Earnings before Interest and Taxes.

The higher ratio means the better the financial health of the company. When interest payment expense ratio is lower that 2, it can mean the company has questionable ability to meet interest expenses. The recommended value of interest payment expense ratio is approximately 5 [21].

3.4.3 Predictive models

To assess the overall financial situation of the company exist different systems of indicators, as analytical models or models of financial analysis. An increasing number of indicators allow for a more detailed assessment of the financial and economic situation of the company, but at the same time, a large number of indicators make the orientation and especially the final evaluation of the company more difficult [54].

Are widely used by managers of companies and independs analysts predictive models focused on forecasting analysis, prediction of financial difficulties, bankruptcy prediction, credit risk assessment and early warning analysis [55].

Predictive models based on the evaluation and analysis of financial data of the enterprise and can be divided into two types: Creditworthy model and Bankruptcy model.

3.4.3.1 Creditworthy models

Creditworthy models are aimed to assess the financial stability of the company and to identify financial problems. The feature of this type of method is that the values of selected financial indicators are transformed into points using a scale. These scales are usually determined by expert methods.

Creditworthy models allow judging the position of a company in comparison with a larger set of business entities compared. The most widely used methods of estimating a financial stability of company is Kralickuv Quicktest [56].

Kralickuv Quicktest. Kralicek Quick test provides an assessment of financial difficulties of enterprises with a high level of accuracy. The model includes four key indicators: R1 indicator shows financial stability (debt ratio), R2 presents solvency, R3 profitability, and R4 evaluates liquidity. Each ratio is evaluated in accordance with a scale from 0 to 4 points. Overall rating of the company status can be then calculated according to the formula (20) [56]:

$$K = \frac{R1+R2+R3+R4}{4} \quad (20)$$

Where $$R1 = \frac{Total\ Equity}{Total\ Assets} \quad (21)$$

$$R2 = \frac{Total\ Debt-Cash\ and\ Cash\ Equivalents}{Operating\ Cash\ Flow} \quad (22)$$

$$R3 = \frac{EBIT}{Total\ Assets} \quad (23)$$

$$R4 = \frac{Operating\ Cash\ Flow}{Operating\ Income} \quad (24)$$

Where EBIT - Earnings before Interest and Taxes.

Depending on the obtained value of the overall score financial situation and creditworthiness of the company can be estimate according to the rating scale:

- K > 2,99 - financial situation of the company in "Good" condition
- 1,23 < K < 2,99 - financial situation of the company is in „Grey zone"
- K < 1,23 - financial situation of the company in a „Poor" condition

3.4.3.2 Bankruptcy models

Whether an enterprise is or not threatened by bankruptcy can be verified by bankruptcy models. Every company that is at risk of bankruptcy has symptoms that are typical for bankruptcy. The most common symptoms include problems with normal liquidity, net working capital and return on total capital.

Z-Score model. The Z-score model was created by American Professor of Finance Edward Altman in 1968 by using a Multiple Discriminant Analysis [57]. This method is based on the sum of indicators (23) with assigning weights to them to estimate the likelihood of a financial distress.

$$Z = 1{,}2 * X1 + 1{,}4 * X2 + 3{,}3 * X3 + 0{,}6 * X4 + X5 \quad (25)$$

Where: $X1 = \frac{Net\ Working\ Capital}{Total\ Assets}$ (26)

$$X2 = \frac{Retained\ Earnings}{Total\ Assets} \quad (27)$$

$$X3 = \frac{EBIT}{Total\ Assets} \quad (28)$$

$$X4 = \frac{Market\ Value\ of\ All\ Equity}{Book\ Value\ of\ Total\ Liabilities} \quad (29)$$

$$X5 = \frac{Sales}{Total\ Assets} \quad (30)$$

Where EBIT - Earnings before Interest and Taxes.

Altman (2000) mentions the accuracy of this model as 90,9% for correctly classified companies that are likely to experience bankruptcy [57]. There are three zones based on result of Z-Score. If the score is higher than 2,99 it is safe zone; between values 1,81 and 2,99 it is grey zone and below 1,81 it is red zone or distress zone [58].

Model IN - Trust Index. The model was developed by Neumaier's husbands and its aim is to evaluate the financial situation of the company, operated in the Czech Republic. Model based on the result of an analysis of 24 mathematical-statistical models of business evaluation and analysis of more than a thousand enterprises.

The first model *IN95* was created in 1995. This model focuses primarily on the ability of an enterprise to meet its obligations. The second *IN99* model was created in 2000. It respects the fact that, from the investor's point of view, it is not the primary business sphere, but the ability to manage the funds entrusted. In this model, scales are identical for all companyes across business areas. The *IN01* model was created in 2012. The data comes from the 1915 industrial enterprises that were divided into a company group according to the financial situation. The last *IN05* model is based on IN01 model. In a newer version, the balance was adjusted for the EBIT/A indicator. Another change was the change in the interval of inclusion of the enterprises, where there is a danger [59].

In addition to these models, such integrated financial management models like Balanced Scorecard - BSC, EVA model and Benchmarking are widely popular among managers.

3.5 DuPont model

The Return on Equity indicator is one of the main indicators for measuring business performance. As part of the financial analysis, this indicator can be decomposed and analyzed using DuPont decomposition. Since ROE does not show how assets acquired with borrowed funds generate profit, ROE is worth analyzing with ROA, observing how both indicators will change when a company purchases assets with borrowed funds. In addition, together with ROE it is worth considering such indicators as ROS and EBIT.

The relationship of the individual analytical indicators that affect ROE can be expressed by the equation:

$$ROE = ROA * Financial\ Leverage \tag{31}$$

Where: *ROA* - Return on Assets, *ROE*- Return on Equity.

The tax burden defines how much of the pre-tax profit remains after tax, and can be expressed as a share of EAT and EBT [60]. The ROA indicator, also production power, is a key measure of profitability. The value of the indicator is given by the ratio of the total assets invested in the business. Asset profitability is used for ROE pyramid decompositions [61]. The leverage indicator (compound leverage) consists of an interest rate indicator and a leverage ratio. The interest burden is defined as the share of EBT and EBIT. The financial leverage indicates the possibility to increase the return on own funds with the help of foreign capital and its value can be determined by the ratio of total assets to the value of equity [62].

The method of pyramidal decomposition is based on the method of chain decomposition of the synthetic indicator, which is realized in the form of the equation - on the left side there is a synthetic indicator and on the right side this indicator is broken down into a series of fractions, ie analytical preachers. For chain breakdown, the left side of the equation must be equal to the right side of the results, and each of these indicators should have the economic ability to tell.

General formula of pyramidal decomposition:

$$\frac{A}{B} = \frac{A}{C} * \frac{C}{D} * \frac{D}{E} * \ldots * \frac{K}{B} \tag{32}$$

Relationship indicators in the pyramid decomposition ROE:

$$ROE = \frac{EAT}{EBT} * \frac{EBIT}{S} * \frac{S}{A} * \frac{EBT}{EBIT} * \frac{A}{E} \tag{33}$$

Where: *EAT* - Earnings after Taxes, *EBT* - Earnings before Taxes, *EBIT* - Earnings before Interest and Taxes, *S* - Sales, *A* - Total Assets, *E* – Equity.

At the top of the imaginary pyramid is a synthetic indicator - usually this indicator is return on equity. This synthetic indicator is broken down into a number of analytical indicators, even at several levels. With the help of the decomposition of the synthetic indicators to the analytical indicators, the relations between the used sub-indicators are described, which explains the relationships between them. This analysis is used in practice to assess the time of the enterprise, to compare the business performance of the enterprise or to analyze one's own business, where can be determined the magnitude of the influence of individual indicators on the profitability of the enterprise. In particular, the logarithmic method for multiplicative bonds is used for the evaluation of the influence of the individual components of the synthetic indicator, as well as the distribution number for the total relations between the analytical indicators [63].

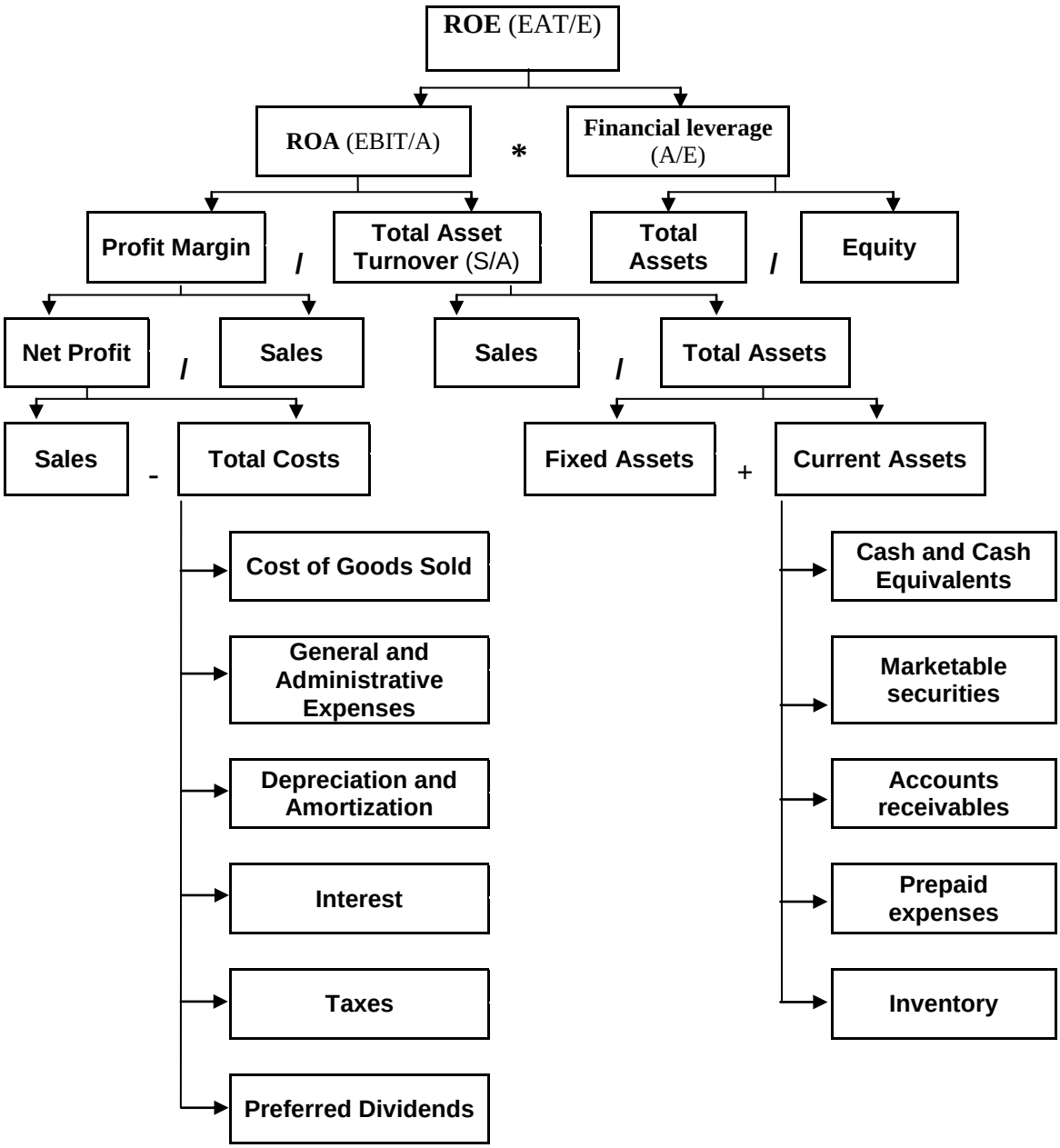


Fig. 4 DuPont decomposition of ROE. Source: author

3.6 Benchmarking

One of the most popular methods for assessing the effectiveness of a company is benchmarking. The ratio values should always be compared with the values reported by the market leaders, to see exactly what position of a company is.

Constant changes in the external environment, the development of technology have a direct impact on the construction industry. These changes force company managers to find and develop new competitive advantages. According to Luu et al. (2008), benchmarking is the next step to improve effectiveness of products and processes [64].

Camp (1989) wrote the first definitive book on benchmarking and defined benchmarking as "*the continuous process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders*". The Construction Industry Institute (CII) has adopted the following definition of benchmarking: "*A systematic process of measuring one's performance against*

results from recognized leaders for the purpose of determining best practices that lead to superior performance when adapted and implemented" (Hudson, 1997 cited in El-Mashaleh et al., 2008) [65].

Its initial intent was to identify leading companies regardless of industry sector, and apply their best practices to improve one's own company. Over time, benchmarking has become synonymous with process improvement [66].

The traditional view of benchmarking required two separate disciplines focused on performance improvement: measures and methods. Identifying and capturing performance indicators is only the first step; developing and implementing performance improvement is the second step for the benchmarking process to be truly effective [67].

3.6.1 Types of benchmarking

Various business situations require that operation managers and staff apply different benchmarking skills. In accordance with these applications, three benchmarking types are defined:

- Process benchmarking;
- Performance benchmarking;
- Strategic benchmarking.

Process benchmarking requires identification of the most effective work practices in the companies having similar operating functions. If one company improves the basic process, it has an influence on performance improvement (increased productivity, lower costs or improved sale). Effects of application of benchmarking process are shown in the improvement of financial results in very short time period [68].

Performance benchmarking enables managers to assess their competitive position by comparison of products or services. Performance benchmarking is usually focused to price elements, technical quality or characteristics of service. Numerous industries apply performance benchmarking as a standard method in relations with competitors.

Strategic benchmarking researches long-term successfulness pattern and tries to identify the winning strategies that have enabled success of companies in their markets. Companies that look for short-term benefits apply process benchmarking which produces the results much faster.

Benchmarking also can be divided into external and internal benchmarking.

Internal benchmarking – implies comparison of some sectors and divisions within the organization. This benchmarking type is generally used in big, multinational companies where each company's department performs specific activity or operation.

External benchmarking is divided into external competitive benchmarking, external functional benchmarking and external generic benchmarking. External competitive benchmarking is comparison of company's activity with direct competitors. The objective of external competitive benchmarking is obtaining specific and important data on the competitor's business and it facilitates positioning of products and company's business services on the market in relation to competitors. External industrial or functional benchmarking compares company's functions with functions of other companies. It is used when company wants to make improvements by comparing the elements of its business with the elements of other companies from the same industry but which are not the direct competitors [69].

3.6.2 Benchmarking cycle

Benchmarking is the continuous learning process. For effective implementation of benchmarking it is necessary to respect the benchmarking cycle. To initiate such a cycle, management support is required, also an employee and part owners of the process involvement is needed. In order to get useful results from benchmarking it is necessary to keep a systematic approach. Over time, different methodologies were developed, different sources describe the steps of benchmarking differently. The most important is the approach developed by four companies which are extensively involved in benchmarking (Boeing, Digital Equipment, Motorola and Xerox). This approach establishes the general context for the creation of a process model, uses the four phases of benchmarking - planning, data collection, analysis and improvement.

At application of benchmarking is besides of same procedure appropriate for the individual partners found agreement in the mutual approach in the form of so-called code of ethics defining the basic rules of communication, interaction and information. The truth is that benchmarking works with public data, but the partners exchange openly and with confidence a lot of information in the process that could in certain occurrences cause damage [70].

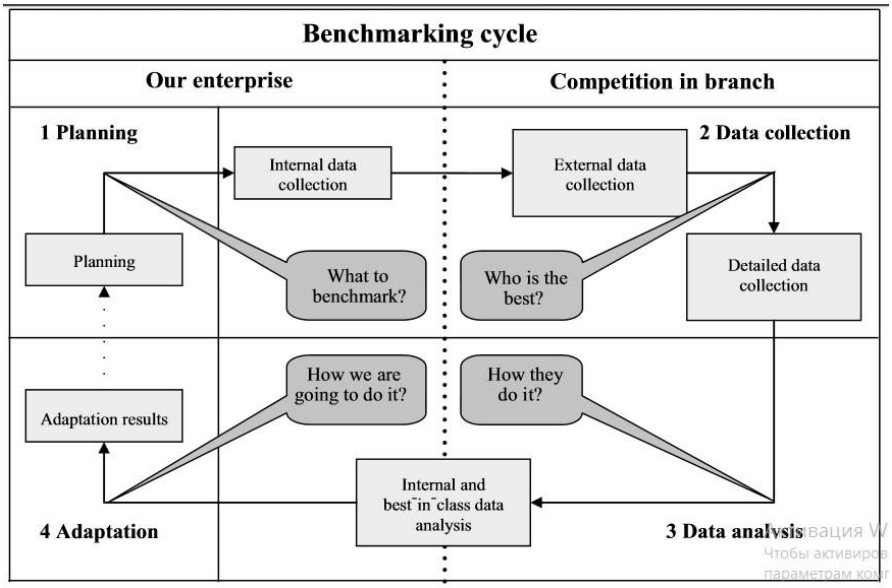


Fig. 5 Benchmarking cycle. Sourse: Barbora Jetmarová (2011)

The previous image (Fig. 5) shows the benchmarking cycle. It displays the already mentioned four phases of benchmarking - planning, data collection, analysis and adaptation. On the left side of the picture shows what is going on within the company where the benchmarking study proceeded. The right side shows the steps happening within the competitor‘s enterprise in the sector.

3.7 Effectiveness of financial management

The effectiveness of the financial management of the enterprise is the result obtained in the process of its financial activities. The level of effectiveness of the financial management is characterized by the level of its costs, results and financial condition. In order to determine the level of efficiency of the financial activity of the enterprise, it is necessary to calculate a set of indicators characterizing its cost, effectiveness and financial condition.

In order to assess the financial efficiency of enterprises in world practice, the following indicators are usually used:

- *Liquidity* is the ability of an enterprise to meet current short-term liabilities.
- *Solvency* is the ability to pay its short and long-term liabilities at maturity.
- *Profitability* is one of the main qualitative indicators of efficiency, which characterizes the level of return on costs and the degree of use of funds in the process of production and sale of products.
- *Business activity* characterizes the effectiveness of the current activities of the enterprise and is associated with the effectiveness of the use of material, labor, and financial resources and with indicators of capital turnover [71].

3.7.1 EVA model

One of the most popular indicators for evaluating the performance of a company is the EVA indicator (Economic Value Added).

According to the authors of this method, American researchers B. Stewart and D. Stern, economic value added is a universal indicator that can be used for financial analysis, management and valuation of a company [72]. EVA is an indicator of profitability, which eliminates the disadvantages of the classic indicators. Classical indicators for measuring the profitability of a company are profitability indicators (ROE, ROI, etc.) calculated on the basis of accounting reports [73]. However, according to research by Brigham and Houston (2008) despite the high prevalence of these indicators, they have some limitations:

1. Using just ROE as a measure of performance can deceive investors' expectations. Real profit may be less than expected.
2. ROE can not consider the risk of a company, and the shareholders are interested in the risk associated with investment, more than in its potential benefits.
3. ROA is a relative measure of a company’s performance, which does not account for the size of the invested capital [74].

One of the first successful attempts to eliminate the above disadvantages was the development of Free Cash Flow (FCF) in the 80-90s. According to Jensen (1986), the use of cash flows allowed to exclude profits from the calculations and introduce Discounted Cash Flow (DCF), taking into account the factors of time and risk using a discount rate [75]. However, according to Brealey & co (2005), the DCF method is more beneficial for estimating the value of a company, but is not suitable for operational and current management of companies, since it cannot be used to calculate indicators that are most relevant to managers [76]. In order to make the financial analysis more accurate and to avoid the above problems, it is very important to perform ROE analysis in complex with other performance indicators such as the added economic value (EVA method) [77].

In addition, the emergence of the EVA indicator was also caused by the need to find an economic indicator that would:

1. Reflected a close relationship with stock value using statistical methods.
2. Made it possible to use the largest amount of information from accounting.
3. Assessed the value of the company, taking into account the risk factor.

The EVA method removes the contradiction between the microeconomic theory, which states that the main goal of a commercial company is to make a profit, and the theory of financial management, according to which the more important goal is to increase the

status of shareholders of a company, in the form of growth of stock prices, growth of the company's equity value.

One of the fundamental application forms of EVA is considered a structure (34), which reveals the fact that the value of the economic profit depends on the value of equity, on Return on Equity and its cost:

$$EVA = (ROE - Re) * E \quad (34)$$

Where ROE - Return on Equity, Re - Sost of Equity, E - Equity.

Thus constructed indicator has a direct link to the capital invested by the owners. EVA reflects the economic assessment of the value added to the market value of an enterprise and the assessment of the effectiveness of an enterprise's activity through determining how this enterprise is evaluated by the market (35):

$$EVA = NOPAT - WACC * C \quad (35)$$

Where NOPAT - Net Operating Profit after Taxes, WACC - Weighted Average Cost of Capital, C – Capital (Equity + Long-Term Credit Debt).

In each specific period of time EVA shows what real economic profit the company received as a result of its activities, taking into account the losses from investing in other, alternative ways of investing funds (35):

$$EVA = EBIT * (1 - t) - WACC * C \quad (36)$$

Where EBIT - Earnings before Interest and Taxes, t - income tax rate in % multiplied by 1/100, WACC - Weighted Average Cost of Capital, C – Capital (Equity + Long-Term Credit Debt).

One of the popular modified structures of EVA in the environment has the form:

$$EVA = OP * (1 - t) - WACC * C \quad (37)$$

Where OP - Operating Profit (profit or loss from operating activities), t - income tax rate in % multiplied by 1/100, WACC - Weighted Average Cost of Capital, C – Capital (Equity + Long-Term Credit Debt).

Capital represents all company liabilities, including both long-term and short-term funding sources. Capital represents the reward given capital used to achieve the operational performance of the company (specifying NOPAT, taxed EBIT, or Operational Profit), i.e. equity and explicitly interest-bearing foreign sources. Its cost is determined by the weighted arithmetic average as (38):

$$WACC = Rd * (1 - t) * \frac{D}{C} + Re * \frac{E}{C} \quad (38)$$

Where Rd - cost of interest-bearing debt taking into account the tax shield, t - income tax rate in % multiplied by 1/100, D - interest-bearing debt capital, C – Capital (Equity + Long-Term Credit Debt), Re - Cost of Equity, E - Equity.

Waiting for future values of EVA has a significant impact on the growth of capitalization of an enterprise. If expectations are contradictory, the stock price will fluctuate, and in the short term it will be impossible to draw a clear correlation between the EVA values and the price of the company's shares. Therefore, the task of planning profits, the structure and price of capital is the first priority of enterprise management.

As an indicator of the efficiency criterion of EVA growth from financial sustainability indicators, the coefficient of added economic value can be calculated (39). The

coefficient of added economic value indicates the share of EVA in the value of the net assets of the company. This coefficient characterizes what proportion of sources of equity is in the form of economic value added.

$$K^{EVA} = \frac{EVA}{Net\ Assets} \tag{39}$$

3.8 Correlation analysis

After studying the external environment of the company and calculating financial ratios, it is necessary to assess the interrelation of macroeconomic indicators with the internal state of the enterprise. In order to find the relationship between macroeconomic indicators and financial ratios, Pearson Correlation was applied.

Pearson correlation is the most widely used correlation statistic to assess the strength of the link between linearly related variables. Pearson correlation measures the degree of dependence between two variables. Pearson correlation can be positive (direct relationship) or negative (inverse relationship). The larger the coefficient, the stronger is relationship between the variables [78].

The following formula is used to calculate the Pearson *r* correlation (40):

$$r = \frac{N*\sum x*y-\sum(x)*(y)}{\sqrt{(N*\sum x^2-\sum(x^2))*N*\sum y^2-\sum(y^2))}} \tag{40}$$

Where *r* = Pearson r correlation coefficient, N = Number of observations, ∑xy = sum of the products of paired scores, ∑x = sum of x scores, ∑y = sum of y scores, $\sum x^2$= sum of squared x scores, $\sum y^2$= sum of squared y scores.

Correlation analysis has main objectives:

- Determination of the narrowness of the linear relationship between various economic indicators.
- The correct definition of the type of connection - direct or inverse.
- Making the right strategic decision based on the identified indicator links [79].

The Fig. 6 shows example of four hypothetical scenarios in which one continuous variable is plotted along the X-axis and the other along the Y-axis [80].

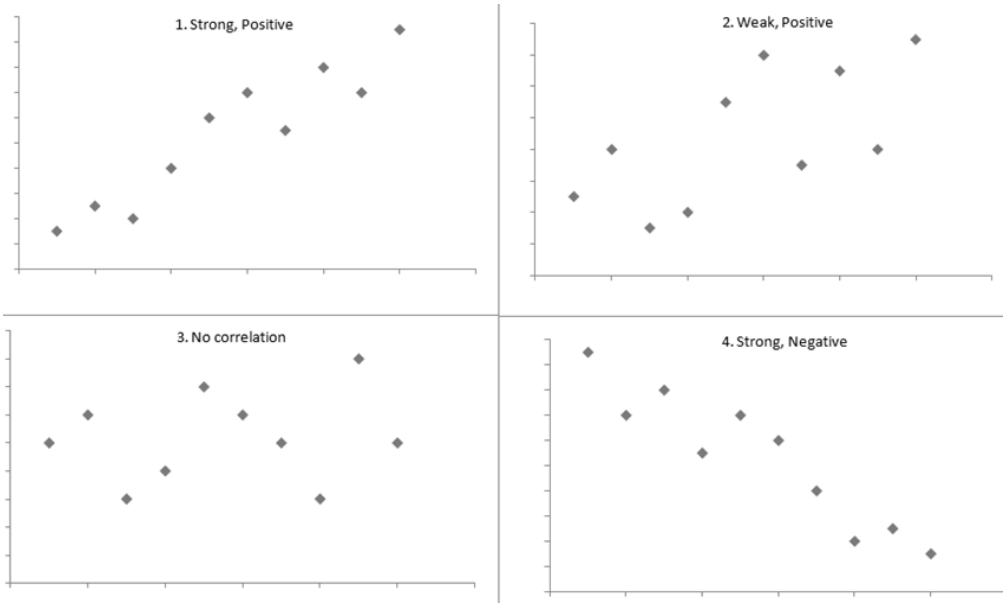


Fig. 6 Scenarios of Correlation analysis. Source: HAUKE J. and KOSSOWSKI T. (2011)

3.9 Model of financial management of company

Model of financial management of enterprises is a system of financial management processes arranged in a certain way. It is appropriate that the model made for controlling the management of one key financial indicator [81]. Then the model according to the movements of key parameters can show the correctness of recent or planned decisions, such as when simulating future situations on the model. Although the arrangement of the model to one key parameter desired, could never judge the success of corporate governance only by this single parameter. Therefore, it is common that the lower level of the model contain a number of indicators with universal or specific character, which must be taken into consideration. By Corporate Finance Institute a financial model is a tool built in Excel to forecast a business' financial performance into the future. The forecast is typically based on the company's historical performance, assumptions about the future, and requires preparing an income statement, balance sheet, cash flow statement and supporting schedules [82].

By creating a financial model of the company, it is possible to objectively assess the viability of the projects, to develop ways to optimize the process of business plan creation.

The financial model includes:

- Prediction of cash flows;
- Defining the scope, structure and optimal financial scenarios;
- Risk analysis and optimization of risk management systems;
- Timely adaptation activity of company in order to correspond to the selected scenario of business development [83].

Currently, there are many different types of financial models. However, models can be divided into types depending on the tasks. When most of the financial models concentrate on valuation, some of them are created to calculate and predict risk, performance of portfolio, or economic trends within an industry. According to Corporate Finance Institute and EDUCBA the most common models used in corporate finance by financial modeling professionals are:

- Three Statement Model;
- Discounted Cash Flow (DCF) Model;
- Merger Model (M&A);
- Comparable Company Analysis model;
- Leveraged Buyout (LBO) Model.

Three Statement Model is the most basic setup for financial modeling. In this model the three statements (income statement, balance sheet, and cash flow) are all dynamically linked with formulas in Excel. The objective is to set it up so all the accounts are connected, and a set of assumptions can drive changes in the entire model.

Discounted Cash Flow (DCF) Model based upon the theory that the value of a business is the sum of its expected future free cash flows, discounted at an appropriate rate. In simple words this is a valuation method uses projected free cash flow and discounts them to arrive at a present value which helps in evaluating the potential of an investment. Investors particularly use this method in order to estimate the absolute value of a company.

Merger Model (M&A) is a more advanced model used to evaluate the pro forma

accretion/dilution of a merger or acquisition. It's common to use a single tab model for each company, where the consolidation where Company A + Company B = Merged Co. The level of complexity can vary widely and is most commonly used in investment banking and/or corporate development.

Comparable Company Analysis model is the one of the major company valuation analyses that is used in the investment banking industry. In this method compares the financial metrics of a company against similar firms in industry. It is based on an assumption that similar companies have similar valuations multiples, such as EV/EBITDA (EV - enterprise value). The process involves selecting the peer group of companies, compiling statistics on the company under review, calculation of valuation multiples and then comparing them with the peer group.

Leveraged Buyout (LBO) Model involves acquiring another company using a significant amount of borrowed funds to meet the acquisition cost. This model is being used majorly in leveraged finance at bulge-bracket investment banks and sponsors who want to acquire companies with an objective of selling them in the future at a profit [84].

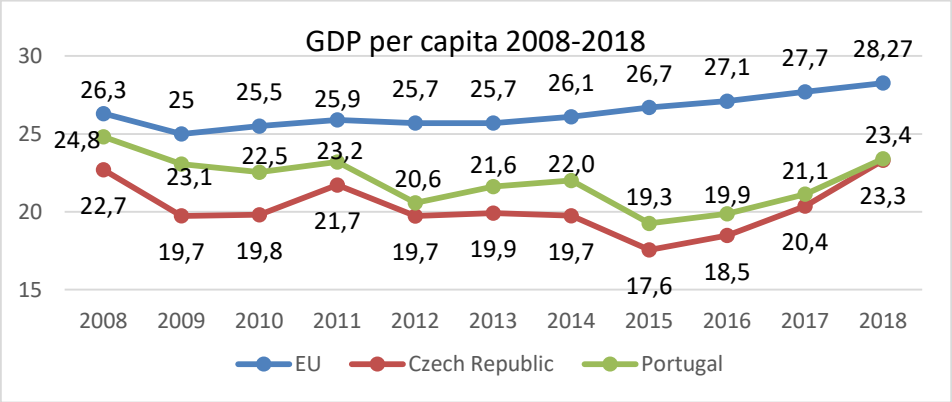
4 CASE STUDY

4.1 Analysis of macroeconomic indicators

Over the past two decades, under the influence of global financial crises, the economy of all countries has experienced dramatic events related to political, economic and social changes. However, depending on the country's position in the global economy, the crisis affected the economic stability of each country in different way [85].

To understand and analyze the difference of the impact of the financial crisis on the stability of the economy, a comparative analysis of changes in macroeconomic indicators (GDP per capita, Inflation and Unemployment Rate) in the economy of the Czech Republic, Portugal and European Union has been carried out for the period 2008-2018, which includes crisis and post-crisis time.

According to EUROSTAT report Gross domestic product per (GDP) is one of the most popular tools to measure the overall size of an economy of the country and GDP per capita, which is used for monitoring economic convergence between countries [86].



Graf 1 GDP per capita 2008-2018 in the Czech Republic, Portugal and EU. Source: Eurostat

According to Graf 1, GDP per capita in Portugal and in the Czech Republic is significantly lower than the average GDP per capita in the European Union. However, this does not mean that the economies of the Czech Republic and Portugal are in poor condition. An important indicator is dynamics of changes. The dynamics of changes in GDP per capita with a sharp decline in 2008–2009, then its further growth until 2011 and its new decline corresponds to the beginning of the financial crisis. But after a long recession, the Czech and Portuguese economy started to recover in 2013. The highest growth in GDP per capita by 21% over the period of 2013-2018 has been in the Czech Republic, while Portugal's GDP per capita rose by 9,5% and the average GDP per capita in the EU by 12%.

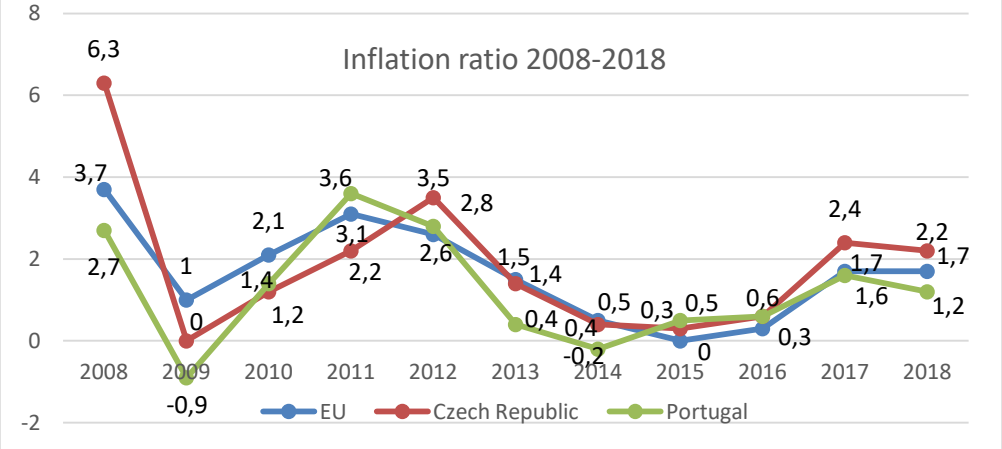
According to European Commission report, private consumption and investment had positive impact on economic growth. Moreover, domestic demand is continuing to recover, with imports growing faster than exports, what helps to improve economic stability in the Czech Republic and Portugal [87].

Inflation rate is an indicator of the government’s overall ability to manage the economy in the country [88] and can be divided into three groups:

1. Hyperinflation. Monthly inflation rate is more than 50%. Hyperinflation is caused by the government issuing an excess amount of money to cover the deficit.

2. Galloping Inflation. Annual price increase from 10 to 50%. Dangerous for the economy, requires urgent anti-inflationary measures.
3. Moderate Inflation. Price increase of less than 10% per year [89]. Moderate inflation is a positive factor for the economy, it stimulates demand, contributes to the expansion of production and investment.

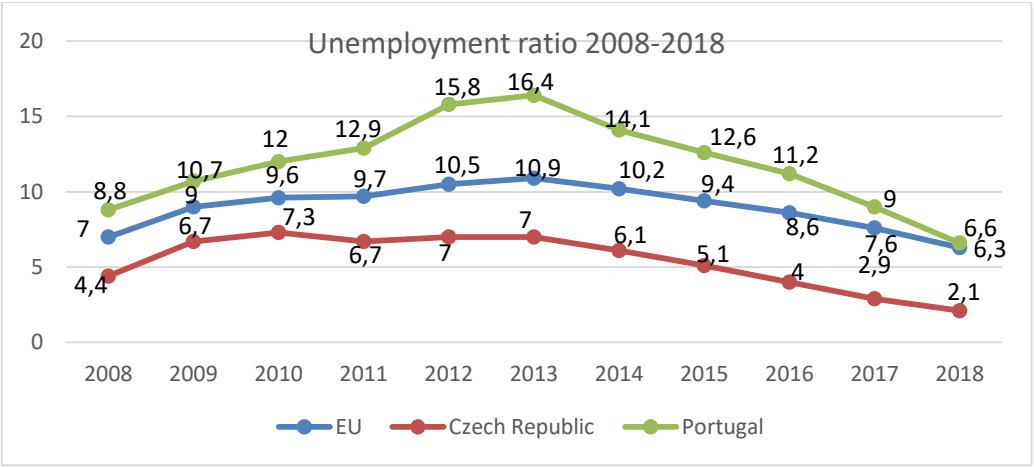
When inflation ratio falls below 0%, deflation occurs. Deflation is defined as a decrease in the general price level for goods and services [90].



Graf 2 Inflation ratio 2008-2018 in the Czech Republic, Portugal and EU. Source: Eurostat

According to Graf 2, the Czech Republic's inflation ratio and average inflation in the European Union in the period 2008–2018 did not go beyond moderate inflation. This means that the pricing policy is not much influenced by the financial crisis, but some small both negative and positive changes did occur. The economy of Portugal, which already at the time of the financial crisis of 2008 had an external debt, felt stronger the negative financial unrest in the world economy. In 2008 and 2014, the country's economy faced deflation. Deflation in Portugal resulted from sharp fall in energy prices, which caused a sharp rise in unemployment and a decrease in demand [91].

Another important indicator of economic stability in the country is the unemployment rate. As world practice shows, countries usually experiences high unemployment rate during recession time [92]. For example in 2012 about 6% of the world's workforce lost their job. According to modern ideas of economists, the permissible level of unemployment rate is considered to be up to 4-5% [93].



Graf 3 Unemployment ratio 2008-2018 in the Czech Republic, Portugal and EU. Source: Eurostat

All countries of the European Union experienced the negative impact of the 2008 financial crisis through a sharp increase in unemployment until 2013 (Graf 3). The largest increase in unemployment occurred in Portugal, where the unemployment rate almost doubled from 2008 to 2013, while unemployment in the Czech Republic increased by 36% during this period. The labor market situation has been improving by employment growth year-on-year from 2013, thereby outpacing GDP growth.

Unemployment rate is very high in Portugal compared to the EU average and have deteriorated further in the wake of the financial and economic crisis. During 2008 and 2013 years the number of people threatened by poverty rose to 27,4% of the total Portuguese population in 2013. The gap between Portugal and the rest of the European Union has widened dramatically. The high unemployment rate has caused a rise in poverty in the country.

An analysis of the three main macroeconomic indicators of the economic state of Portugal and the Czech Republic clearly indicates that the economies of both countries have suffered under the negative impact of the financial crisis. In Portugal, the situation has even been worsened by the presence of high external debt.

In the period 2008 - 2013, the time of recession, the GDP declined, inflation was unstable, besides deflation was observed in Portugal, as a result, the unemployment rate greatly increased. However, in 2013, the post crisis period began, the time of positive changes. The GDP of both countries began to grow, the unemployment rate began to decline, and by 2018, macroeconomic indicators not only returned to indicators of the pre-crisis period, but even improved their values. This means that countries have successfully managed to cope with negative changes during the financial crisis.

4.2 Impact of financial crisis of 2008 on construction companies in Czech Republic and Portugal

The global financial crisis of 2008 had a major impact on all sectors of the economy. The construction sector had the worst impact of the crisis. Budgeting and financing of the construction of private buildings has been reduced, public investment has fallen. Regarding the ratio of products and the number of employed workers, the construction industry is approximately a tenth of the country’s economy [1].

4.2.1 Construction industry in Portugal

In 1989, Portugal became a member of the European Union. As a result, the country's economy grey significantly. One of the important factors that influenced the development of the country's economy was the high growth rate of construction. However, in 2001 the situation changed, the economic crisis began in Portugal. Accordingly, investment in the construction area has declined. This situation got even worse with the onset of the global financial crisis in 2008. The construction industry’s output value decreased from 2008 to 2014 by 46,4%. By 2018, the share of the construction industry in Portugal's GDP is 3,2%.

In order to solve problems, Portugal was forced to take loans from the European Union. As a result, the gross domestic product was lower than the national depth.

Under the influence of the financial crisis, the purchasing power of the population fell, which affected the decline in demand. This influenced the growth of competition between construction companies. Garnel (2009) noted *that the growth of competition has resulted in contracts awarded by total amounts increasingly with high risks. The area of contract management has been progressively seen as crucial in the success, or*

survival, of these companies. At the same time, there has been a growing increase in contracts with final costs much higher than expected [94].

This situation led to a decrease in the productivity of all sectors of construction. The government of Portugal, in order to support the construction industry, made investments in the non-residential construction [95]. In order to reduce the risks involved, it became necessary for construction companies to develop new strategies, in order to run their businesses in countries with positive perspectives of economic growth. In the issue, according to the study made by Deloitte with Associação Nacional de Empreiteiros de Obras Públicas (ANEOP), 70% of the biggest fifty construction enterprises in the country have affairs in foreign territories such as: Latin America, Africa and Eastern Europe (Deloitte/Aneop, 2010) [96].

4.2.2 Construction industry in the Czech Republic

According to the Ministry of Industry and Trade in the Czech Republic, construction is one of the largest sectors of the country's economy and still continues to recover after the global financial crisis of 2008 [97]. The indicator of the importance of the construction sector in the economy of the country is the share of gross value added in GDP (which is 5-6% in the Czech Republic) and the number of employed in the national economy (6% of the working-age population) [98]. At the same time, the construction industry strongly depends on the stability of government policies and current priorities of funding from the state budget [99].

The current business environment can be characterized by a high level of dynamism, instability and competition. For example, the financial crisis of 2008 caused a decrease in demand for real estate in 2008 compared to 2007, by about 1/3. As a result, construction investment has been curbed, and this fall has been reflected in all companies [100].

Due to the impossibility of controlling external factors, companies should constantly monitor the economic changes and find the relationship between the strategy of the company and the external environment.

4.2.3 Comparison of Impact of financial crisis of 2008 on construction companies in Czech Republic and Portugal

Changes in total construction output for the period 2008-2018 in 21 European countries are presented in Table 5.

Table 5 Changes in total construction output during 2008-2018 years (%). Source: Database Eurostat

Country	Years										
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Czech Republic	-0,2	-0,9	-7,6	-3,4	-7,3	-6,8	4,2	7,0	-5,8	3,5	9,1
Portugal	-4,6	-10,4	-11,7	-12,7	-16,1	-16,2	-9,6	-3,1	-3,8	2,2	3,5
EU	-1,9	-7,7	-2,3	-0,1	-5,5	-1,7	2,7	1,1	2,5	3,8	1,8

According to data from Database Eurostat 2018 average construction output in the EU countries began to recover during next two years after a maximum decline to 2009 by 7,7%, recording positive rates of change to 2011, when decline was only 0.1%. After that, there was some decline in EU construction output observed through until 2012. Since 2014 the volume of construction production began to increase year by year, reaching a maximum growth in 2017 by 3.8% [101]. All countries experienced a maximum decline in the industry in 2009/2010 and subsequent growth in 2014, but the values of changes for a similar year are very different between countries. While the

reduction in construction production in the Czech Republic was lower than the average change in the European Union, but the increase is higher, the opposite situation was in Portugal. Moreover, there was a decrease in production up to 2018 [102]. These observations can be explained by the fact that the economy of Portugal at the time of the financial crisis was already experiencing financial problems, which in 2008 worsened even more, which critically affected the construction sector of the economy [103].

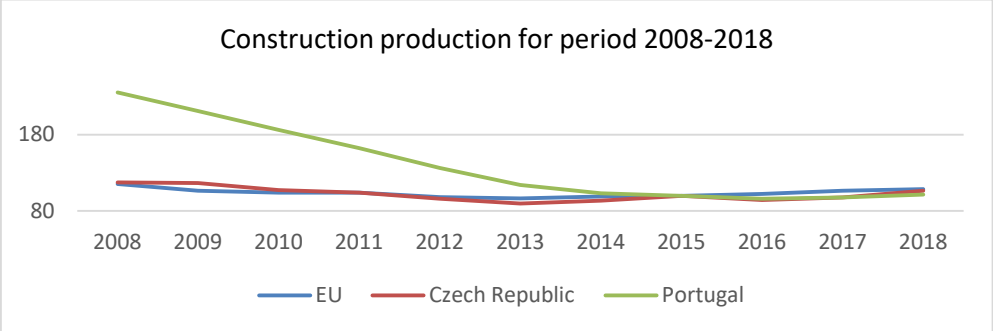
The next important task is to find out how the crisis affected the activities of the enterprise depending on the size of the company (Table 6).

Table 6 Numbers of construction companies in 2008-2016 by size. Source: Database Eurostat

Country	Years								
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Czech Republic									
Micro	432	460	203	219	233	239	263	261	281
Small	81	84	84	85	82	80	74	73	76
Medium	37	30	30	29	29	27	29	28	28
Large	17	18	16	15	15	17	14	14	14
Total	567	592	333	348	359	363	380	376	399
Portugal									
Micro	1 177	1 124	1 040	998	941	944	891	851	830
Small	272	260	249	230	209	193	191	199	197
Medium	39	37	32	31	23	17	16	12	14
Large	2	2	2	2	3	3	4	4	4
Total	1 490	1 423	1 323	1 261	1 176	1 157	1 102	1 066	1 045
EU									
Micro	-	-	-	14 600	15 000	14 000	14 500	15 357	-
Small	-	-	-	-	3 685	3 733	3 732	3 687	-
Medium	-	-	-	-	800	778	755	745	-
Large	-	-	-	231	234	240	238	-	-
Total	-	-	-	19 700	19 000	19 000	-	19 995	-

Note: *The following size-class definitions are applied: micro firms (0-9 persons employed), small firms (10-49 persons employed), medium-sized firms (50-249 persons employed), and large firms (250+ persons employed).*

According to analysis of changing in numbers of enterprises in the Czech Republic, Portugal and EU by size for period 2008-2016 it was found that the larger the enterprise, the higher the ability to maintain it's position in the domestic and global markets. This situation is observed both in the whole European Union and in Portugal and the Czech Republic in particular. Accordingly, the question arises how large organizations managed to survive and continue their activities in such a difficult period in the global economy. In this regard, it was decided to study the activities of large companies by comparing changes in the financial stability of 10 large construction companies operating in the Czech Republic and Portugal.



Graf 4 Construction production for period 2008-2018 in EU, Czech Republic and Portugal. Source: Eurostat

Construction production in the European Union started to grow in 2014 for the next three years, after six years of decline. Construction production in Portugal has been dropping continuously between 2008 and 2016 (-59,0%), with the decline being exacerbated by the Portuguese sovereign debt crisis, highlighting the fact that the Portuguese construction sector to 2016 year has still not recovered from the effects of the cuts in public spending and low levels of investment following the crisis [104]. Construction production in the Czech Republic also dropped by 23,7% over 2008-2013, subsequently recovering until 2015. However, it fell again in 2016, following the exhaustion of EU funds in 2015, being 12,7% lower than 2010 [105].

4.3 Backgrounds of companies

Dissertation research is based on analysis and comparing of the activities of the five large construction companies in the Czech Republic and five in Portugal: Metrostav a.s., Skanska a.s., Hochtief CZ a.s., OHL ŽS, a.s., Strabag a.s., Mota-Engil, Teixeira Duarte, Sacyr Somague, Martifer Group and Gabriel Couto**.**

Table 7 Overview of the case study companies operated in the Czech Republic. Source: Annual reports

	Metrostav a.s.	**Skanska a.s.**	**Hochtief CZ a.s.**	**OHL ŽS, a.s.**	**Strabag a.s.**
Employees	2 934	2 903	1 053	1 346	2 049
Revenue bill. €	0,69	0,43	0,20	0,205	0,39

Table 8 Overview of the case study companies operated in Portugal. Source: Annual reports

	Mota- Engil	**Teixeira Duarte**	**Sacyr Somague**	**Martifer Group**	**Gabriel Couto**
Employees	2 456	1 105	1 923	3000	1 049
Revenue bill. €	0,99	0,22	0,46	0,217	0,11

Metrostav a.s. operates in all segments of the building industry and its activities account for almost half of domestic underground construction. Metrostav a.s. is one of the few companies in the country that employ highly specialised mining methods of construction. Traditionally, transport engineering accounted for the largest share by financial volume (almost one-third of projects), followed by civil engineering, industrial construction and projects manifesting the original focus of the company – subterranean bored structures and metro constructions. In recent years, Metrostav's share on the Czech construction volume has been stable at 4% to 5% [106].

Skanska a.s. is a part of the European concern Skanska AB (Sweden). Skanska a.s. is mainly construction and development company. The core business is all construction industries, development and sale of own residential and commercial projects, asset management and related services. The company focuses mainly on the construction of commercial properties in Prague and its surroundings and other regional cities [107].

Hochtief CZ a.s. is a part of a major multinational company HOCHTIEF. The company employs 1105 employees who implement constructions in the construction market segments in the whole Czech Republic. These are residential, public and office, industrial, environmental and water management constructions, including projects of transport and linear infrastructure [108].

Strabag a.s. is an independs company belonging to the STRABAG SE group. Its activities are supported by more than 20 years of experience in the construction industry. The company carries out all kinds of constructions in the transport, land and civil engineering sectors, both in the private and public sectors. However, rather than building construction, the company focuses mainly on transport constructions and is thus a very important supplier in this construction segment [109].

OHL ŽS a.s. focuses on the complex implementation of various construction works, their modernization, reconstruction and maintenance according to the needs and wishes of customers in the following areas: transport, railway, road and highway construction, water and ecological constructions, engineering and energy constructions, ground and underground constructions [110].

Mota-Engil a.s. is a part of Portuguese Group, one of the leaders in the sectors of civil construction, public works, port operations, waste, water and logistics. Mota-Engil works in three major business areas – engineering and construction, environment and services and transport concessions. The transport concessions are a business area of strategic importance for the Mota-Engil [111].

Teixeira Duarte started is one of the largest Portuguese Economic Groups. Teixeira Duarte operates in 16 countries in 7 different sectors such as construction, transport construction, concessions and services, real estate, hotel services, distribution, energy and automobile industry. Teixeira Duarte is engaged in civil construction and public works. The company also specializes in maritime and river works and rail infrastructures. Company pays big attention to environment, transport and road development [112].

Sacyr Somague provides design, construction and engineering services. It offers its services for maritime works, dams and hydro schemes, rail infrastructure, tunnels and underground excavation, transportation infrastructure (roads, bridges and viaducts) and airports, industrial structures, housing, leisure, sports, hospital, environmental infrastructure and restoring buildings and monuments [113].

Martifer Group is a player with global recognition in the sector. The company is focused on two major geographic areas: Europe and the Middle East and Africa, and has industrial units that allow it, from those areas, to build the most complex projects. Company provides global and innovative engineering solutions, mostly in the metal mechanical constructions, aluminium and glass façades, infrastructures for oil & gas and in the naval industry segments (via its subsidiaries Navalria and West Sea) [114].

Gabriel Couto is a Portuguese civil construction and Public Works Company, operating in the renewable energy, infrastructure, and water and sanitation sectors. Gabriel Couto has been performing public and private construction for over a half-century, headquartered in Vila Nova Famalicão in the northern part of Portugal. Founded as a small family-oriented business, the firm has evolved into an economic organization of national importance [115].

4.4 Assessment of the external environment of the company – PESTEL analysis

As methodology of creation of a model of financial management of the enterprise is based on the study and comparison financial and managerial practices of large construction companies for the comparative assessment of external and internal is applied PESTEL analysis. In the present study, 12 indicators were considered and divided into five groups.

Political

Fragile States Index (FSI) was created by Fund for Peace in 2005. The index is based on twelve indicators of state vulnerability. Considered together in the index, the indicators are a way of assessing a state's vulnerability to collapse or conflict, ranking states on a categories labeled sustainable (0,0–29,9), stable (30,0–59,9), warning (60,0–89,9), and alert (90,0–120,0) [116].

Economic

Economic Decline Indicator (EDI) is a comprehensive indicator showing the overall economic situation of the country. The Indicator looks at patterns of progressive economic decline of the society as a whole as measured by per capita income, Gross National Product, unemployment rates, inflation, productivity, debt, poverty levels, or business failures [117]. The lower is indicator, the higher the economic stability of the country.

GDP per capita, Inflation rate, Unemployment rate were considered in chapter 4.1, page 41.

The Index of Economic Freedom (IEF) measures the degree of economic freedom in the world's nations. The author s (The Heritage Foundation, 1995) of the index took an approach similar to Adam Smith's in The Wealth of Nations that "basic institutions that protect the liberty of individuals to pursue their own economic interests result in greater prosperity for the larger society". According to value of IEF economic environment can be characterized as Free (80–100), Mostly Free (70,0–79,9), Moderately Free (60,0–69,9), Mostly Unfree (50,0–59,9) and Repressed (0–49,9) [118].

Social

Population growth rate (PGR) is the change in population during a particular period of time. If there is a positive growth rate it means that the population is increasing and opposite, when there is a negative growth rate it means that the population is decreasing [119].

Human development index (HDI) is a statistical indicator that measures the level of life expectancy, education, and income per capita. According to United Nations Development Programme Human Development Index can be divided into 4 categories: very high (0,800–1,000), high (0,700–0,799), medium (0,555–0,699) and low (0,350–0,554) [120].

External Intervention Indicator (EII) External Intervention Indicator shows the influence of the external environment on the security and economic situation of the country. This indicator focuses on measuring the degree of influence from external participants in the internal affairs of a state at risk by entities that may affect the balance of power within a state [121].

Technical and Environmental

Environmental Performance Index (EPI) Environmental Performance Index (EPI) includes an assessment of environmental health by evaluating of level of air quality, health impacts, water and sanitation and secondly an assessment of ecosystem vitality by evaluating of level water resources, agriculture, forests, climate, energy, biodiversity and habitat [122].

Global Innovation Index (GII) Global Innovation Index (GII) measures the degree of innovative development of the country, including an overview of the political situation, the level of development of education, infrastructure and business [123].

Legal

State Legitimacy Indicator (SLI) State Legitimacy Indicator (SLI) measures degree of openness of government, the openness of ruling elites to transparency, accountability

and political representation and its relationship with its citizenry. In addition, this indicator reflects the level of corruption in the country [124].

Table 9 PESTEL analysis. Czech Republic. Source: Eurostat

	Czech Republic										
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Political											
Fragile States Index	42,1	42,6	41,5	42,4	39,5	39,9	39,4	37,4	40,8	40,1	39,0
Economic											
Economic Decline Indicator	3,4	4,1	4,4	4,6	4,3	4,5	4,8	4,8	4,3	4,6	4,3
GDP per capita	22,699	19,742	19,808	21,717	19,729	19,916	19,744	17,556	18,484	20,368	23,307
Inflation rate	6,3	1,0	1,5	1,9	3,3	1,4	0,4	0,3	0,7	2,5	2,2
Unempl, Rate	4,39	6,66	7,28	6,71	6,98	6,95	6,11	5,05	3,95	2,89	2,1
Index of Economic Freedom	68,1	69,4	69,8	70,4	69,9	70,9	72,2	72,5	73,2	73,3	74,2
Social											
Population growth rate	0,83	0,57	0,29	0,21	0,14	0,03	0,11	0,20	0,19	0,24	0,10
Human development index	0,854	0,857	0,862	0,865	0,865	0,874	0,879	0,882	0,885	0,888	-
External Intervention Indicator	3,4	3,7	3,7	3,8	3,5	3,2	2,9	2,6	2,9	2,7	2,8
Technical and Environmental											
Environmental Performance Index	-	-	-	-	-	-	-	81,47	73,5	67,68	67,68
Global Innovation Index	3,64	3,77	3,77	47,3	49,7	48,36	50,22	51,32	49,40	50,98	48,75
Legal											
State Legitimacy Indicator	3,7	3,6	3,4	3,7	3,5	4,1	4,2	4,2	4,9	4,7	4,6

According to data of FSI of the Czech Republic relative to level of vulnerability to collapse or conflict country is on a politically stable position. Stable dynamics of growth of the economic decline indicator indicates a decrease in the stability of the economy of the country. According to the analyzed data presented in Table 9 it can be concluded that the financial crisis of 2008 had a negative impact on the economic stability of the Czech Republic. The first negative changes occurred in 2008-2009, when the GDP per capita fell to value 19,742, inflation sharply fell in 2009, and, as a result, the unemployment has increased to 8,1%. Macroeconomic indicators turned positive in 2010. But under the influence of new global financial negative changes in 2012-2013, the GDP decreased sharply again. Only in 2013 the economic situation began to improve and in just two years (2014-2015), the country's GDP has risen from -0,5 in 2013 to 4,6 in 2015. In addition, changes in inflation since 2010 slow and steady. According to value of Index of Economic Freedom position of Economy of the Czech Republic from 2008 to 2011 was in Moderately Free Zone, and from 2011 to 2018 in Mostly Free Zone. This means there was an improvement of the economic environment for business.

The growth of the population of the Czech Republic has halved, the maximum growth was in 2008, the minimum in 2013. According to Human development index Czech Republic is in very high level during all period under reviewed. The economy of the Czech Republic is characterized by low level of influence of external factors in the functioning of a state. Value of Global Innovation Index indicates a high rate of development of innovative and technological activities in the country. Moreover, according to Legal factor of PESTEL analysis Czech Republic have a high level representativeness and openness of government and its relationship with its citizenry.

Table 10 PESTEL analysis. Portugal. Source: Eurostat

	Portugal										
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Political											
Fragile States Index	31,8	32,7	33,1	32,3	34,2	32,6	33,1	29,7	29,2	29,0	27,3
Economic											
Economic Decline Indicator	3,8	4,2	4,7	4,8	5,3	5,4	5,2	5,1	5,0	5,3	4,8
GDP per capita	24,815	23,064	22,539	23,196	20,577	21,618	22,007	19,252	19,872	21,136	23,403
Inflation rate	2,7	-0,9	1,4	3,6	2,8	0,4	-0,2	0,5	0,6	1,6	1,2
Unempl, Rate	7,6	9,4	10,8	12,68	15,53	16,18	13,9	12,4	11,1	8,9	6,6
Index of Economic Freedom	63,9	64,9	64,4	64	63	63,1	63,5	65,3	65,1	62,6	63,4
Social											
Population growth rate	0,14	0,10	0,05	-0,15	-0,40	-0,55	-0,54	-0,41	-0,31	-0,31	-0,27
Human development index	0,814	0,817	0,822	0,826	0,829	0,837	0,839	0,842	0,845	0,847	-
External Intervention Indicator	3,2	3,0	2,8	2,5	3	3,3	3	3,3	2,5	2,8	2,9
Technical and Environmental											
Environmental Performance Index	-	-	-	-	-	-	-	75,8	74,6	71,91	71,91
Global Innovation Index	3,49	3,56	3,56	42,4	45,7	45,1	45,63	46,61	46,45	46,05	45,71
Legal											
State Legitimacy Indicator	1,5	1,6	1,6	1,6	2	2,1	2,3	1,8	1,8	1,6	1,7

According to data of FSI of Portugal relative to level of vulnerability to collapse or conflict country is on a politically stable position. Stable dynamics of growth of the economic decline indicator indicates a decrease in the stability of the economy of the country. According to the data presented in Table 10 it can be concluded that the financial crisis of 2008 had even more negative impact on the economic stability than in the Czech Republic. The first negative changes occurred in 2008-2012, when the GDP per capita fell to value 20,577, inflation fell sharply in 2009, and, as a result, the unemployment began to grow again after a slight decline in 2008 until 2013. Since 2013/2014 the economic situation began to improve. According to value of Index of Economic Freedom position of Economy of Portugal during all period under reviewed was in Moderately Free Zone.

With regard to social factors, despite the increase in Human development index and External Intervention Indicator decline in the number of working population continues to fall, which is dangerous indicator for the country's economy. The maximum positive Population growth rate was in 2008 when it was 0,2, the minimum (negative) in 2013 was -0,54. Value of Global Innovation Index indicates a high rate of development of innovative and technological activities in the country. According to Legal factor of PESTEL analysis Portugal does not have a high level representativeness and openness of government.

The dynamics of changes in per capita GDP with a sharp decline in GDP in the period 2008–2009 correspond to the beginning of the financial crisis 2008. After a long recession, the Czech and Portuguese economy started to recover in 2013. The highest growth in GDP per capita by 21% over the period of 2013-2018 has been in the Czech Republic, while Portugal's GDP per capita rose by 9,5% and the average GDP per capita in the EU by 12%. Despite the fact that the population growth rate of the Czech Republic for the period under review decreased, however, in contrast to Portugal, it

remained positive. In Portugal, due to high unemployment, a significant part of the working-age population immigrates to countries with more stable economies.

The main external factor that influenced on the financial stability of economy of country and in particular on construction industry is the financial crisis. However, each country had its influence in varying degrees. The most serious consequences had Portugal.

4.5 Altman Z-Score analysis

This part of the study is devoted to a quick analysis of the probability of bankruptcy of companies in the period 2008-2018, in order to identify the general trend of changes in financial stability and determine the most unstable period of the construction industry in the Czech Republic and Portugal. This method assesses the company's profitability, liquidity, activity, solvency and leverage.

According to obtained results there are Zones of financial condition of the company:

- Z-score > 2,99 - safe zone. Condition of the company is considered as safe.
- 1,81 < Z-score < 2,99 - grey zone. Company has a good chance of going bankrupt.
- Z-score < 1,81 - distress zone. Company has a high probability of distress.

If Altman Z-Score of the company is below 2,99 before considering investing it is important to analyze the financial condition of the company in more detail [123].

4.5.1 Altman Z-Score analysis of construction companies operated in the Czech Republic

Table 11 Z-Score analysis of Metrostav, a.s. Source: author

Metrostav	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	0,11	0,13	0,12	0,15	0,20	0,17	0,17	0,22	0,24	0,19	0,18
X2	0,20	0,21	0,22	0,24	0,27	0,25	0,26	0,28	0,31	0,28	0,25
X3	0,04	0,04	0,03	0,04	0,02	0,01	0,02	0,02	0,01	0,01	0,02
X4	0,41	0,45	0,41	0,49	0,52	0,45	0,48	0,53	0,61	0,49	0,44
X5	1,42	1,34	1,08	1,09	1,12	1,02	1,13	1,20	1,12	1,12	1,10
Z-Score	**2,20**	**2,19**	**1,86**	**2,02**	**2,12**	**1,89**	**2,05**	**2,25**	**2,26**	**2,06**	**2,01**
Result	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***

According to data obtained in Table 11, Z-Score for Metrostav a.s. has been in the grey zone for the last 11 years. It reached its lowest levels in 2010 and 2013 when it hit 1,86 and 1,89 points. The development of this score seems very stable without any significant volatility. Despite being in the grey zone, the change the development of this score seems very stable without any significant volatility. Company from this perspective is solid and is unlikely to have some serious financial distresses in the next few years. However, financial difficulties are possible, which indicates the need for action to improve the financial stability of the company.

Table 12 Z-Score analysis of Skanska, a.s. Source: author

Skanska	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	0,81	0,72	0,72	0,71	0,70	0,70	0,70	0,71	0,68	0,64	0,62
X2	0,09	0,22	0,27	0,33	0,34	0,25	0,31	0,29	0,28	0,35	0,33
X3	0,06	0,06	0,04	0,00	-0,01	-0,05	0,01	0,03	0,02	0,02	-0,04
X4	0,31	0,63	0,84	0,98	1,06	0,87	0,61	0,71	0,91	0,92	1,03
X5	1,29	1,06	0,95	0,75	0,69	0,65	0,89	0,89	0,91	0,89	0,98
Z-Score	**2,78**	**2,80**	**2,82**	**2,66**	**2,63**	**2,22**	**2,55**	**2,67**	**2,71**	**2,76**	**2,66**
Result	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***

According to data obtained in Table 12, Z-Score for Skanska a.s. has been in higher levels of the grey zone for the last 11 years. It reached its lowest level in 2013 when it hit 2,22 points. Average value over the past 11 years is 2,689 which is above the level of 2,675 points, meaning that the company from this perspective is solid and is unlikely to have some serious financial distresses in the next few years. Also the development of this score seems very stable without any significant volatility. In addition, since 2013, there has been a steady increase in the indicator and in 2017 the score was 2,76, which can be seen as a very effective result with a positive future outlook. In other words a bankruptcy of Skanska is highly unlikely.

Table 13 Z-Score analysis of OHL ŽS, a.s. Source: author

OHL ŽS	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	0,60	0,60	0,49	0,52	0,57	0,69	0,71	0,65	0,29	0,58	0,62
X2	0,15	0,18	0,22	0,25	0,25	0,24	0,18	0,19	-0,02	-0,22	0,00
X3	0,02	0,03	0,03	0,04	0,01	0,00	-0,04	-0,08	-0,31	-0,08	0,00
X4	0,28	0,36	0,44	0,50	0,51	0,46	0,30	0,23	-0,02	0,35	0,30
X5	1,57	1,82	1,53	1,33	1,31	1,14	1,22	1,73	1,11	1,12	1,19
Z-Score	**2,75**	**3,13**	**2,78**	**2,73**	**2,70**	**2,58**	**2,38**	**2,66**	**0,40**	**1,46**	**2,12**
Result	***Grey Zone***	***Safe Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Distr Zone***	***Distr Zone***	***Grey Zone***

According to data obtained in Table 13, Z-Score for OHL ŽS, a.s has been in higher levels of the grey zone for the period 2008-2015. Moreover, in 2009 its value reached 3,13, which means the company was in a good financial position, with a high degree of financial stability. However, Z-Score value since 2009 began to gradually decrease, reaching its critical value of 0,4 in 2016. In 2016-2017, the company had a high risk of bankruptcy. However, management of the company managed to bring the company back to the grey zone by 2018. Despite this Z-Score value is at the lowest level of the grey zone, which means that the risk of bankruptcy still exists, further measures are needed to restore the company's financial stability.

Table 14 Z-Score analysis of Strabag, a.s. Source: author

Strabag	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	0,83	0,86	0,82	0,83	0,81	0,81	0,82	0,85	0,88	0,87	0,86
X2	0,13	0,15	0,17	0,16	0,12	0,05	0,05	0,06	0,07	0,09	0,08
X3	0,02	0,04	0,03	0,04	0,02	0,04	0,01	-0,01	0,03	0,03	0,03
X4	0,60	0,75	0,94	0,88	0,70	0,64	0,56	0,36	0,36	0,49	0,37
X5	1,32	1,29	1,45	1,35	1,23	1,30	1,22	1,05	0,92	1,00	1,05
Z-Score	**2,91**	**3,12**	**3,33**	**3,22**	**2,86**	**2,86**	**2,64**	**2,33**	**2,39**	**2,57**	**2,51**
Result	***Grey Zone***	***Safe Zone***	***Safe Zone***	***Safe Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***

In the period 2008-2011, the company is distinguished by a high degree of financial stability, the absence of any risk of bankruptcy. Despite the fact that the Z-Score in 2012 dropped to the grey zone, its value was still at a high level. In 2015 the value was reduced to the minimum of 2,33 with next growth. Company's financial situation is highly stable and a bankruptcy of Strabag is highly unlikely.

According to data obtained in Table 15, Z-Score for Hochtief a.s. has been in higher levels of the grey zone for the period 2008-2014. It reached its lowest level in 2011 when it hit 2,55 points. The development of Z-score during that time was very stable without any significant volatility. By 2015, the company was able to improve its financial stability by increasing Z-Score to a value of 3,31 and put the company into a Safe zone.

Table 15 Z-Score analysis of Hochtief, a.s. Source: author

Hochtief	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	0,84	0,79	0,84	0,84	0,84	0,86	0,86	0,85	0,81	0,86	0,88
X2	0,08	0,12	0,12	0,12	0,15	0,14	0,14	0,17	0,20	0,14	0,11
X3	0,02	0,00	0,00	0,01	0,01	0,01	0,03	0,01	0,04	0,01	0,00
X4	0,26	0,39	0,37	0,35	0,46	0,40	0,42	0,51	0,66	0,37	0,27
X5	1,38	1,48	1,17	1,15	1,15	1,25	1,34	1,68	1,42	1,25	1,08
Z-Score	**2,72**	**2,83**	**2,57**	**2,55**	**2,66**	**2,74**	**2,91**	**3,30**	**3,19**	**2,74**	**2,47**
Result	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Safe Zone***	***Safe Zone***	***Grey Zone***	***Grey Zone***

Despite the decline in the indicator in 2017 to a value of 2,74 and bringing the company back to the grey zone, it is important to note that its values are still high. Given the slight changes in the values of indicators over the 11 years under consideration, the company can be characterized as financially stable and bankruptcy of Strabag is highly unlikely.

The results of the Z-Score analysis indicate that the bankruptcy of construction companies operating in the Czech Republic is highly unlikely. Despite the fact that in most cases the Z-score is in the grey zone, its value is close to the safe zone. This indicates satisfactory financial stability of the companies, however, the probability of bankruptcy exists, which indicates the need for measures to improve the financial situation of companies.

4.5.2 Altman Z-Score analysis of construction companies operated in Portugal

Table 16 Z-Score analysis of Mota-Engil, a.s. Source: author

Mota-Engil	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	0,50	0,31	0,43	0,46	0,47	0,25	0,22	0,49	0,42	0,51	0,46
X2	-0,08	-0,06	0,00	0,02	0,01	-0,01	-0,03	0,00	-0,02	-0,01	-0,05
X3	0,01	0,03	0,02	0,01	0,01	-0,01	-0,02	0,01	-0,02	0,00	-0,02
X4	0,13	0,28	0,20	0,28	0,26	0,34	0,42	0,42	0,36	0,37	0,29
X5	1,96	1,59	1,26	1,42	1,56	1,48	0,89	1,25	1,00	1,06	1,03
Z-Score	**2,55**	**2,13**	**1,94**	**2,19**	**2,31**	**1,91**	**1,30**	**2,11**	**1,64**	**1,89**	**1,63**
Result	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Distr Zone***	***Grey Zone***	***Distr Zone***	***Grey Zone***	***Distr Zone***

According to data obtained in Table 16, Z-Score indicator reached its maximum value in 2008 when it was 2,55. Since 2008, a gradual decline until 2014 to the distress zone, when it reached its minimum of 1,3. In 2015 the situation improved when the indicator rose to 2,11. Despite its decline in 2016, its growth is observed again in 2017 and then fell again in 2018. Mota-Engil, a.s. has a risk of bankruptcy.

Table 17 Z-Score analysis of Teixeira Duarte, a.s. Source: author

Teixeira Duarte	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	-0,05	-0,04	0,01	0,04	-0,06	-0,02	0,03	-0,01	0,01	0,11	0,17
X2	0,17	0,06	0,02	0,00	0,01	0,03	0,04	0,06	0,08	0,10	0,24
X3	-0,13	0,03	0,01	-0,08	0,01	0,02	0,02	0,01	0,01	0,00	0,01
X4	0,12	0,17	0,26	0,14	0,13	0,15	0,20	0,22	0,21	0,22	0,28
X5	0,41	0,37	0,51	0,44	0,50	0,57	0,57	0,49	0,44	0,45	0,47
Z-Score	**0,23**	**0,61**	**0,75**	**0,31**	**0,55**	**0,76**	**0,85**	**0,74**	**0,73**	**0,86**	**1,19**
Result	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***

During all the 11 years under consideration the company was in a distress zone. A strong deterioration in the company's financial position was in 2016 when the indicator

dropped to 0,73, which means a high level of probability of bankruptcy. During 2009-2010 years managers managed to slightly improve the company's financial position, but the probability of bankruptcy remained high. Despite the continued growth of the indicator in the period 2012-2014, the company was unable to get out of the distress zone. Bankruptcy of Teixeira Duarte is highly likely.

Table 18 Z-Score analysis of Gabriel Couto. Source: author

Gabriel Couto	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	0,12	0,16	0,19	0,22	0,11	0,08	0,14	0,14	0,21	0,18	0,11
X2	0,20	0,20	0,19	0,12	0,16	0,16	0,01	0,01	0,01	0,13	0,12
X3	0,03	0,04	0,04	0,04	0,03	-0,05	0,05	0,02	0,01	0,01	0,01
X4	0,33	0,38	0,31	0,31	0,25	0,13	0,16	0,17	0,20	0,22	0,21
X5	1,33	1,36	1,16	1,13	0,88	0,92	0,86	0,87	0,99	0,84	1,14
Z-Score	**2,04**	**2,19**	**1,98**	**1,87**	**1,47**	**1,17**	**1,32**	**1,24**	**1,41**	**1,39**	**1,61**
Result	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Distr. Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***	***Grey Zone***

According to data obtained in Table 18, Z-Score for Gabriel Couto has been in grey zone for the period 2008-2012 and period 2014-2018. However, after a steady decline in financial stability since 2009 Z-Score value has reached a critical value of 1,17 in 2013. In 2013, the company had a risk of bankruptcy. However, management of the company managed to bring the company back to the grey zone by 2014. Despite this Z-Score value is at the lowest level of the grey zone, which means that the risk of bankruptcy still exists, further measures are needed to restore the company's financial stability.

Table 19 Z-Score analysis of Sacyr Somague. Source: author

Sacyr Somague	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	-0,03	0,00	-0,25	0,00	-0,04	-0,08	-0,25	0,02	0,03	0,09	0,04
X2	-0,01	0,00	0,01	0,02	0,02	0,04	0,05	-0,01	0,00	0,00	-0,01
X3	-0,01	0,03	0,01	-0,10	-0,07	-0,04	0,00	0,04	0,01	0,01	0,01
X4	0,10	0,17	0,22	0,18	0,12	0,09	0,13	0,22	0,24	0,17	0,12
X5	0,19	0,29	0,23	0,23	0,26	0,21	0,25	0,28	0,27	0,23	0,27
Z-Score	**0,18**	**0,46**	**0,11**	**0,05**	**0,09**	**0,09**	**0,09**	**0,54**	**0,48**	**0,46**	**0,42**
Result	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***

During all the 11 years under consideration the company was in a distress zone. In 2015, the value of Z-score began to increase, but is still in the distress zone. According to obtained results bankruptcy of Sacyr Somague is highly likely.

Table 20 Z-Score analysis of Martifer Group. Source: author

Martifer Group	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
X1	-0,08	0,03	0,02	0,01	-0,08	0,02	0,01	0,15	0,13	0,07	0,04
X2	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
X3	0,01	0,07	-0,05	-0,05	-0,02	-0,07	-0,22	0,00	-0,14	0,01	0,00
X4	0,33	0,44	0,43	0,38	0,30	0,22	0,02	0,02	-0,08	-0,09	-0,13
X5	0,40	0,36	0,52	0,51	0,49	0,66	0,30	0,36	0,49	0,47	0,63
Z-Score	**0,51**	**0,89**	**0,65**	**0,60**	**0,51**	**0,59**	**-0,38**	**0,56**	**0,13**	**0,53**	**0,61**
Result	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***	***Distr. Zone***

According to data obtained in Table 20, Z-Score for Martifer Group during all the 11 years under consideration the company was in a distress zone. A strong deterioration in

the company's financial position was in 2014 when the indicator dropped to -0,38, which means a high level of probability of bankruptcy.

The results of the Z-Score analysis indicate that bankruptcy of construction companies operating in Portugal is high probability. In most cases, an increase in the likelihood of a bankruptcy of the company corresponds to the beginning of the financial crisis, which indicates the direct impact of the crisis on the financial stability of companies. Despite the fact that the Z-score of Mota-Engil is in the grey zone, its value is close to the distress zone. Companies have a high probability of distress. Thus, in all cases under consideration, it is necessary to take measures to increase the financial stability of companies.

The decline in Z-Score corresponds to the beginning of the financial crisis. In most cases, a decrease in this indicator is observed in 2009/2010. This indicates a direct dependence of the financial condition of companies on the financial stability in the country and the direct impact of the financial crisis. In addition, construction companies operating in the Czech Republic have a higher Z-Score, which indicates a lower likelihood of bankruptcy of these companies.

4.6 Financial analysis of companies

The effectiveness of the company is determined by the profitability indicators. Profitability is the most generalized qualitative indicator of the economic efficiency of activity, the efficiency of functioning of an enterprise of any industry. ROA and ROE of construction companies in Portugal and in the Czech Republic for the 2008-2018 are presented in table 21 and 22.

4.6.1 Financial analysis of five construction companies operated in the Czech Republic

Table 21 ROA, ROE of five construction companies operated in the Czech Republic. Source: author, Database of the Department of Justice of the Czech Republic for 2008-2018 [131]

Ratios, %	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
	Metrostav a.s.										
ROA	3,7	4,0	2,6	3,7	1,9	1,4	2,0	2,3	1,3	0,6	2,4
ROE	12,8	13,1	9,1	11,1	5,4	4,4	6,3	6,6	3,6	1,9	7,8
	Skanska a.s.										
ROA	6,4	6,0	3,6	0,1	-0,6	-4,5	0,8	2,8	1,9	2,2	-4,1
ROE	28,6	16,7	8,6	0,2	-1,2	-12,1	2,1	6,8	3,9	4,4	-8,2
	Hochtief CZ a.s.										
ROA	2,1	0,1	0,1	0,6	0,7	0,6	2,6	1,5	3,7	0,8	0,4
ROE	11,6	0,3	0,6	2,5	2,5	2,1	9,5	4,6	9,8	2,9	1,9
	OHL ŽS a.s.										
ROA	2,5	3,4	2,9	4,0	1,2	0,3	-3,5	-8,0	-31,0	-8,0	0,1
ROE	11,2	12,8	9,7	12,0	3,7	1,1	-15,4	-41,2	1418,0	-30,9	0,4
	STRABAG a.s.										
ROA	1,5	4,0	2,9	3,8	2,0	4,0	1,1	-1,4	2,9	3,0	2,7
ROE	5,1	11,4	7,5	9,6	5,8	12,0	3,6	-6,5	13,8	1,7	12,3
	Overall for construction industry of the country										
ROA	8,15	8,82	5,93	3,64	3,32	2,28	3,0	5,12	4,82	5,91	5,14
ROE	16,57	18,39	12,46	7,96	6,76	5,97	5,87	8,47	7,2	9,13	11,6

Metrostav, a.s. After a gradual increase in the profitability of both assets and equity by 2009, when the return on assets was 4% and the return on equity was 13,1%, by 2010 there was a sharp drop in return on assets by 35% and return on capital by 30%. Despite the further growth of the ratios until 2011 in the following years, there is a strong

decline until 2013 by more than 50%. However, by 2014, the recession was stopped and a new increase in profitability indicators began. According to the dynamics of changes in the company's profitability indicators for the period under review, the company's profitability by 2018 compared to 2008 dropped significantly.

Values of profitability indicators of *Skanska a.s.* have been subject to a steady decline by 2011 and have fallen negative in 2012 due to the loss achieved. In addition, the loss deepened further in 2013, reflected in a further decline in profitability. However, in 2014 there was a positive turn around and thanks to profit the profitability indicators started to grow again. Return on assets was 0,8% this year, which is relatively low (especially when compared to 2008 when it reached 8,0%).

Profitability indicators of the company *Hochtief CZ a.s.* characterized by positive results during the period under review. The biggest drop in profitability was in 2009, the year the return on assets dropped to 0,1, and the return on equity to 0,3. Further, there was a steady growth in these indicators until 2012, after which the profitability again fell slightly. Since 2013, the dynamics of change is not stable; each growth of indicators is accompanied by a subsequent fall.

Rentability of *OHL ŽS, a.s.* declined 2009/2010, ROA from value 3,4 to 2,9 and ROE from 12,8 to 9,7. In 2011, the company was able to restore profitability to almost the level of 2008. In 2012, profitability fell again and continued to decline until 2017. In addition, from 2014 to 2017, both indicators return on equity and return on assets were negative. The company was losing lose financial stability.

Strabag a.s. according to data presented in Table 21 had two strong years 2009 and 2013. By contrast, 2015 was very weak in terms of profitability. Due to very low EBIT, ROA and ROE that year were at critically low levels. In 2009 there was a sharp increase in profit and profitability. At the same time, equity and assets decreased, which also had a positive impact on indicators. The following year 2010 was marked by a decline in profitability with their subsequent growth until 2014. After the drop in profitability in 2015 to negative values, in 2016, their sharp growth begins again.

The construction industry in the Czech Republic suffered under the impact of the 2008 financial crisis with the decrease in profitability of all presented firms over the period researched. According to the calculation, in general, the dynamics of changes in the profitability of all companies is similar. All the companies under consideration had two waves of sharp drop in profitability indicators in 2009/2010 and 2012/2013. In addition, their profitability decreased significantly from 2008 to 2018. However, the difference in changes between companies is significant. While the profitability of Metrostav a.s and Hochtief CZ a.s. remained positive throughout the period under review, which means companies managed to maintain their financial stability and make a profit, the trend of high negative changes of other companies means that the companies have significant problems. Overall ROE for construction industry of the country from the value of 16,57% in 2008 decreased to 11,6% by 2018. A similar situation was observed with ROA which decreased between 2008 from 8,15 to 5,14 in 2018.

4.6.2 Financial analysis of five construction companies operated in Portugal

Table 22 ROA, ROE of five construction companies operated in Portugal. Source: author, Iberian Balance Analysis System (SABI) (2008-2018) [132]

Ratios, %	Mota- Engil										
	2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
ROA	1,1	2,8	2,0	2,0	2,1	2,3	2,1	1,0	1,6	1,3	2,0
ROE	11,7	21,0	14,4	17,1	17,0	15,8	14,4	7,2	11,8	10,3	20,9
	Teixeira Duarte										
ROA	-13,0	3,3	1,4	-7,9	0,94	2,33	2,23	1,41	1,3	0,1	0,5
ROE	-121,8	22,5	7,0	-65,44	7,99	17,9	13,6	7,8	7,5	0,8	2,4
	Gabriel Couto										
ROA	2,7	4,3	4,3	3,5	2,6	-5,1	5,4	2,4	0,8	0,8	1,3
ROE	11,1	15,6	18,5	15,2	12,9	-43,2	38,2	16,9	4,7	4,4	7,7
	Sacyr Somague										
ROA	-0,9	2,5	1,0	-9,6	-7,1	-4,0	0,3	3,5	1,1	1,0	1,1
ROE	-9,2	17,6	5,6	-62,9	-63,7	-48,4	2,5	19,4	5,8	6,5	10,0
	Martifer Group										
ROA	0,6	7,0	-4,7	-4,6	-2,3	-6,9	-21,6	0,2	-	1,0	0,5
ROE	2,3	22,9	-15,4	-16,8	-9,7	-38,9	-89,7	10,0	-	-10,2	-3,2
	Overall for construction industry of the country										
ROA	-3,2	1,47	1,83	3,78	0,0	0,9	3,0	1,63	1,52	1,76	1,99
ROE	23,3	32,7	26,7	32,6	12,4	2,8	3,1	7,95	8,86	10,12	11,34

To the financial crisis of 2008, the Portuguese economy was already in a weak position due to large foreign debt to the European Union. The crisis of 2008 reflected in 2010/2011 by a sharp drop in profitability rates.

The profitability of the company *Mota-Engil a.s.* has risen significantly over the period under review. While in 2008 the return on assets was 1,1% and the return on equity was 11,7%, by 2018 the company managed to improve its financial condition ROA to 2,0% and ROE to 20,9%.

Despite the negative profitability of *Teixeira Duarte* in 2008, when the company lost financial stability, in 2009, managers were able to return their financial position to the positive level. The next sharp drop in profitability occurred in 2011, when their values again were negative. However, from 2012 there was a gradual increase in profitability until 2018, with a slight decrease in 2016.

In the case of *Gabriel Couto* the situation is almost the same, but negative profitability was observed only in 2013, after which the company managed to increase its profitability and maintain its stable growth.

The profitability of the company *Sacyr Somague* over the period under review changed from negative to positive values. While in 2008 the return on assets was negative -0,9% and the return on equity was -0,92%, by 2018 the company managed to improve its financial condition ROA to 1,1% and ROE to 10,0%. The second sharp drop in profitability in 2011-2013 corresponds to deterioration in the economic situation in the country.

The worst situation is observed in the company *Martifer Group.* Profitability of the company since 2009 steadily fell until 2014 to the negative value. After a sharp increase in the company's profitability in 2015 and positive values, the company's profitability in 2016-2018 again fell to negative values.

The crisis adversely affected the quality and value of assets of the construction companies. According to the obtained data presented in Table 21 and Table 22 financial

stability of construction companies in Portugal was badly affected. 2013 year was a turning point for companies' profitability, as the Portuguese economy emerged from recession in the second half of the year. The construction industry in the Czech Republic also suffered under the impact of the 2008 financial crisis with the decrease in profitability of firms over the period researched.

From a comparison of coefficients of profitability in Table 21 and Table 22 for the researched period, it is important to note that the changes in the Czech Republic, in contrast to Portugal, were more predictable and slower. In addition, the impact of the crisis differs between companies within one country. The difference can be explained by the existing financial condition of the company at the time of the crisis, as well as the internal policy of the company.

4.7 DuPont ROE of selected construction companies

DuPont (pyramidal decomposition of ROE) is useful tool to manage the return on equity. DuPont displays individual sub-indicators that affect the top return on equity. Furthermore, due to the long-term use of real estate, it is possible to create a financial management model including financial analysis and investment decision making. As property development will always take into account the return on investment property and its risk. Through the use DuPont ROE, can be determined the key indicator that has the greatest impact on the overall value of return on equity.

The mathematical methods used to determine the significance of factors are based on comparing the values of the indicators. It is possible to compare values from several points of view, based on time, spatial or factual differences. Most often, the difference or the ratio can be used for the description. The value of the synthetic indicator is based on the influence of partial analytical factors and quantification of the impact of these partial indicators can be determined using mathematical methods (logarithmic method). The logarithmic method, also the method of decomposition according to the logarithms of the indexes of the analytical indicators, is based on the overall identified change and subsequent identification of the influence of the analytical indicators. This method gives an unambiguous result but cannot be used if the change of the synthetic indicator is zero. The logarithmic method is used for pyramidal decompositions.

$$\Delta X = \frac{ln\, I_a}{ln\, I_x} * \Delta X + \frac{ln\, I_b}{ln\, I_x} * \Delta X \tag{40}$$

Where: X - synthetic indicator

I_a - Index of the change in the analytical indicator obtained by the ratio of the values of the a_1 and a_0 indicators in the period change

I_b - index of the change in the analytical indicator obtained by the ratio of the b_1 and b_0 values in the period change

I_x - index of the change of the synthetic indicator obtained by the ratio of the values of the indicators X_1 and X_0 in the period change.

By decomposing the ROE and using the logarithmic method, can be find analytical indicator that has the highest impact on the change in the synthetic indicator [122].

4.7.1 DuPont ROE of construction companies operated in the Czech Republic

To determine the key indicator that has the greatest impact on the value of the profitability of capital, decomposing the ROE indicator of each selected construction companies operated in the Czech Republic is presented below.

Detailed DuPont decomposition of ROE of Metrostav a.s. for 2008-2018 is presented in

ANNEX 2. Based on the results of DuPont decomposition was developed Table 23.

Table 23 Summary result of DuPont ROE of Metrostav a.s. for period 2008-2018. Source: author

Metrostav a.s.	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage				+	+			+	+		4
ROA	+	+	+			+	+			+	6
Total Assets					+				+		2
Equity				+				+			2
Profit margin	+	+	+			+	+			+	6

According to data obtained in Table 23, on the change in ROE of the company Metrostav, a.s. mostly affects indicator ROA. As a result of further decomposition of ROA and Financial Leverage, it was found that Financial Leverage is equally depends on changes in the values of assets and capital. ROA is directly depends on changes in the value of Profit margin. In this case, Profit margin can be considered as a key indicator that has the greatest impact on the ROE.

Detailed DuPont decomposition of ROE of Hochtief, a.s. for 2008-2018 is presented in ANNEX 3. Based on the results of DuPont decomposition was developed Table 24.

Table 24 Summary result of DuPont ROE of Hochtief, a.s. for period 2008-2018. Source: Own creation

Hochtief, a.s.	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage	+				+		+			+	4
ROA		+	+	+		+		+	+		7
Total Assets					+					+	2
Equity	+						+				2
Profit margin		+	+	+		+		+	+		6
TAT											0

According to data obtained in Table 24, changes in the return of equity of Hochtief, a.s are most influenced by changes in the value of return on assets. Changes in the value of ROA, as in the above-considered company, are caused by a change in Profit Margin indicator.

Detailed DuPont decomposition of ROE of OHL ŽS, a.s. for 2008-2018 is presented in ANNEX 4. Based on the results of DuPont decomposition was developed Table 25.

Table 25 Summary result of DuPont of ROE of OHL ŽS, a.s. for period 2008-2018. Source: author

OHL ŽS, a.s	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage		+		+	+					+	4
ROA	+		+			+	+	+	+		6
Total Assets					+						1
Equity		+		+							2
Profit margin	+		+			+	+	+			5
TAT									+	+	2

As a result of pyramidal decomposition of ROE of the company OHL ŽS for 2008-2018 years was found that return of equity of the company is 60% depends on the variation of ROA and 40% on Financial Leverage. The change in return on assets according to the results presented in the Table is under significant influence of Profit Margin.

Detailed DuPont decomposition of ROE of Strabag, a.s. for 2008-2018 is presented in ANNEX 5. Based on the results of DuPont decomposition was developed Table 26.

Table 26 Summary result of DuPont of ROE of Strabag, a.s. for period 2008-2018. Source: author

Strabag, a.s	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage		+		+		+	+		+	+	5
ROA	+		+		+			+			4
Total Assets				+		+	+			+	4
Equity		+							+		2
Profit margin	+		+		+			+			5
TAT											0

According to data obtained in Table 26, on the change in ROE of the company Strabag, a.s. affect both indicators Financial Leverage and ROA. As a result of further decomposition of these indicators, it was found that Financial Leverage is depends on changes in the values of assets and capital. ROA is directly depends on changes in the value of Profit margin. This case again confirms that Profit margin can be considered as a key indicator that has the greatest impact on the coefficient of Return on equity.

Detailed DuPont decomposition of ROE of Skanska, a.s. for 2008-2018 is presented in ANNEX 6. Based on the results of DuPont decomposition was developed Table 27.

Table 27 Summary result of DuPont ROE of Skanska, a.s. for period 2008-2018. Source: author

Skanska, a.s	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage		+	+			+			+		4
ROA	+			+	+		+	+		+	6
Total Assets											-
Equity		+	+						+		3
Profit margin	+			+	+		+	+		+	6
TAT						+					1

According to DuPont of ROE of Skanska, on the change in ROE of the company affect both indicators Financial Leverage and ROA. As a result of further decomposition of these indicators, it was found that Financial Leverage is mostly depends on Equity. ROA is directly depends on changes in the value of Profit margin. So, in case of Skanska Profit margin again can be considered as a key indicator that has the greatest impact on the ROE.

4.7.2 DuPont ROE of construction companies operated in Portugal

Detailed DuPont decomposition of ROE of Mota-Engil, a.s. for 2008-2018 is presented in ANNEX 7. Based on the results of DuPont decomposition was developed Table 28.

Table 28 Summary result of DuPont ROE of Mota-Engil, a.s. for period 2008-2018. Source: author

Mota-Engil	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage		+	+	+			+		+		5
ROA	+				+	+		+		+	6
Total Assets		+		+			+				3
Equity			+						+		2
Profit margin	+				+	+		+		+	5
TAT											0

As a result of pyramidal decomposition of ROE of the company Mota-Engil, a.s. for 2008-2018 years was found that return of equity of the company is 40% depends on the variation of ROA and 60% on Financial Leverage. The change in return on assets according to the results presented in the Table is under significant influence of Profit Margin.

Detailed DuPont decomposition of ROE of Teixeira Duarte, a.s. for 2008-2018 is presented in ANNEX 8. Based on the results of DuPont decomposition was developed summary Table 29.

Table 29 Summary result of DuPont ROE of Teixeira Duarte, a.s. for period 2008-2018. Source: author

Teixeira Duarte	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage	+			+				+			4
ROA		+	+		+	+	+		+	+	7
Total Assets				+							1
Equity	+							+			3
Profit margin		+	+		+	+	+		+	+	7
TAT											0

As a result of pyramidal decomposition of ROE of the company Teixeira Duarte, a.s. for 2008-2018 years was found that return of equity of the company is 60% depends on the variation of ROA and 40% on Financial Leverage. The change in return on assets mostly is influenced by Profit Margin.

Detailed DuPont decomposition of ROE of Gabriel Couto for 2008-2018 is presented in ANNEX 9. Based on the results of DuPont decomposition was developed Table 30.

Table 30 Summary result of DuPont of ROE of Gabriel Couto for period 2008-2018. Source: author

Gabriel Couto	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage		+	+	+			+	+	+		7
ROA	+				+	+					3
Total Assets		+		+							3
Equity			+				+	+	+		4
Profit margin	+				+	+					3
TAT											

As a result of pyramidal decomposition of ROE of the company Gabriel Couto for 2008-2016 years was found that return of equity of the company is 40% depends on the variation of ROA and 60% on Financial Leverage. The change in Financial Leverage depends on both Equity and Assets. The change in return on assets according to the results presented in the table is dependet from change of Profit Margin.

Detailed DuPont decomposition of ROE of Sacyr Somague for 2008-2018 is presented in ANNEX 10. Based on the results of DuPont decomposition was developed Table 31.

Table 31 Summary result of DuPont of ROE of Sacyr Somague for period 2008-2018. Source: author

Sacyr Somague	**2008/ 2009**	**2009/ 2010**	**2010/ 2011**	**2011/ 2012**	**2012/ 2013**	**2013/ 2014**	**2014/ 2015**	**2015/ 2016**	**2016/ 2017**	**2017/ 2018**	
Fin Leverage	+				+				+		3
ROA		+	+	+		+	+	+		+	8
Total Assets					+				+		2
Equity	+										1
Profit margin		+	+	+		+	+	+		+	7
TAT											0

According to DuPont of ROE of Sacyr Somague on the change in ROE of the company mostly affect by change of ROA. The change in return on assets according to the results presented in the table is under significant influence of Profit Margin.

Detailed DuPont decomposition of ROE of Martifer Group for 2008-2018 is presented in ANNEX 11. Based on the results of DuPont decomposition was developed Table 32.

Table 32 Summary result of DuPont of ROE of Martifer Group for period 2008-2018. Source: author

Martifer Group	2008/ 2009	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015	2015/ 2016	2016/ 2017	2017/ 2018	
Fin Leverage		+	+	+		+	+		+	+	7
ROA	+				+			+			3
Total Assets		+	+	+		+	+				5
Equity									+	+	2
Profit margin	+				+			+			3
TAT											0

According to data obtained in Table 32, changes in the return of equity of Martifer Group are most influenced by changes in the value of return on assets. Changes in the value of Financial Leverage, and caused by a change in Total Assets indicator.

According to calculations, in 8 out of 10 studied companies the change in the ROA has the greatest effect on the change in the ROE. The change in ROA at the same time is in direct significant dependence on changes in Profit Margin. However, it is necessary to make an amendment, and note the need for DuPont alignment in each specific case. With DuPont decomposition of the ROE of the companies Gabriel Couto and Martifer Group it was found that the influence of financial leverage exceeds the power of influence of the ROA.

4.8 Determination of dependence of profitability indicators with indicators of the external environment using Correlation Analysis

After determining the key financial indicator - Profit Margin, it is necessary to determine the relationship of this indicator with the external environment. In order to identify the relationship of external indicators and Profit Margin was applied correlation analysis.

In modern world practice, correlation analysis has become widespread in the prediction of enterprise bankruptcy. Eduardo Acosta-Gonzalez and ets. (2017) in their study about influence of macroeconomic factors on the probability of bankruptcy of enterprises in the construction sector of the Spanish economy confirmed that a model that contains both financial indicators and macroeconomic ones has a greater predictive ability than models that do not take into account macroeconomic factors [125]. I. Honkho in the article “Bankruptcy of new enterprises: an empirical analysis using a multiplicative risk description model” states that the economic indicators characterizing the industry in which the enterprise operates can also affect the probability of bankruptcy of enterprises. The model used indicators of the geographical concentration of the industry and the probability of bankruptcy of the industry as a whole [126]. Anderson, Sweeney & Williams (1990) noted that correlation is high when its value is above 0,6-0,7 [127].

4.8.1 Correlation analysis between macroeconomic indicators and Profit Margin of construction companies operated in the Czech Republic

Table 33 Pearson Correlation of macroeconomic indicators and Profit Margin of construction companies operated in the Czech Republic for period 2008-2018. Source: author

	FSI	EDI	GDP	IR	UR	EFI	PGR	HDI	EII	GII	SLI
Metrostav, a.s.	0,61	-0,57	0,43	0,15	0,53	-0,71	0,50	-0,80	0,77	-0,59	0,09
Hochtief, a.s.	-0,19	-0,12	-0,14	-0,02	-0,52	0,42	-0,03	0,43	-0,51	0,04	0,31
OHL ŽS, a.s.	0,20	-0,12	0,49	0,32	0,61	-0,70	0,24	-0,67	0,57	0,19	-0,39
Skanska, a.s.	0,31	0,11	0,05	0,17	-0,34	-0,18	0,71	-0,26	0,07	0,72	-0,60
Strabag, a.s.	0,65	0,21	0,30	0,01	0,06	-0,05	-0,04	-0,09	0,40	-0,10	-0,33

As a result of the correlation analysis, no significant relationship was found between economic indicators and the profit margin of the selected construction companies operating in the Czech Republic. The results can be explained by external factors. In 2015, the European Union allocated funds to the country's construction industry. As it was already revealed in the financial analysis, after receiving funds from the European budget in the Czech construction industry, there was a sharp increase in profitability. In 2016, after two years of growth, production of the construction industry fell by 5,9% year-on-year. This unfavorable result was influenced mainly by the unpreparedness of new projects and also by the higher comparative base of 2015, when intensive construction was driven by an effort to draw down subsidies from EU funds.

To confirm or refute this assumption, a correlation analysis of the dependence of macroeconomic indicators up to 2015 was performed. The calculation results are presented in Table 34.

Table 34 Pearson Correlation of macroeconomic indicators and Profit Margin of construction companies operated in the Czech Republic for period 2008-2015. Source: author

	FSI	EDI	GDP	IR	UR	EFI	PGR	HDI	EII	GII	SLI
Metrostav, a.s.	0,93	-0,49	0,73	0,10	-0,03	-0,46	0,70	-0,66	0,76	-0,47	-0,47
Hochtief, a.s.	0,39	-0,18	0,42	0,28	-0,70	0,26	0,09	0,35	-0,76	-	0,26
OHL ŽS, a.s.	0,77	-0,33	0,72	0,33	-0,11	-0,70	0,39	-0,76	0,94	-	-0,44
Skanska, a.s.	0,64	-0,39	0,66	0,26	-0,39	-0,56	0,78	-0,71	0,40	-	-0,80
Strabag, a.s.	0,38	0,25	0,29	0,40	-0,55	-0,02	-0,17	-0,10	0,51	-0,01	-0,10

According to the results of the correlation analysis presented in table 34 for the majority of the reviewed construction companies, there is a significant correlation between the profit of enterprises with political, economic and social factors. Regarding economic factors, a direct significant relationship was found between GDP and Profit Margin of companies Metrostav, a.s., OHL ŽS, a.s., Skanska, a.s.

4.8.2 Correlation analysis between macroeconomic indicators and Profit Margin of construction companies operated in Portugal

Table 35 Pearson Correlation of macroeconomic indicators and Profit Margin of construction companies operated in Portugal for period 2008-2018. Source: author

	FSI	EDI	GDP	IR	UR	EFI	PGR	HDI	EII	GII	SLI
Mota-Engil	0,16	0,10	0,31	0,25	-0,71	0,17	0,69	-0,60	0,01	-0,21	-0,58
Teixeira Duarte	0,00	-0,04	0,75	0,72	-0,39	0,10	-0,45	0,47	0,04	0,94	0,27
Gabriel Couto	0,12	-0,78	0,74	0,09	-0,42	0,34	0,35	-0,25	-0,31	1,00	-0,28
Sacyr Somague	0,29	-0,18	0,77	0,11	-0,62	0,30	0,89	-0,81	0,13	-1,00	-0,04
Martifer Group	0,02	0,12	0,60	0,19	-0,52	0,24	0,75	-0,59	-0,01	-0,26	-0,55

The results of the correlation analysis of macroeconomic indicators with the profitability indicators of construction companies operating in Portugal generally correspond to the results of the correlation analysis of companies in the Czech Republic. A significant correlation was found between the Profit Margin of construction companies with the political, economic and social factors. In Portugal, in addition to the direct significant relationship between GDP and Profit Margin a direct significant negative relationship was found between Unemployment Rate and Profit Margin.

Despite some differences in the relationship between macroeconomic indicators and financial indicators of companies, there is a general dependence of the changes in the financial status of both the Portuguese companies and the Czech companies on the changes in the economic indicators of countries. The most significant relationship was found between Profit Margin and GDP.

The lowest dependence of the profitability of Czech companies was found from the Economic Decline Indicator and Environmental Performance Index. Portuguese construction firms were more depends on external factors, which can be explained by the less stable situation in the country. As the country cannot invest a lot of money in the development tehnlogogy, the lowest correlation was revealed the company's financial condition from the technical factors.

4.9 Evaluation of the effectiveness of the model – EVA model

Stern Stewart & Co, the New York – based consulting group noted that EVA provides a better predictor of market value due to systematically linked to market value. Investors capitalize positive EVA at much higher multiples than negative EVA. Positive EVA is a sign of future improvement, but negative EVA reduces market value. Moreover, big companies that do not generate positive EVA now are less and less likely to generate any EVA improvement in the future. EVA improvement provides a powerful tool for understanding the investor expectations that are built into a company's current stock price [128]. Kollar et al. (2014) in their study noted that EVA is one of the most effective and important measures of business performance, management and financial system. According to Kollar et al. EVA method is a relatively simple approach compared with other evaluation criteria with the possibility of complex application of this indicator in the control system [129]. In 2016, by the example of Polish companies, Kamieniecki also conducted a comparative analysis of the methods for evaluating the effectiveness of companies. According to his research EVA values are changing in the same direction as indicators of current operational efficiency – income from sales, earnings per share, ROE and ROA and gives a more thorough and accurate assessment of the effectiveness of the company [130].

Evaluation of effectiveness:

$$EVA = (ROE - Re) * E \tag{41}$$

$$EVA = (ROA - WACC) * A \tag{42}$$

Where ROE – Return on Equity, ROA – Return on Assets, WACC - Weighted Average Cost of Capital, Re - Cost of Equity, E – Equity, A - Assets.

According to formula 41 and 42, EVA value has a direct correlation on the value of ROE, as a result, by calculating EVA value we can determine in what financial condition is the company, and what actions need to be applied, if necessary, to improve its effectiveness.

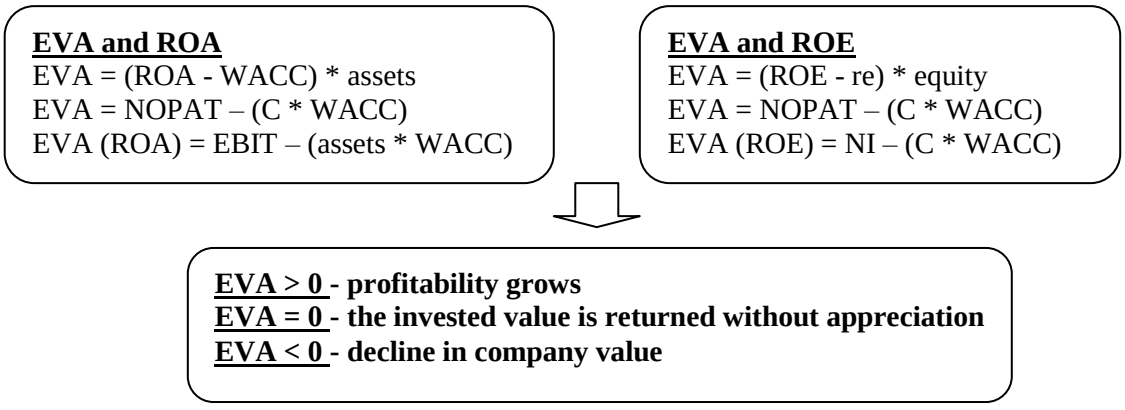


Fig. 7 Methods of calculation of EVA. Source: author

Where:

$$WACC = Rd * (1 - t) * \frac{D}{C} + Re * \frac{E}{C} \quad (43)$$

Where Rd - Cost of interest-bearing debt taking into account the tax shield, t - Income tax rate in % multiplied by 1/100, D - interest-bearing debt capital, C – Capital (Equity + long-term credit debt), Re - Cost of Equity, E - Equity.

If EVA > 0, it means that the company creates added value and the company achieves a higher yield than the required minimum yield. If EVA = 0, it means that the company does not add value but also does not lose value. If EVA < 0, it means that the company is losing value. Although the company can achieve accounting profits, it will be smaller than the income expected by owners so owners could achieve a higher appreciation at the same risk on the capital market.

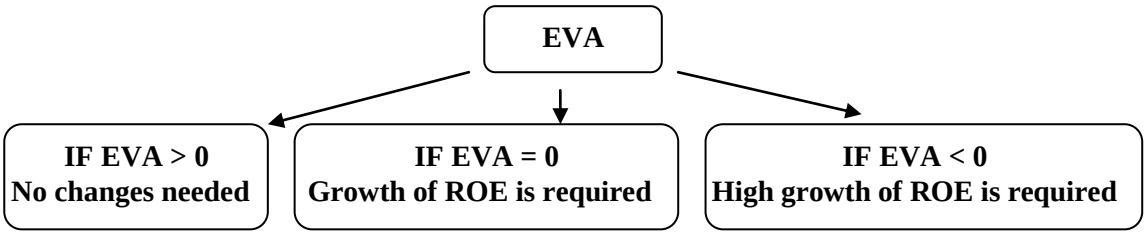


Fig. 8 Recommendations for further development according to EVA. Source: author

4.10 Model of financial management of company

In order to make possible to use the results of research in practice it is necessary to systematize the results obtained, to bring them into a common model, to create a methodology for their implementation, to formulate tasks and steps. It is necessary to develop recommendations for the application of the model with a description of each step and an explanation of the results obtained (Fig.9).

The created model of financial management of company consists of four main blocks:

- Preparatory section;
- Analysis of the external environment;
- Analysis of the internal environment;
- Strategic planning;
- Evaluation of the effectiveness of decisions.

Each block (section) is composed of steps.

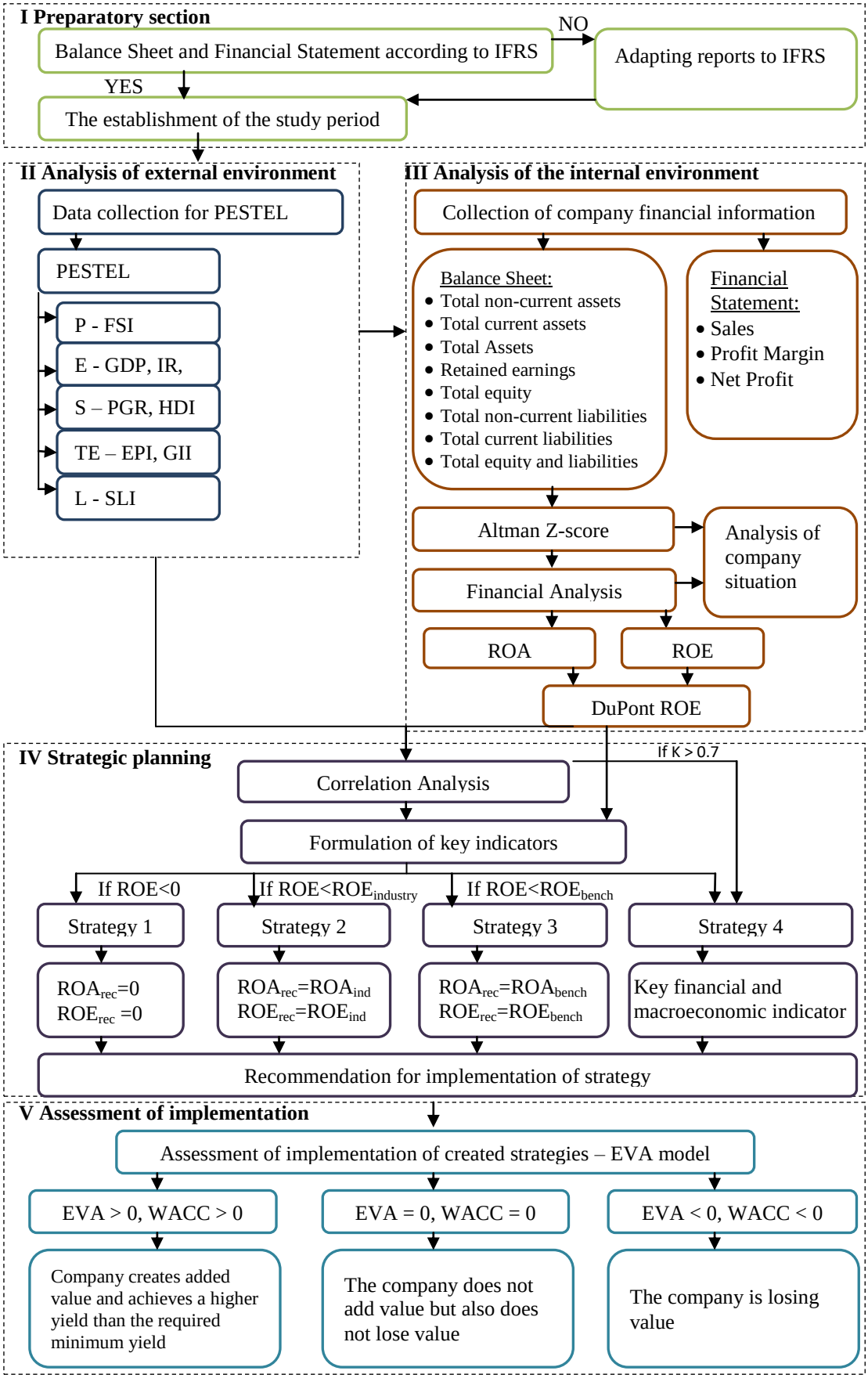


Fig. 9 Created model of financial management. Source: author

Preparatory section

This part is intended to collect data necessary for further use of the model. Data is collected from the Balance Sheet and Financial Statement, which are presented in the annual reports of companies. The annual reports are presented on the official websites of companies or on the websites of the ministry of the country, where a common catalog of annual reports of companies operating in the country are presented, for example in the Czech Republic it is justice.cz, in Portugal SABI.pt.

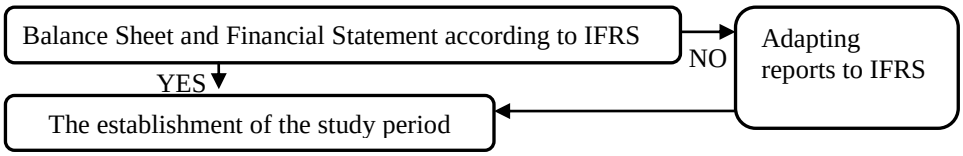


Fig. 10 Preparatory section of created model of financial management. Source: author

1 step. Determination of the possibility of using the model

Firstly it is necessary to check whether it is possible to apply the model in a specific case. It is necessary to check whether financial reports (Balance Sheet and Financial Statement) are formed according to IFRS Standards or in accordance with the norms and laws of the country as Czech Account Standarts in the Czech Republic in this case. In that case, if not, then it is necessary to check the possibility of adapting reports according to IFRS Standards.

2 step. The establishment of the study period

It is necessary to determine which reporting period will be investigated in a particular case. The most full-fledged analysis of the activities of the company is the analysis from the moment of the appearance of the company. A sufficiently high accuracy of the results obtained is achieved when calculating indicators for a period of 10 years or more, the minimum period is 3 years, it is recommended to be used only in extreme cases, since the reliability for predicting further development of such results will be extremely small. However, the process of collecting information over a long period is complicated and sometimes impossible. In addition, as shown by studies of 10 selected companies, in general, the dynamics of changes in indicators is repeated every 4-5 years. Thus, the optimal period for which you can assess the dynamics of changes in the indicator and make the process of collecting information less time consuming is 5 years.

Analysis of the external environment

At this part, it is necessary to analyze the external environment in which the company operates. One of the most popular and successful methods is PESTEL analysis. PESTEL analysis describes a framework of macro-environmental factors used in the environmental scanning component of strategic management. It is a part of the external analysis when conducting a strategic analysis or doing market research, and gives an overview of the different macro-environmental factors that the company has to take into consideration.

A PESTEL includes Political, Economic, Social, Technological, Environmental and Legal factors. PESTEL analysis is important part of creation and implementation of a strategy of company and should be regularly repeated to identify changes in the macro environment.

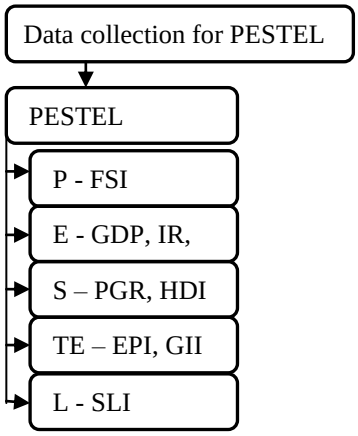


Fig. 11 Analysis of the external environment section of created model of financial management. Source: author

3 step. Data collection for PESTEL analysis

PESTEL contains 9 indicators which are divided into 5 groups. However, the number of indicators can be changed, depending on the conditions and tasks, their number can be reduced or additional factors can be added.

Table 36 PESTEL analysis. Source: author

	Year 1	Year 2	Year 3	Year 4	Year 5
Political					
Fragile States Index (FSI)					
Economic					
GDP per capita					
Inflation rate (IR)					
Unemployment Rate (UR)					
Social					
Population growth rate (PGR)					
Human development index (HDI)					
Technical and Environmental					
Environmental Performance Index					
Global Innovation Index (GII)					
Legal					
State Legitimacy Indicator (SLI)					

An important example of a political factor is Fragile States Index (FSI). This indicator shows states' vulnerability to conflict or collapse and scored on a scale of 0 to 10, where 0 being the lowest intensity (most stable) and 10 being the highest intensity (least stable). This indicator can be found in annual report published by the United States think tank the Fund for Peace and the American magazine Foreign Policy from 2005 to 2018, then by The New Humanitarian since 2019.

The main indicators of the economic situation in the country are GDP per capita, Inflation rate and Unemployment Rate, which are presented in the analytical sections of the official websites of the ministry of the country.

Next Social factor is Population growth rate (PGR) can be found on official websites of the ministry of the country. Another important social factor is Human development index (HDI), which contains life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development. The higher Human development index the better the social condition in the country.

Indicator of Technical factor is Global Innovation Index (GII) and shows the success in innovation in the country. The evaluation range is from 0 to 100, the higher the value of the indicator, the higher the level of innovative development. This indicator can be founded on website of INSEAD (World Intellectual Property Organization).

An important indicator of Environmental factor is Environmental Performance Index, which is presented on website of EUROSTAT. This indicator assesses environmental health and ecosystem vitality. The higher EPI score better environmental health and ecosystem vitality. The evaluation range is from 0 to 100.

The State Legitimacy Indicator considers the representativeness and openness of government and its relationship with its citizenry. The Indicator takes into account openness of government or conversely the levels of corruption, profiteering, and marginalizing. The Indicator also considers the ability of a state to exercise basic functions that infer a population's confidence in its government and institutions. This indicator can be found in annual report published by the United States think tank the Fund for Peace and the American magazine Foreign Policy.

4 step. PESTEL analysis

At this stage, it is necessary to make an analysis of the situation in the country, assess the dynamics of changes in macroeconomic indicators during the selected period, and determine the political and economic stability in the country and the level of favorable business. Depending on the dynamics of changes in indicators during the period under review, the overall situation is assessed: favorable or not favorable.

Analysis of the internal environment

After analyzing and evaluating the external business environment, it is necessary to proceed to the analysis of the internal environment of the company, its financial position. It is necessary to find out whether the company's financial information is freely available, if not, find out if the company is ready to provide this information.

The purpose of this research is to study the activities of large companies, which provide all the necessary information on their website, but experience has shown that not all companies adhere to this policy. While collecting detailed financial information of large companies operating in the Czech Republic did not provide any problems, in Portugal not all large companies managed to obtain this information.

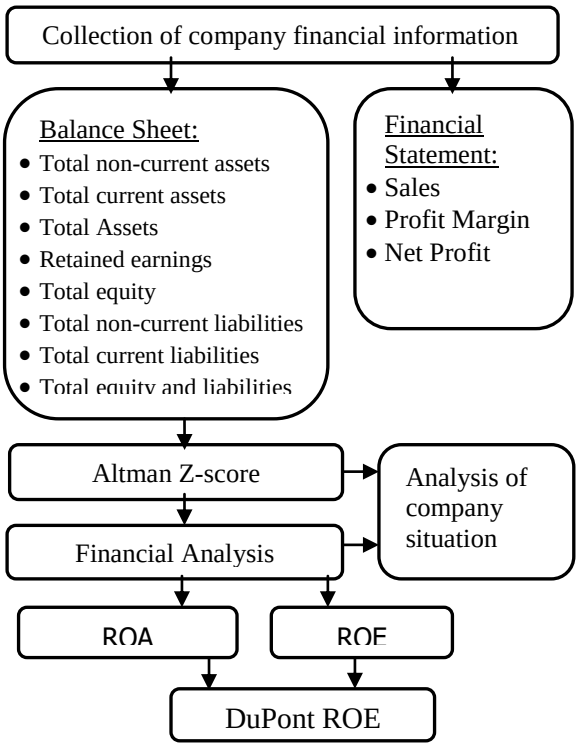


Fig. 12 Analysis of the internal environment section of created model of financial management. Source: author

5 step. Collection data for calculation of the Altman Z-score

Data required for further calculations, which is presented in Table 37 should be selected from Balance Sheet and Financial Statement.

Table 37 Data selected from Balance Sheet and Financial Statement. Source: author

Balance Sheet	Financial Statement
• Receivables • Total current assets • Total Assets • Retained earnings • Total equity • Total non-current liabilities • Total current liabilities	• Sales • Net Profit

6 step. Collection data for ROE calculation and DuPont decomposition

In addition to the information presented in step 5, the following information should be selected from Balance Sheet and Financial Statement.

Table 38 Data selected from Balance Sheet and Financial Statement. Source: author

Balance Sheet	Financial Statement
• Receivables • Total current assets • Total non-current assets • Total Assets • Retained earnings • Total equity • Total non-current liabilities • Total current liabilities	• Sales • Total costs • Net Profit

7 step. Calculation of Altman Z-score

This step is intended for a quick check of the risk of bankruptcy of the enterprise. This analysis is performed automatically in Excel based on financial data entered on the 5 step by using formulas presented in chapter 3.4.3.2 page 32.

8 step. Analysis of the result of Altman Z-score

Depending on the results obtained, the financial situation of the company can be determined:

- Z > 2,99 - Safe Zone - company is financially stable;
- 1,81 < Z < 2,99 - Grey zone - financial situation of the company is satisfactory, but there is a risk of deterioration;
- Z < 1,81 - Distress Zone - financial situation of the company is financially not stable, company is close to bankruptcy.

The result is a conclusion on the financial condition of the company: *financially stable*, *financially satisfactory*, *financially not stable***.**

9 step. Calculation of profitability ratios

The next step is to calculate the return on assets (ROA) and the return on equity (ROE) of the company. The calculation of ROE and ROA is carried out in accordance with the formulas in chapter 3.4.2. The data obtained must be entered into the Table 39.

Table 39 ROA, ROE of a company. Source: author

Profitability Ratios	Year 1	Year 2	Year 3	Year 4	Year 5
Return on Assets (ROA)					
Return on Equity (ROE)					

10 step. Analysis of profitability ratios

After getting results of calculation it is neccessery to analyze the dynamics of changes of ROA and ROE during period under consideration.

A comprehensive assessment of ROA and ROE changes is needed:

1) If the values of ROA and / or ROE are negative, this indicates that the company is unprofitable and incurs losses. In this case, urgent measures are needed to improve the financial condition of the company.
2) If the values of ROA and / or ROE are equal to zero, this also indicates that the efficiency of the company is zero. The company does not incur losses, but also does not make a profit. Measures are required to improve company performance.
3) If the values of ROA and / or ROE are above zero, this indicates that the company's profit exceeds its costs, however, the dynamics of changes in the ratios of coefficients should be analyzed:
   a) Stable growth in profitability indicators indicates an increase in the efficiency of the company;
   b) Steady decline in profitability shows a decline in the efficiency of the company, which may be caused by a decrease in profits and rising costs;
   c) A sudden change in indicators during the period under review is a negative factor characterizing the lack of financial stability in the company.

11 step. Comparison of profitability of the company with the average profitability of the industry

In order to determine the position of the company relative to its competitors, it is necessary to compare profitability of the company with an average value of the sector profitability indicators in the country, which can be found in the analytical sections of the official websites of the ministry of the country.

Table 40 Overall ROA and ROE for construction industry in the country. Source: author

Profitability Ratios	Year 1	Year 2	Year 3	Year 4	Year 5
Return on Assets (ROA)					
Return on Equity (ROE)					

If the values of the profitability ratios of the company in Table 39 are less than the average values of profitability in the country in Table 40, this indicates a weak competitiveness of the company. The company needs to set a goal to increase the profitability of companies to above the average values of profitability in the country.

12 step. DuPont ROE. Logarithmic method

The result of this step is to determine the key parameter that has the greatest impact on company profitability. Since from the ROE decomposition, it is clear that ROA is a part of ROE, it is only necessary to perform the DuPont decomposition of ROE.

The ROE decomposition is made in three levels.

- ROE is divided into two components of Financial Leverage and ROA;
- Financial Leverage is decomposed on Total Assets and Equity;
- ROA is decomposed into Profit Margin and Total Assets Turnover.

Using the method of logarithmic calculations, an indicator should be determined that has the greatest impact on the return on equity. The selected indicator will be a key indicator in this particular case.

Strategic planning

Section is aimed at shaping the strategy for the further development of the enterprise. Strategies are developed based on the results obtained in step 10 and step 13. It is necessary to develop 4 strategies for the further development of the financial condition of the company, depending on its existing financial situation:

1 strategy: if ROE<0 – goal of the strategy to take action to achieve equality $ROA_{rec}=0$ and $ROE_{rec}=0$

2 strategy: if $ROE<ROE_{industry}$ – goal of the strategy to take action to achieve equality $ROA_{rec}=ROA_{ind}$ and $ROE_{rec}=ROE_{ind}$

3 strategy: if $ROE<ROE_{bench}$ – goal of the strategy to take action to achieve equality $ROA_{rec}=ROA_{bench}$ and $ROE_{rec}=ROE_{bench}$

4 strategy: if Correlation coefficient > 0,7 – goal of the strategy to take action to achieve equality $ROA_{rec}=ROA_{bench}$ and $ROE_{rec}=ROE_{bench}$

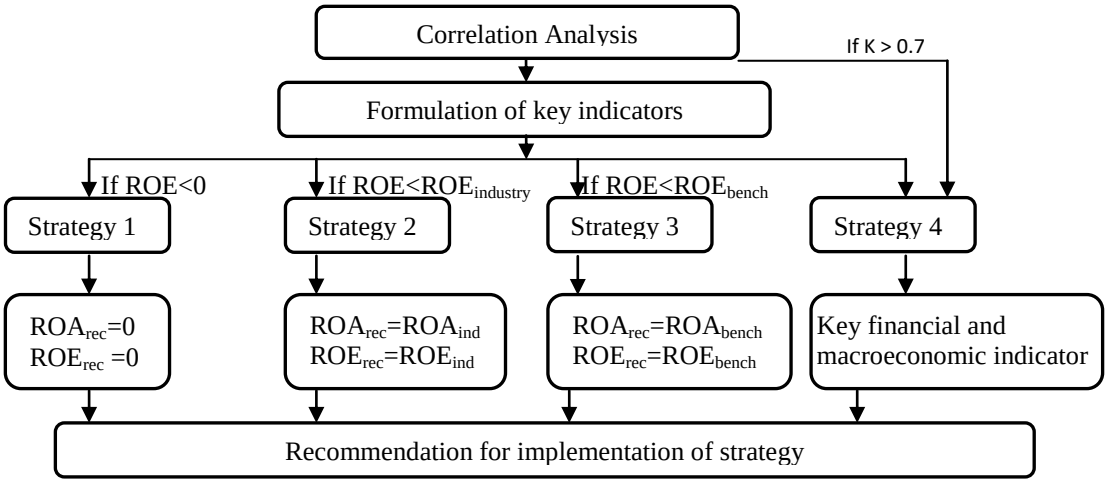


Fig. 13 Strategic planning section of created model of financial management. Source: author

After the strategies are formulated and selected, it is necessary to test them and choose the final strategy, which will be implemented.

13 step. Correlation analysis

At this stage, the need to develop 4 strategies is identified by identifying the relationship between macroeconomic indicators presented in Table 36 in step 3 and the key financial indicator of the company from step 2. The calculation of the correlation coefficient is performed in Excel.

- If the correlation coefficient is higher than 0,7 the relationship between the key indicator and the macroeconomic indicator is direct significant.
- If the correlation coefficient is below -0,7 the relationship is negative significant.
- If the correlation coefficient between -0,7 and 0,7 relationship is insignificant.

If relationship is direct significant or negative significant, the need for a fourth strategy is confirmed. If relationship is insignificant 4th a strategy is not developed.

14 step. Data preparation for the formation of 1-3 strategies

At this stage, it is necessary to collect data to develop three strategies. Table 41 is a DuPont of ROE presented in tabular form. The data for creating the table is taken from the Balance Sheet and Financial Statement as specified in step 5 and step 6. The table is calculated in Excel.

Table 41 Result of calculation of the 1 strategy. Source: author

Indicators	Year1	Year2	Year3	Year4	Year5
ROE (EAT/E), %					
ROA (EAT/A), %					
Financial leverage (A/E), %					
Profit margin (EAT/S), %					
Total asset turnover (S/A), %					
Total Assets (A), 10^3 Euro					
Equity (E), 10^3 Euro					
Net income (EAT), 10^3 Euro					
Sales (S), 10^3 Euro					
Total cost (TC)					
Fixed Assets					
Total Cost, 10^3 Euro					

15 step. Tasks formulation

The question arises, what is the recommended value of the key indicator?

First of all, profitability should not be negative. If ROE <0 it means that the company does not receive profit. Moreover, the company has a risk of bankruptcy. It is necessary urgent measures to improve the financial condition, taking the company out of the risk zone. To determine the recommended value of ROE it is necessary to use the method of benchmarking. If the company's profitability is lower than the average industry profitability in a country, this means that the company loses to its competitors in the country. Thus, the recommended values of the company's profitability ratios should not be lower than the national average. However, industry data is generalized; there is no separation by size of companies. The average value of ROE of large, medium and small enterprises may differ, therefore it is necessary to analyze and calculate the average value of similar companies of competitors. Then the recommended ROE value of the company under study should not be lower than the average profitability of competing companies.

Possible recommended scenarios for the company:

1) ROE > 0
2) ROE > ROE_{ind}
3) ROE > ROE_{conc}

16 step. Business preservation strategy - 1 strategy

The first condition is financial sustainability when ROE > 0.

Since profitability must be greater than zero, the extreme possible values of the initial indicators are when ROE = 0. According to DuPont, the value of profitability can be zero when Financial Leverage or ROA is zero. However, since Financial Leverage, according to the source data, cannot take a zero value, suppose ROA is zero.

$$ROA = \frac{Net\ Income}{Total\ Assets} \tag{44}$$

According to formula (44) when ROA = 0 then Net Income = 0,

$$Net\ Income = Sales - Total\ Cost \tag{45}$$

If Net Income = 0, so Sales = Total Cost.

Thus, the first condition - company will have profit if Sales > Total Cost.

Note: This step should be applied only if the return on equity is negative. This stage is aimed at preserving the business, avoiding bankruptcy and liquidating the company.

17 step. Business development strategy - 2 strategy

The goal of any company is to increase competitiveness, and hence the financial position of the company, therefore, the recommended profitability of the company should not be lower than the profitability of its competitors.

The essence of this strategy lies in the fact that the recommended value of the company's profitability is the average profitability of the industry in the country. If ROE < ROE_{ind}, then ROE_{ind} can be taken as the recommended value.

$$ROA_{rec}=ROA_{ind}\ and\ ROE_{rec}=ROE_{ind}$$

Where rec – recommended, ind – industry.

On the basis of the recommended values of profitability it becomes possible to calculate the recommended Net Income$_{rec}$ and Equity$_{rec}$.

$$Net\ Income\ rec = ROAind\ * Total\ Assets \quad (46)$$

$$Equity\ rec = \frac{Net\ Income}{ROEind} \quad (47)$$

18 step. Business development strategy - 3 strategy

Since the average data in industry reports are summarized without dividing companies by size, the results may not be reliable enough. Therefore it is necessary to conduct a comparative analysis of similar companies - benchmarking method. Analyze the results of the financial activities of companies similar in size, revenue, number of employees, operating in one area and in one country.

Provided that ROE < ROE$_{bench}$ accept ROE$_{bench}$ for the recommended value.

$$ROA_{rec}=ROA_{bench}\ and\ ROE_{rec}=ROE_{bench}$$

Where rec – recommended, bench – benchmarking.

On the basis of the recommended values of profitability it becomes possible to calculate the recommended Net Income$_{rec}$ and Equity$_{rec}$.

$$Net\ Income\ rec = ROAbench\ * Total\ Assets \quad (48)$$

$$Equity\ rec = \frac{Net\ Income}{ROEbench} \quad (49)$$

19 step. Creating a strategy 4

Since company managers are not able to influence macroeconomic indicators, knowing the dependence of the company's financial condition on external factors and predicting the further development of macroeconomic indicators, they can regulate the company's financial stability.

This stage is developed only if the correlation coefficient is above 0,7 or less than -0,7. After identifying key macroeconomic indicators at step 13, and identifying its relationship with the internal financial indicator identified at step 6, it is necessary to develop a strategy that will allow for predicting a possible further change in the internal indicator and will make it possible to temporarily take measures for possible negative changes.

Knowing the dependence of the indicators, as well as the predicted values of macroeconomic indicators for future years, which can be found from the EUROSTAT analytical section, it is possible to calculate the expected values of the internal key indicator.

Let the internal key indicator be X, the macroeconomic indicator identified in the correlation analysis is Y, the correlation coefficient is K, then the predicted key indicator X$_{pred}$ can be calculated as:

$$Xpred = K * Y \quad (50)$$

<u>Evaluation of the effectiveness of decisions</u>

This section is intended to test the effectiveness of the developed strategies using the EVA model, discussed in chapter 3.7.1 and select the most suitable one, to develop measures to achieve the goal of the chosen strategy.

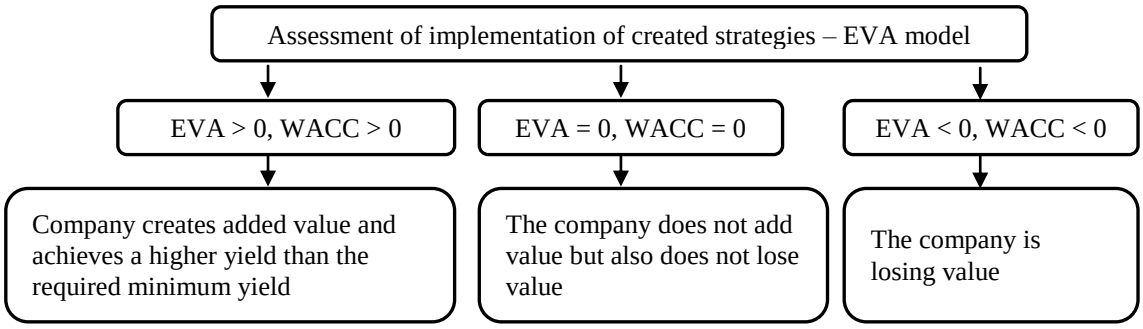


Fig. 14. Evaluation of the effectiveness of decisions section of created model of financial management. Source: author

20 step. Assessment of implementation of created strategies. EVA model. Data collection

As noted in chapter 3.7.1 the EVA model is used to assess the effectiveness of the strategies.
There here are several ways to calculate EVA:

$$EVA = (ROE - Re) * Equity \quad (51)$$

$$EVA(ROE) = Net\ Income - (Capital * WACC) \quad (52)$$

Where ROE - Return on Equity, Re - Cost of Equity, WACC - Weighted Average Cost of Capital.

According to formula (52) EVA has inverse linear relationship with WACC. There may be three situation for WACC, when WACC > 0, WACC = 0 and WACC < 0. The negative WACC indicates the effective work of the organization's management, as the organizations receive economic profit. The WACC value within the limits of changes in return on assets from zero to the value of industry average values indicates that the business is profitable, but not competitive. The WACC indicator, which exceeds the average industry profitability of assets, indicates a loss-making business.

Thus, the organization makes a profit when ROE>WACC.

In this case, consider the extreme acceptable situation where the company does not incur losses, but does not make a profit, this is possible when WACC=ROE. From this condition, the maximum possible value of Re can be calculated, up to which the company generates a profit.

$$WACC = Rd * (1 - t) * \frac{D}{C} + Re * \frac{E}{C} \quad (53)$$

According to formula (53) and provided that WACC=ROE the formula for calculating R_e is as follows:

$$Re = \left(WACC - Rd * (1 - t) * \frac{D}{C}\right) * \frac{C}{E} \quad (54)$$

Where Rd - cost of interest-bearing debt taking into account the tax shield, t - income tax rate in % multiplied by 1/100, D - interest-bearing debt capital, C – Capital (Equity + long-term credit debt), Re - Cost of Equity, E – Equity

To perform the necessary calculations to evaluate the calculations, first of all, it is necessary to collect all the necessary data and enter them into the Table 42.

Table 42 Data for calculating EVA. Source: author

Indicators	Year1	Year2	Year3	Year4	Year5
Before changes					
ROE (EAT/E), %					
Long-Term Debt, 10^3 Euro (D)					
Current Liabilities, 10^3 Euro(CL)					
Total Debt, 10^3 Euro (TD)					
Interesr Expences, 10^3 Euro (IE)					
Equity, 10^3 Euro (E)					
Capital, 10^3 Euro (C)					
Tax Rate (t)					
Pretax cost of debt (Rd)					

21 step. Test the effectiveness of the 1th strategy

The calculation results produced in Excel must be entered to the Table 43.

Table 43 Test the effectiveness of the 1th strategy. Source: author

Indicators	Year1	Year2	Year3	Year4	Year5
After changes					
ROE (EAT/E), %					
Long-Term Debt, 10^3 Euro (D)					
Current Liabilities, 10^3 Euro(CL)					
Total Debt, 10^3 Euro (TD)					
Interesr Expences, 10^3 Euro (IE)					
Equity, 10^3 Euro (E)					
Capital, 10^3 Euro (C)					
Tax Rate (t)					
Pretax cost of debt (R_d)					
Net Profit, 10^3 Euro					
Cost od Equity (R_e)					
EVA, 10^3 Euro					

By a result of EVA it is possible to determine the effectiveness of the strategy:

- If EVA > 0, it means that the company creates added value and the company achieves a higher yield than the required minimum yield - the effectiveness of the strategy confirmed;
- If EVA = 0, it means that the company does not add value but also does not lose value - depending on the initial situation the effectiveness of the strategy confirmed or not confirmed;
- If EVA < 0, it means that the company is losing value - the effectiveness of the strategy not confirmed.

22 step - 24 step. Test the effectiveness of the 2-4th strategy

Repeat procedure of 21 steps.

25 step. Development of strategy implementation tools

If all strategies have been effective, it is necessary to choose the strategy with the highest EVA value, or at the discretion of the company manager.

At this stage, after the formation of the goals of the strategies for the further development of the company, it is necessary to develop measures to achieve certain goals and objectives. This stage is developed by company managers, depending on the characteristics of the company, its capabilities, as well as the external environment in which the company operates.

5 TESTING THE MODEL ON TWO SELECTED CONSTRUCTION COMPANIES IN THE CZECH REPUBLIC AND PORTUGAL

In order to test the model were chosen companies located in the Czech Republic and Portugal. Two companies were analyzed, OHL ŽS, a.s. and Teixeira Duarte they have ones the worst financial ratios from all selected companies. The aim of this part is develop a further strategy to develop the financial situation of these companies.

5.1 Application of the financial management model by OHL ŽS, a.s.

1 step. Determination of the possibility of using the model

Balance Sheet and Financial Statement of company OHL ŽS, a.s. is formed according to Czech Account Standards. In this case, the application of the model is possible.

2 step. The establishment of the study period

Since all financial information is publicly available, the latest financial reports in the form of annual reports refer to 2018, the company's development over the 5 years 2014-2018 years is being studied.

3 step. Data collection for PESTEL analysis

After determining the period of the study period, proceed to the analysis of the external environment. PESTEL contains 9 indicators which are divided into 5 groups.

Table 44 PESTEL analysis of the Czech Republic. Source: author

	2014	**2015**	**2016**	**2017**	**2018**
Political					
Fragile States Index (FSI)	39,4	37,4	40,8	40,1	39,0
Economic					
GDP per capita	19,744	17,556	18,484	20,368	23,307
Inflation rate (IR)	0,4	0,3	0,7	2,5	2,2
Unemployment Rate (UR)	6,11	5,05	3,95	2,89	2,1
Social					
Population growth rate (PGR)	0,11	0,20	0,19	0,24	0,10
Human development index (HDI)	0,879	0,882	0,885	0,888	-
Technical and Environmental					
Environmental Performance Index (EPI)	-	81,47	73,5	67,68	67,68
Global Innovation Index (GII)	50,22	51,32	49,40	50,98	48,75
Legal					
State Legitimacy Indicator (SLI)	4,2	4,2	4,9	4,7	4,6

4 step. PESTEL analysis

According to Fragile States Index published by the Fund for Peace and the American magazine Foreign Policy an annual report during period 2014-2015 political situation in the Czech Republic was in more stable zone. During time 2016-2018 political stability slightly decreased, but still was in stable zone. Political situation in the Czech Republic has a high degree of stability and a low level of vulnerability to political unrest on the world stage. Despite the decline in GDP in 2015, the country's economy managed to raise GDP by 2018, which even exceeds the value of GDP in 2014. Despite the rise in inflation during the period under review, this growth is insignificant and stable. Inflation values do not go beyond the limits of Moderate Inflation, when price increase of less than 10% per year. A positive trend is observed with the decline in

unemployment. By 2018, the unemployment rate dropped by more than 2 times compared with the beginning of the period under review. The economy of the Czech Republic is distinguished by a high degree of stability. In addition, the Czech Republic was able to restore a stable economic situation after the impact of the economic crisis.

After analyzing the changes in indicators for the time in question, it can be argued with a high degree of probability that in the near future the economic development of the country will develop in a positive direction. The country managed to avoid the demographic crisis, and in addition to increase the Human development index. Despite the decline in the ranking by country relative to the Environmental Performance Index, the Czech Republic is among the 10 leaders in this indicator. This means that the Czech Republic has a high degree of environmental sustainability. State Legitimacy Indicator is an indicator of how easy or difficult it is to conduct business in a country, the lower the indicator (the maximum value is 10). State Legitimacy Indicator is the less there are restrictions on the part of the state and difficulties in managing business. This indicator includes the level of tax policy, the bureaucratic system and exercise of basic functions. Despite the fact that the value of this indicator for the period under review has increased, its value remains much less than the maximum value.

According to the results of PESTEL analysis can be concluded that the Czech Republic has a stable economic, political, social, environmental and legal situation in the country. Moreover, during the period under review, there is a uniform positive dynamics of changes in almost all indicators. Based on what can be argued that the country has a favorable environment for doing business.

5 step. Collection data for calculation of the Altman Z-score

From the data presented in the Balance Sheet and Financial Statement, the necessary data is entered in Table 45. Financial reports are presented in Annual Reports on justice.cz. All data presented in a currency other than EURO translate into EURO at the rate of the corresponding year in question.

Table 45 Financial data of OHL ŽS, a.s. for Altman Z-score (in EURO thousands). Source: author

Resource	Indicator	2014	2015	2016	2017	2018
Balance Sheet	Receivables	209 439	114 835	89 540	86 949	94 941
	Total current assets	264 577	210 939	124 957	117 587	137 789
	Total Assets	335 779	283 429	187 254	170 081	187 616
	Retained earnings	59 959	54 783	-3 173	-37 151	175
	Total equity	77 338	53 868	-4 088	43 922	42 825
	Total non-current liabilities	27 315	25 374	69 944	19 427	22 149
	Total current liabilities	231 126	204 187	121 398	106 732	122 642
Financial Statement	Sales	410 575	489 634	207 913	191 147	236 502
	Net profit	-11 884	-22 568	-57 975	-13 573	180

6 step. Collection data for ROE calculation and DuPont decomposition

From the data presented in the Balance Sheet and Financial Statement, the necessary data is entered in Table 46. Financial reports are presented in Annual Reports on justice.cz. All data presented in a currency other than EURO translate into EURO at the rate of the corresponding year in question.

Table 46 Financial data of OHL ŽS, a.s. for Altman Z-score (in EURO thousands). Source: author

Resource	Indicator	2014	2015	2016	2017	2018
Balance Sheet	Receivables	209 439	114 835	89 540	86 949	94 941
	Total current assets	264 577	210 939	124 957	117 587	137 789
	Total non-current assets	65 952	67 760	58 770	50 840	49 826
	Total Assets	335 779	283 429	187 254	170 081	187 616
	Retained earnings	59 959	54 783	-3 173	-37 151	175
	Total equity	77 338	53 868	-4 088	43 922	42 825
	Total non-current liabilities	27 315	25 374	69 944	19 427	22 149
	Total current liabilities	231 126	204 187	121 398	106 732	122 642
Financial Statement	Sales	410 575	489 634	207 913	191 147	236 502
	Total costs	10 002	4 037	288	525	347
	Net profit	-11 884	-22 568	-57 975	-13 573	180

7 step. Calculation of Altman Z-score

Table 47 Z-Score analysis of OHL ŽS, a.s. Source: author

OHL ŽS, a.s.	2014	2015	2016	2017	2018
Z-Score	2,38	2,66	0,40	1,46	2,12
Result	*Grey Zone*	*Grey Zone*	*Distress Zone*	*Distress Zone*	*Grey Zone*

8 step. Analysis of the result of Altman Z-score

According to data obtained in Table 47, Z-Score for OHL ŽS, a.s has been in higher levels of the grey zone for the period 2013-2015. However, in 2016, the Z-Score value fell sharply, reaching its critical value of 0,40. This means that in 2016, the company had a high risk of bankruptcy. Despite the company managed to bring financial position back to the grey zone by 2018 – unstable situation shows that the company is *financially unsatisfactory*. Risk of bankruptcy exists. It is necessary to set the task of taking action to return the stability of companies.

9 step. Calculation of profitability ratios

Table 48 ROA, ROE of OHL ŽS, a.s. Source: author

Profitability Ratios, %	2014	2015	2016	2017	2018
Return on Assets	-3,5	-8,0	-31,0	-8,0	0,1
Return on Equity	-15,4	-41,9	n/a	-30,9	0,4

10 step. Analysis of profitability ratios

Rentability of OHL ŽS, a.s. steadily declined since 2013 till 2016. In addition, from 2014 to 2017, ROE and ROA were negative. The company began to lose financial stability; the costs become much higher than profits. The negative profitability in 2016 indicates problems in the business - mainly in terms of the credit burden, as well as the sufficiency of highly liquid assets. Calculations of profitability caused by the results of the Z-Altman model that the company is in an extremely unstable financial situation.

11 step. Comparison of profitability of the company with the average profitability of the industry

Table 49 Overall ROA and ROE for construction industry in the Czech Republic. Source: author

Profitability Ratios, %	2014	2015	2016	2017	2018
Return on Assets	2,28	3,0	5,12	4,82	5,91
Return on Equity	5,97	5,87	8,47	7,2	9,13

According to comparative analysis of Table 48 and Table 49 the change in the company's profitability does not match the dynamics of change in the average profitability of the construction industry in the country. At that time, the company's profitability falls the industry average profitability is growing.

12 step. DuPont ROE. Logarithmic method

DuPont decomposition of ROE of OHL ŽS, a.s. for 2014-2018 years for each year in particular is presented in ANNEX 3. All results of DuPont decomposition are presented in one Table 50, where indicators that have the greatest impact on the company's return on equity in the corresponding years are indicated by a plus sign.

Table 50 Result of DuPont of ROE of OHL ŽS, a.s. for 2014-2018 years. Source: author

	2014/2015	2015/2016	2016/2017	2017/2018
Fin Leverage				+
ROA	+	+	+	
Total Assets				
Equity				
Profit margin	+	+		
TAT			+	+

According to the DuPont decomposition, ROA has the greatest impact on ROE in the period under review at the first decomposition level, and further ROA has revealed the greatest significance of the Profit Margin indicator. However, despite the more significant impact of Profit Margin on ROE, according to DuPont decomposition Profit Margin should be considered in the system with Assets and Equity.

13 step. Correlation analysis

Table 51 Pearson Correlation OHL ŽS, a.s. Source: author

	GDP	IR	UR
Profit Margin	-0,34	-0,3	-0,03

According to correlation analysis presented in Table 51 there is no significant link between the macroeconomic indicators and the key financial indicator Profit Margin. The development of 4 strategies is impossible.

14 step. Data preparation for the formation of 1-3 strategies

For a visual representation of the establishment of the course for the further development of the company, we will present DuPont ROE in tabular form (Table 52).

Table 52 Data for 2-4 strategy OHL ŽS, a.s. Source: author

Indicators	2014	2015	2016	2017	2018
ROE (EAT/E), %	-15,37	-41,89	n/a	-30,90	0,4
ROA (EAT/A), %	-3,54	-7,96	-30,96	-7,98	0,1
Financial leverage (A/E), %	4,34	5,26	-45,80	3,87	4,38
Profit margin (EAT/S), %	-2,89	-4,61	-27,88	-7,10	0,08
Total asset turnover (S/A), %	1,22	1,73	1,11	1,12	1,19
Total Assets (A), 10^3 Euro	335 779	283 429	187 254	170 081	187 616
Equity (E), 10^3 Euro	77 338	53 868	-4 088	43 922	42 825
Net income (EAT), 10^3 Euro	-11 884	-22 568	-57 975	-13 573	175
Sales (S), 10^3 Euro	410 575	489 634	207 913	191 147	236 502
Fixed Assets	71 202	72 490	62 296	52 495	49 826
Total Cost, 10^3 Euro	422 459	512 202	265 888	204 720	236 327

The minimum profitability during the period under review is observed in 2016. According to DuPont, this can be explained by the minimum values of profit, when the company did not generate profit.

15 step. Tasks formulation

It is necessary to develop three strategies for the development of the financial condition of the company:

1. When the company does not make a profit, but there is no loss either, that is, ROA = 0 and ROE = 0, however, these values are much lower than the average for the country and the average profitability of competitors, so go to the next item.
2. The average values in the industry in the country over the period under review exceed the company's profitability over the period under consideration; therefore we take these values as recommended and develop the first development strategy.
3. The profitability of the company for the period under review is significantly lower than the average capital profitability in the industry. Thus, we take the value of the average capital return in the industry for the period 2013-2017 for the recommended for our company.

16 step. Business preservation strategy – 1th strategy

Since profitability must be above zero, the extreme possible value of the initial indicators is when ROE = 0. Since the profitability of 2018 is positive, there is no need to accept a zero return on capital in 2018.

Table 53 Result of calculation of 1 strategy of OHL ŽS, a.s. Source: author

	Indicators	**2014**	**2015**	**2016**	**2017**	**2018**
Before changes	**ROE, %**	-15,37	-41,89	n/a	-30,90	0,4
	ROA, %	-3,54	-7,96	-30,96	-7,98	0,1
	Sales , 10^3 Euro	410 575	489 634	207 913	191 147	236 502
	Total Cost, 10^3 Euro	422 459	512 202	265 888	204 720	236 327
After changes	**ROE, %**	0	0	0	0	0,4
	ROA, %	0	0	0	0	0,1
	Sales , 10^3 Euro	410 575	489 634	207 913	191 147	236 502
	Total Cost, 10^3 Euro	410 575	489 634	207 913	191 147	236 327
	Total Cost Change, %	-2,81	-4,41	-21,80	-6,63	0

In 2014, in order to increase return on capital, Total Cost should be reduced by more than 2,81%, in 2015 by more than 4,41%. The most powerful actions are needed in 2016, and reduce Total Cost by 21,8%. Despite the fact that the company managed to reduce Total Cost in 2017, however, a greater reduction is needed, by 6,63%.

17 step. Business development strategy – 2th strategy

The goal of any company is to increase the competitiveness, and hence the financial position of the company, therefore, the recommended profitability of the company should not be lower than the profitability of its competitors. First of all, it is necessary to consider the average value of profitability by industry in the country (Table 54). Data is taken from sources published on the website Ministerstvo průmyslu a obchodu. For clarity and possibility of a comparative analysis in the table will also provide the values of return on equity of the studied company.

Table 54 Data for benchmarking. Source: author

Indicators, %	2014	2015	2016	2017	2018
OHL ŽS, a.s.					
ROA	-3,54	-7,96	-30,96	-7,98	0,1
ROE	-15,37	-41,89	n/a	-30,90	0,4
Overall for construction industry of the country					
ROA	3,0	5,12	4,82	5,91	5,14
ROE	5,87	8,47	7,2	9,13	11,6

From the Table 54 it is obvious that the company's profitability over the entire period is significantly lower than the average profitability in the industry. Thus, the value of the average return on capital in the industry is as recommended for company. Using DuPont decomposition and calculations in Excel, it is possible to determine which changes in financial indicators have the greatest impact on the ROE. These calculations are presented in Table 55.

Table 55 Result of calculation of 2th strategy for development financial condition of OHL ŽS, a.s. Source: author

	Indicators	2014	2015	2016	2017	2018
Before changes	**ROE, %**	-15,37	-41,89	n/a	-30,90	0,4
	ROA, %	-3,54	-7,96	-30,96	-7,98	0,1
	Sales , 10^3 Euro	410 575	489 634	207 913	191 147	236 502
	Total Cost, 10^3 Euro	422 459	512 202	265 888	204 720	236 327
	Equity (E), 10^3 Euro	77 338	53 868	-4 088	43 922	42 825
	Net income (EAT), 10^3 Euro	-11 884	-22 568	-57 975	-13 573	175
After changes	**ROE (EAT/E), %**	5,87	8,47	7,2	9,13	11,6
	ROA (EAT/A), %	3 ,0	5 ,12	4 ,82	5 ,91	5,14
	Financial leverage (A/E), %	1 ,95	1 ,65	1 ,49	1 ,5	2,26
	Profit margin (EAT/S), %	1 ,65	1 ,66	0 ,01	0 ,03	4,07
	Total asset turnover (S/A), %	1 ,82	3 ,08	37 ,01	1 ,78	1,26
	Total Assets (A), 10^3 Euro	225 415	158 926	5 618	107 426	187 616
	Equity (E), 10^3 Euro	115 204	96 068	3 761	69 539	83 015
	Net income (EAT), 10^3 Euro	6 762	8 137	271	6 349	9 625
	Sales (S), 10^3 Euro	410 575	489 634	207 913	191 147	236 502
	Total cost (TC)	403 813	481 497	207 642	184 798	210 707
	Equity Change, %	48,9	78,3	192	58,3	48,4
	Total Cost Change, %	-4,4	-5,99	-21,9	-9,7	-10,8

The results of testing 2th scenarios again confirm the findings of testing the 1th scenario with stronger changes.

18 step. Business development strategy – 3th strategy

Since the average data in industry reports are summarized, without dividing companies by size, the results may not be reliable enough. Therefore, it is necessary to refer to the benchmarking method, which includes a comparative analysis of companies comparable in size, income, number of employees of companies operating in one industry. Thus, by calculation of the average positive value of the profitability of these companies can be find the recommended ROE value for the company under study. Next, 4 international large companies operating in the Czech Republic were accepted and considered: Metrostav, a.s., Skanska a.s., Hochtief CZ a.s. and STRABAG a.s. Data for calculating profitability ratios are taken from annual reports provided on justice.cz.

Table 56 Profitability ratios of construction companies, operating in the Czech Republic. Source: author

Company	Indicators, %	2014	2015	2016	2017	2018
OHL ŽS, a.s.	**ROA**	-3,5	-8,0	-31,0	-8,0	0,1
	ROE	-15,4	-41,2	n/a	-30,9	0,4
Metrostav, a.s.	**ROA**	2,0	2,3	1,3	0,6	2,4
	ROE	6,3	6,6	3,6	1,9	7,8
Skanska a,s,	**ROA**	0,8	2,8	1,9	2,2	-4,1
	ROE	2,1	6,8	3,9	4,4	-8,2
Hochtief CZ a.s.	**ROA**	2,6	1,5	3,7	0,8	0,4
	ROE	9,5	4,6	9,8	2,9	1,9
STRABAG a.s.	**ROA**	1,10	-1,37	2,94	2,86	2,7
	ROE	3,56	-6,47	13,81	11,09	12,3
Overall positive values for construction companies	**ROA**	1,62	2,20	2,46	1,62	1,83
	ROE	5,36	2,88	7,78	5,07	7,33

In this case, the company's profitability is also lower than the average profitability of competing companies. The average profitability of similar companies accepted as recommended. Using DuPont decomposition and calculations in Excel, were find out necesssary changes in financial indicators. These calculations are presented in Table 57.

Table 57 Result of calculation of 3th strategy for development financial condition of OHL ŽS, a.s. Source: author

	Indicators	2014	2015	2016	2017	2018
Before changes	**ROE, %**	-15,37	-41,89	n/a	-30,90	0,4
	ROA, %	-3,54	-7,96	-30,96	-7,98	0,1
	Sales , 10^3 Euro	410 575	489 634	207 913	191 147	236 502
	Total Cost, 10^3 Euro	422 459	512 202	265 888	204 720	236 327
	Equity (E), 10^3 Euro	77 338	53 868	-4 088	43 922	42 825
After changes	**ROE (EAT/E), %**	5,36	2,88	7,78	5,07	7,33
	ROA (EAT/A), %	1,62	2,20	2,46	1,62	1,83
	Financial leverage (A/E), %	3,31	1,31	3,16	3,13	4
	Profit margin (EAT/S), %	1,16	0,64	0,13	1,30	1,45
	Total asset turnover (S/A), %	1,40	3,46	18,51	1,25	1,26
	Total Assets (A), 10^3 Euro	293 123	141 375	112 35	152 902	187 616
	Equity (E), 10^3 Euro	88 593	107 995	3 551	48 856	46 904
	Net income (EAT), 10^3 Euro	4 749	3 110	276	2 477	3 433
	Sales (S), 10^3 Euro	410 575	489 634	207 913	191 147	236 502
	Total cost (TC)	405 826	486 524	207 637	188 670	233 069
	Equity Change, %	14,55	100	187	11	8,68
	Total Cost Change, %	-3,9	-5	-22	-7,8	-0,99

According to the calculations presented in Table 57, to achieve the recommended values of the ROE indicator, it is necessary to increase Equity and reduce Total cost. Measures to change these factors should be carried out simultaneously, starting from the beginning of the study period, the maximum changes should occur in 2016, since this is the year when the worst company profitability indicators are observe.

19 step. Creating of 4th strategy

According to correlation analysis presented in Table 51 there is no significant link between the macroeconomic indicators and the key financial indicator Profit Margin. Since the condition the correlation coefficient is higher than 0,7 is not fulfilled, the development of 4 strategies is impossible.

20 step. Assessment of implementation of created strategies. EVA model

Table 58 Data for calculating EVA. Source: author

Indicators Before changes	2014	2015	2016	2017	2018
ROE (EAT/E), %	-15,37	-41,89	n/a	-30,90	0,4
Long-Term Debt, 10^3 Euro (D)	25 301	23 718	65 985	18 815	22 149
Current Liabilities, 10^3 Euro(CL)	214 083	190 864	114 526	103 368	122 642
Total Debt, 10^3 Euro (TD)	239 384	214 582	180 511	122 183	144 791
Interesr Expences, 10^3 Euro (IE)	1 687	1 550	-2 110	2 206	2 597
Equity, 10^3 Euro (E)	71 636	50 353	-3 857	42 537	42 825
Capital, 10^3 Euro (C)	96 936	74 071	6 228	61 352	64 974
Tax Rate (t)	19%	19%	19%	19%	19%
Pretax cost of debt (Rd)	14%	13%	17%	18%	21%

Since the profitability during 2014-2017 years was negative, there was no sense in counting EVA. Thus, we will assess the effectiveness of the application of 1, 2 and 3 strategies.

21 step. Test the effectiveness of the 1th strategy

Table 59 Test the effectiveness of the 1th strategy of OHL ŽS, a.s. Source: author

Indicators After changes	2014	2015	2016	2017	2018
ROE (EAT/E), %	0	0	0	0	0,4
Long-Term Debt, 10^3 Euro (D)	25 301	23 718	65 985	18 815	22 149
Current Liabilities, 10^3 Euro(CL)	214 083	190 864	114 526	103 368	122 642
Total Debt, 10^3 Euro (TD)	239 384	214 582	180 511	122 183	144 791
Interest Expences, 10^3 Euro (IE)	1 687	1 550	-2 110	2 206	2 597
Equity, 10^3 Euro (E)	71 636	50 353	-3 857	42 537	42 825
Capital, 10^3 Euro (C)	96 936	74 071	6 228	61 352	64 974
Tax Rate (t)	19%	19%	19%	19%	19%
Pretax cost of debt (R_d)	1,07%	0,93%	33,67%	2,07%	21%
Cost of Equity (R_e)	0%	0%	0%	0%	13,2%
EVA, 10^3 Euro	0	0	0	0	125698

In this case acceptance of the conditions that ROE=WACC. The application of the first strategy led to the EVA=0, the company does not add value but also does not lose value. In case if goal is company survival - the effectiveness of the strategy is confirmed.

22 step. Test the effectiveness of 2th strategy

Table 60 Test the effectiveness of the 2th strategy of OHL ŽS, a.s. Source: author

Indicators After changes	2014	2015	2016	2017	2018
ROE (EAT/E), %	5,87	8,47	7,2	9,13	11,6
Long-Term Debt, 10^3 Euro (D)	25 301	23 718	65 985	18 815	22 149
Current Liabilities, 10^3 Euro(CL)	214 083	190 864	114 526	103 368	122 642
Total Debt, 10^3 Euro (TD)	239 384	214 582	180 511	122 183	144 791
Interesr Expences, 10^3 Euro (IE)	1 687	1 550	2 110	2 206	2 597
Equity, 10^3 Euro (E)	115 204	96 068	3 761	69 539	83 015
Capital, 10^3 Euro (C)	140 505	119 786	69 746	88 354	105 164
Tax Rate (t)	19%	19%	19%	19%	19%
Pretax cost of debt (R_d)	7,05%	6,5%	3,2%	11,7%	11,7%
Net Profit, 10^3 Euro	6762	8137	271	6349	9625
Cost od Equity (R_e)	4,23%	8,05%	10,3%	7,68%	10,14
EVA, 10^3 Euro	131 603	40 285	438 551	100 575	120 493

Result: Company creates added value and achieves a higher yield than the required minimum yield - the effectiveness of the strategy is confirmed.

23 step. Test the effectiveness of 3th strategy

Table 61 Test the effectiveness of the 3th strategy of OHL ŽS, a.s. Source: author

Indicators After changes	2014	2015	2016	2017	2018
ROE (EAT/E), %	5,36	2,88	7,78	5,07	7,33
Long-Term Debt, 10^3 Euro (D)	25 301	23 718	65 985	18 815	22 149
Current Liabilities, 10^3 Euro(CL)	214 083	190 864	114 526	103 368	122 642
Total Debt, 10^3 Euro (TD)	239 384	214 582	180 511	122 183	144 791
Interesr Expences, 10^3 Euro (IE)	1 687	1 550	2 110	2 206	2 597
Equity, 10^3 Euro (E)	88 593	107 995	3 551	48 856	46 904
Capital, 10^3 Euro (C)	113 894	131 713	69 536	67 671	69 053
Tax Rate (t)	19%	19%	19%	19%	19%
Pretax cost of debt (R_d)	13,6%	12,55%	17,1%	17,87%	21,03
Net Profit, 10^3 Euro	4 749	3 110	276	2 477	3 433
Cost od Equity (R_e)	3,7%	1,28%	10,5%	1,45%	2,7
EVA, 10^3 Euro	144 507	172 871	400 279	176 963	215 067

Result: Company creates added value and achieves a higher yield than the required minimum yield - the effectiveness of the strategy is confirmed.

24 step. Test the effectiveness of 4th strategy

According to correlation analysis presented in Table 51 there is no significant link between the macroeconomic indicators and the key financial indicator Profit Margin. Since the condition the correlation coefficient is higher than 0,7 is not fulfilled, the development of 4 strategies is impossible.

25 step. Conclusions and discussions

EVA calculation results confirmed the effectiveness of the three proposed strategies for the further development of the company's financial condition. Since during the period under review the company possessed negative Equity, it is necessary to change the value of Total Costs and Equity. The maximum values of EVA were obtained using the third development strategy.

Since the analysis of the external environment showed a favorable business environment in the country, and changes in GDP per capita according to forecasts of the Ministry of Finance of the Czech Republic in the near future are moderately positive, it is necessary to concentrate activity on the internal policy of the company.

Despite the allocation of funds from the European Union budget in 2015 to the country's construction industry, hesitant start of use of new EU grant programs and the insufficient preparedness especially of large infrastructure projects did not bring the expected results.

To take measures to increase the company's efficiency, it is necessary to identify the reasons for the sharp drop in its profitability. Between 2014 and 2016, the Company focused on the expansion to foreign markets, which resulted in a higher total volume of contracts. However, this also had an adverse impact on the Company’s profitability, where the underrated risks associated with operating on new foreign markets became gradually fully apparent throughout the period. Thus, companies should continue to take measures to reduction of overhead costs. Measures should also be taken to increase capital and increase sales.

In 2017, the company already took steps to increase the share capital by capitalizing loans from the parent company. In addition, in 2016-2018, the company took measures

to increase sales growth, however, due to austerity measures adopted by governments at the time and the pressure on tender conditions, when only the companies offering the lowest prices won, brought large projects. As a result, company generated minimum profit and, in many cases, on which losses on direct costs were incurred.

The main reason for the decline in sales was the lack of new projects, due to a loss in tenders, because of competitors, including foreign companies which offer lower prices. In the 2017 year OHL ŽS, a.s. obtained 96 projects in tenders in the amount of over CZK 8 billion, which represents more than 6% of all assigned tenders.

However, during the reporting period, the TOMI - REMONT a.s. (part of OHL ŽS, a.s.) subsidiary continued to make a profit, which saved the parent company. Thanks to the increase efficiency and flexibility of the deployment of the company's tasks were completed almost without the need to use subcontractors for essential and significant tasks on the projects, excluding separate technological units. This fact had a positive impact on the operating profit of the company in the past financial year.

In addition to these methods of cost reduction, it is necessary to implement a number of other measures. Since one of the main reasons for the decline in sales is the low competitiveness in tenders, there is a need to increase advantages over competitors. First of all, it is necessary to reduce the amount of costs for the construction of facilities, to shorten the implementation time, but the quality of the products should not be affected.

Costs can be reduced by the introduction of new technologies, automation of production, which will lead to the possibility of reducing the staff, and, accordingly, reduce wage costs. Costs can also be reduced by accelerating the construction process through intensification. Instead of one shift during the construction of the facility, carry out construction in 2-3 shifts (construction should be carried out even at night). Thus, the developer quickly makes a profit, and faster can direct it to the construction of a new facility.

The OHL ŽS, a.s. activities are primarily focused on construction of roads, bridges, engineering structures and public buildings. Due to the growth of GDP, the increase in the well-being of the population, there is an increase in demand for residential buildings, however, the demand for housing in the country is still much higher than supply. The company could expand the scope of ongoing projects by proposing housing projects.

Rising costs are also associated with rising costs of procurement material and services. One of the options for reducing this cost section is to change suppliers who offer high-level products with lower prices or reduce the number of suppliers by opening their own production of materials. Costs can also be reduced by reducing the number of contractors and subcontractors by opening new departments in the company that fulfill their responsibilities.

5.2 Application of the financial management model by Teixeira Duarte

1 step. Determination of the possibility of using the model

Balance Sheet and Financial Statement of Portuguese companies, in particular Teixeira Duarte, company are formed according to IFRS. In this case, the application of the model is possible.

2 step. The establishment of the study period

Since all financial information is publicly available, the latest financial reports in the form of annual reports refer to 2018, the company's development over the 5 years 2014-2018 years is being studied.

3 step. Data collection for PESTEL analysis

After determining of the study period, proceed to the analysis of the external environment. In Table 62 presented PESTEL analysis, which contains 9 indicators and divided into 5 groups.

Table 62 PESTEL analysis of Portugal. Source: author

	2014	2015	2016	2017	2018
Political					
Fragile States Index (FSI)	33,1	29,7	29,2	29,0	27,3
Economic					
GDP per capita	22,007	19,252	19,872	21,136	23,403
Inflation rate (IR)	-0,2	0,5	0,6	1,6	1,2
Unemployment Rate (UR)	13,9	12,4	11,1	8,9	6,6
Social					
Population growth rate (PGR)	-0,54	-0,41	-0,31	-0,31	-0,27
Human development index (HDI)	0,839	0,842	0,845	0,847	-
Technical and Environmental					
Environmental Performance Index (EPI)	-	75,8	74,6	71,91	71,91
Global Innovation Index (GII)	45,63	46,61	46,45	46,05	45,71
Legal					
State Legitimacy Indicator (SLI)	2,3	1,8	1,8	1,6	1,7

4 step. PESTEL analysis

According to Fragile States Index published by the Fund for Peace and the American magazine Foreign Policy an annual report during 2014-2018 political stability of the Portugal slightly decreased, but still was in stable zone. Despite the decline in GDP per capita in 2015, the country's economy managed to raise GDP by 2018, which even exceeds the value of GDP per capita in 2014 by 6%. According to the sharp fall in inflation in 2014 to a negative value, and then subsequent increase in 2015 the country was in an unstable economic situation. Inflation values do not go beyond the limits of Moderate Inflation, when price increase of less than 10% per year. It is moderation for the economy. A positive trend is observed with the decline in unemployment. By 2018, the unemployment rate dropped by 2 times compared with the beginning of the period under review. After analyzing the of changes in indicators, it can be argued with a high degree of probability that in the near future the economic development of the country will develop in a positive direction. Social factors also point to improved posturing in the country. Population growth rate, at least, still takes negative values, but its decline by 2018 has decreased by 2 times compared to 2014. Human development index also increased. This means that Portugal has a high degree of environmental sustainability. State Legitimacy Indicator is an indicator of how easy or difficult it is to conduct business in a country, the lower the indicator (the maximum value is 10). State Legitimacy Indicator is the less there are restrictions on the part of the state and difficulties in managing business. As this indicator includes the level of tax policy, the bureaucratic system, exercise of basic functions. According to data presented in Table 62, the value of this indicator for the period under review has decreased, what means that Portugal now has better environment for doing business than it was before.

According to the results of PESTEL analysis in Portugal economic, political, social, environmental and legal situation in the country is improving.

5 step. Collection data for calculation of the Altman Z-score

From the data presented in the Balance Sheet and Financial Statement, the necessary data is entered in Table 63. Financial reports are presented in Annual Reports on the official website of the company.

Table 63 Financial data of Teixeira Duarte for calculation of the Altman Z-score. Source: author

Resource		**2014**	**2015**	**2016**	**2017**	**2018**
Balance Sheet	Receivables	812 326	849 595	788 622	689 595	924 011
	Total current assets	1 288 661	1 396 943	1 315 333	56 298	56 872
	Total Assets	2 783 596	2 954 007	2 861 831	1 232 745	1 201 422
	Retained earnings	86 849	112 190	167 822	7 806	7 806
	Total equity	360 728	484 745	518 217	522 155	464 424
	Total non-current liabilities	1 085 881	1 161 523	1 003 779	357 467	418 683
	Total current liabilities	1 336 987	1 307 739	1 339 835	353 123	318 315
Financial Statement	Sales	1 580 959	1 679 722	1 411 906	12 223	13 232
	Net profit	64 746	65 945	40 409	7 093	15 359

6 step. Collection of company financial information

From the data presented in the Balance Sheet and Financial Statement, the necessary data is entered in Table 64. Financial reports are presented in Annual Reports on the official website of the company.

Table 64 Financial data of Teixeira Duarte. Source: author

Resource		**2014**	**2015**	**2016**	**2017**	**2018**
Balance Sheet	Receivables	812 326	849 595	788 622	689 595	924 011
	Total non-current assets	1 494 935	1 557 064	1 546 498	1 176 447	1 144 550
	Total current assets	1 288 661	1 396 943	1 315 333	56 298	56 872
	Total Assets	2 783 596	2 954 007	2 861 831	1 232 745	1 201 422
	Retained earnings	86 849	112 190	167 822	7 806	7 806
	Total equity	360 728	484 745	518 217	522 155	464 424
	Total non-current liabilit	1 085 881	1 161 523	1 003 779	357 467	418 683
	Total current liabilities	1 336 987	1 307 739	1 339 835	353 123	318315
Financial Statement	Sales	1 580 959	1 679 722	1 411 906	12 223	13 232
	Total costs	1 516 213	1 613 777	1 371 497	1 081 859	1 032 406
	Net Profit	64 746	65 945	40 409	7 093	15 359

7 step. Calculation of Altman Z-score

Table 65 Z-Score analysis of Teixeira Duarte. Source: author

Teixeira Duarte, a.s.	**2014**	**2015**	**2016**	**2017**	**2018**
Z-Score	0,85	0,74	0,73	0,86	1,19
Result	*Distress Zone*	*Distress Zone*	*Distress Zone*	*Distress Zone*	*Distress Zone*

8 step. Analysis of the result of Altman Z-score

During all 5 years under consideration the company was in a distress zone. During all period under consideration company has risk of bankruptcy - company is *financially unsatisfactory*. Thus, it is necessary to take action to return the stability of companies, moves Z-score to the grey zone.

9 step. Calculation of profitability ratios

Table 66 ROA, ROE of Teixeira Duarte. Source: author

Profitability Ratios, %	2014	2015	2016	2017	2018
Return on Assets	2,23	1,41	1,3	0,1	0,5
Return on Equity	13,6	7,8	7,5	0,8	2,4

10 step. Analysis of profitability ratios

Rentability of Teixeira Duarte steadily declined since 2014 till 2018. The strongest decline in profitability was observed in 2017. Despite the negative changes in profitability, its value remained above zero. In addition, the company's profitability has grown significantly by 2018.

11 step. Comparison of profitability of the company with the average profitability of the industry

Table 67 Overall ROA and ROE for construction industry in Portugal. Source: author

Profitability Ratios, %	2014	2015	2016	2017	2018
Return on Assets	3,0	1,63	1,52	1,76	1,99
Return on Equity	3,1	7,95	8,86	10,12	11,34

From a comparative analysis of Table 66 and Table 67, it was found that the change in the company's profitability does not match the dynamics of change in the average profitability in the construction industry in the country. At that time, the company's profitability falls over the period in question, the industry average Return on Equity was growing.

12 step. DuPont ROE. Logarithmic method

DuPont decomposition of ROE of Teixeira Duarte for 2014-2018 years for each year in particular is presented in Appendix 2. All results of DuPont decomposition are presented in one Table 68, where indicators that have the greatest impact on the company's return on equity in the corresponding years are indicated by a plus sign.

Table 68 Result of DuPont of ROE of Teixeira Duarte for 2014-2018 years. Source: author

	2014/2015	2015/2016	2016/2017	2017/2018
Fin Leverage		+		
ROA	+		+	+
Total Assets				
Equity		+		
Profit margin	+		+	+

According to the DuPont decomposition, ROA has the greatest impact on ROE in the period under review at the first decomposition level, and further ROA has revealed the greatest significance of the Profit Margin indicator. However, despite the more significant impact of Profit Margin on ROE, according to DuPont decomposition Profit Margin should be considered in the system with Equity.

13 step. Correlation analysis

Table 69 Pearson Correlation Teixeira Duarte. Source: author

	GDP	IR	UR
Profit Margin	0,72	-0,20	-0,21

According to correlation analysis presented in Table 69 correlation coefficient is higher than 0,7 between the macroeconomic indicator of GDP and the key financial indicator Profit Margin - *significant direct link*. Thus, it can be concluded that with the growth of GDP per capita the company's profit grows.

14 step. Data preparation for the formation of 1-3 strategies

For a visual representation of the establishment of the course for the further development of the company, DuPont ROE is presented in Table 70.

Table 70 Financial data of Teixeira Duarte. Source: author

Indicators	2014	2015	2016	2017	2018
ROE (EAT/E), %	13,6	7,8	7,5	0,8	2,4
ROA (EAT/A), %	2,2	1,4	1,3	0,1	0,5
Financial leverage (A/E), %	6,09	5,52	5,7	5,6	4,8
Profit margin (EAT/S), %	3,93	2,86	3,00	0,31	1,08
Total asset turnover (S/A), %	0,57	0,49	0,44	0,45	0,47
Total Assets (A), 10^3 Euro	2 954 007	2 861 831	2 539 972	2 294 359	1 857 701
Equity (E), 10^3 Euro	484 745	518 217	444 810	408 843	403 360
Net income (EAT), 10^3 Euro	65 945	40 409	33 514	3 232	9 496
Sales (S), 10^3 Euro	1 679 722	1411 906	1 115 373	1 035 638	873 712
Total cost (TC)	1 613 777	1 371 497	1 081 859	1 032 406	966 254
Fixed Assets	1 557 064	1 546 498	1 418 027	975 026	1 045 944

The minimum profitability during the period under review is observed in 2017. According to DuPont, this can be explained by a sharp decline in sales and profits.

15 step. Tasks formulation

It is necessary to develop three strategies for the development of the financial condition of the company:

1. When the company does not make a profit, but there is no loss either, that is, ROA = 0 and ROE = 0, however, these values are much lower than the average for the country and the average profitability of competitors, so go to the next item.
2. The average values in the industry in the country over the period under review exceed the company's profitability over the period under consideration; therefore we take these values as recommended and develop the first development strategy.
3. The profitability of the company for the period under review is significantly lower than the average capital profitability in the industry. Thus, we take the value of the average capital return in the industry for the period 2013-2017 for the recommended for our company.

16 step. Business preservation strategy – 1th strategy

Since during the period under review, the company's profitability was positive, there is no need to develop a first strategy.

17 step. Business development strategy – 2th strategy

The goal of any company is to increase the competitiveness, and hence the financial position of the company, therefore, the recommended profitability of the company should not be lower than the profitability of its competitors. First of all, it is necessary to consider the average value of profitability by industry in the country (Table 71). Data is taken from sources published on the website of company. For clarity and possibility

of a comparative analysis in the table will also provide the values of return on equity of the studied company.

Table 71 Data for benchmarking. Source: author

Indicators, %	2014	2015	2016	2017	2018
Teixeira Duarte					
ROA	2,23	1,41	1,3	0,1	0,5
ROE	13,6	7,8	7,5	0,8	2,4
Overall for construction industry of the country					
ROA	1,0	1,63	1,52	1,76	1,99
ROE	3,1	7,95	8,86	10,12	11,34

From the Table 71 it is obvious that the company's profitability over the entire period is significantly lower than the average profitability in the industry. Thus, the value of the average return on capital in the industry is as recommended for company. Using DuPont decomposition and calculations in Excel, it is possible to determine which changes in financial indicators have the greatest impact on the ROE. These calculations are presented in Table 72.

Table 72 Result of calculation of 2th strategy of Teixeira Duarte. Source: author

	Indicators	2014	2015	2016	2017	2018
Before changes	**ROE, %**	13,6	7,8	7,5	0,8	2,4
	ROA, %	2,2	1,4	1,3	0,1	0,5
	Sales , 10^3 Euro	1 679 722	1 411 906	1 115 373	1 035 638	873 712
	Total Cost, 10^3 Euro	1 613 777	1 371 497	1 081 859	1 032 406	966 254
	Equity (E), 10^3 Euro	484 745	518 217	444 810	408 843	403 360
	Net income (EAT), 10^3 Euro	65 945	40 409	33 514	3232	9 496
After changes	**ROE (EAT/E), %**	3,1	7,95	8,86	10,12	11,34
	ROA (EAT/A), %	3,0	1,63	1,52	1,76	1,99
	Financial leverage (A/E), %	1,03	4,88	5,83	5,75	5,70
	Profit margin (EAT/S), %	0,01	3,10	3,50	3,95	4,71
	Total asset turnover (S/A), %	1,38	0,52	0,43	0,45	0,42
	Total Assets (A), 10^3 Euro	2 954 007	2 861 831	2 539 972	2 294 359	1 857 701
	Equity (E), 10^3 Euro	484 745	551 427	440 257	403 901	362 622
	Net income (EAT), 10^3 Euro	6 188	43 838	39 007	40 875	41 121
	Sales (S), 10^3 Euro	1 679 722	1 411 906	1 115 373	1 035 638	873 712
	Total cost (TC)	1 613 777	1 368 068	1 076 366	994 763	832 591
	Equity Change, %	0	-6,02	1,03	1,22	11,23
	Total Cost Change, %	0	0,25	0,51	3,65	13,83

Since in 2014 the company's profitability exceeds the average value for the industry, in these years no measures are required to improve profitability. In 2015, to increase the return on capital, Total Cost must be reduced by more than 0,25%, in 2015 by more than 0,51%. The most powerful actions are needed in 2018, and reduce Total Cost by 13,83%.

18 step. Business development strategy – 3th strategy

Since the average data in industry reports are summarized, without dividing companies by size, the results may not be reliable enough. Therefore, it is necessary to refer to the benchmarking method, which includes a comparative analysis of companies comparable in size, income, number of employees of companies operating in one industry. Thus, by calculation of the average positive value of the profitability of these companies can be find the recommended ROE value for the company under study. Next, 4 international large companies operating in Portugal were accepted and considered: Mota-Engil,

Gabriel Couto, Sacyr Somague and Martifer Group. Data for calculating profitability ratios are taken from annual reports provided on the official websites of the companies.

Table 73 Profitability ratios of construction companies, operating in Portugal. Source: author

Company	Indicators, %	2014	2015	2016	2017	2018
Mota- Engil	**ROA**	2,1	1,0	1,6	1,3	2,0
	ROE	14,4	7,2	11,8	10,3	20,9
Teixeira Duarte	**ROA**	2,23	1,41	1,3	0,1	0,5
	ROE	13,6	7,8	7,5	0,8	2,4
Gabriel Couto	**ROA**	5,4	2,4	0,8	0,8	1,3
	ROE	38,2	16,9	4,7	4,4	7,7
Sacyr Somague	**ROA**	0,3	3,5	1,1	1,0	1,1
	ROE	2,5	19,4	5,8	6,5	10,0
Martifer Group	**ROA**	-21,6	0,2	-	1,0	0,5
	ROE	-89,7	10,0	-	-10,2	-3,2
Overall positive values for construction companies	**ROA**	2,8	1,5	2,67	1,12	3,1
	ROE	16,7	8,35	11,4	4,85	9,65

In this case, the profitability of the company Teixeira Duarte in the period 2014-2018 is lower than the average profitability of competing companies. It is necessary to take the average value of profitability of similar companies for the recommended value.

Table 74 Result of calculation of 3 strategy of Teixeira Duarte, a.s. Source: author

	Indicators	2014	2015	2016	2017	2018
Before changes	**ROE, %**	13,6	7,8	7,5	0,8	2,4
	ROA, %	2,2	1,4	1,3	0,1	0,5
	Sales , 10^3 Euro	1 679 722	1 411 906	1 115 373	1 035 638	873 712
	Total Cost, 10^3 Euro	1 613 777	1 371 497	1 081 859	1 032 406	966 254
	Equity (E), 10^3 Euro	484 745	518 217	444 810	408 843	403360
After changes	**ROE (EAT/E), %**	2,8	1,5	2,67	1,12	3,1
	ROA (EAT/A), %	16,7	8,35	11,4	4,85	9,65
	Financial leverage (A/E), %	5,96	5,57	4,27	4,33	3,11
	Profit margin (EAT/S), %	0,05	3,05	5,26	2,18	5,42
	Total asset turnover (S/A), %	0,57	0,49	0,51	0,51	0,57
	Total Assets (A), 10^3 Euro	2 954 007	2 861 831	2 539 972	2 294 359	1 857 701
	Equity (E), 10^3 Euro	479 561	516 155	514 405	465 422	490 627
	Net income (EAT), 10^3 Euro	80 087	43 099	58 642	22 573	47 346
	Sales (S), 10^3 Euro	1 679 722	1 411 906	1 115 373	1 035 638	873 712
	Total cost (TC)	1 599 635	1 368 807	1 056 731	1 013 065	826 366
	Equity Change, %	1,07	0,40	-13,53	-12,16	-17,79
	Total Cost Change, %	0,88	0,20	2,32	1,87	14,48

According to the calculations presented in table 74, to achieve the recommended values of the ROE indicator, it is necessary to reduce Total Assets, increase Equity and reduce Total cost. Measures to change these factors should be carried out simultaneously, starting from the beginning of the research period, the maximum changes should occur in 2016, since this year the worst-case profitability of the company is observed.

19 step. Creating a 4th strategy

Using the correlation analysis in step 10, a significant positive effect of GDP per capita on the company's Profit Margin was found. Forecasts on the development of GDP in the near future in Portugal are presented on the website International Monetary Fund what makes it possible to calculate the expected desired Profit Margin values.

Table 75 Profit Margin and GDP. Source: author

Indicators	2014	2015	2016	2017	2018
Profit margin, %	4,1	3,9	2,9	3,0	0,3
GDP	21,618	22,007	19,252	19,872	21,136
Profit marg/ GDP	0,189	-	-	-	-
Profit margin	4,4	4,5	3,9	4,1	4,3

Knowing the desired Profit margin values using DuPont decomposition, it is necessary to calculate the desired indicators affecting this key indicator.

Table 76 Result of 4th strategy for development financial condition of Teixeira Duarte. Source: author

	Indicators	2014	2015	2016	2017	2018
Before Changes	**Profit margin (EAT/S), %**	4,1	3,9	2,9	3,0	0,3
	Net income (EAT), 10^3 Euro	64 746	65 945	40 409	33 514	3 232
	Sales (S), 10^3 Euro	1 580 959	1 679 722	1 411 906	1 115 373	1 035 638
	Total cost (TC)	1 515 882	1 518 300	1 366 837	1 039 365	966 254
After changes	**Profit margin (EAT/S), %**	4,4	4,5	3,9	4,1	4,3
	Net income (EAT), 10^3 Euro	69 484	76 090	54 343	45 802	46 325
	Total cost (TC)	1 412 526	1 315 860	1 016 366	760 511	67 413

According to the calculations presented in Table 76, to achieve the recommended values of the Profit margin, it is necessary to reduce Total cost. Measures to change these factors should be started from the beginning of the study period.

20 step. Assessment of implementation of created strategies. EVA model

Table 77 Data for calculation EVA. Source: author

Indicators	2014	2015	2016	2017	2018
ROE (EAT/E), %	17,9	13,6	7,8	7,5	0,8
Long-Term Debt, 10^3 Euro (D)	1 085 881	1 161 523	1 003 779	1 001 836	816 487
Current Liabilities, 10^3 Euro(CL)	1 336 987	1 307 739	1 339 835	1 093 326	1 069 029
Total Debt, 10^3 Euro (TD)	2 422 868	2 469 262	2 343 614	2 095 162	1 885 516
Interest Expences, 10^3 Euro (IE)	1 515 882	1 518 300	1 366 837	1 039 365	966 254
Equity, 10^3 Euro (E)	360 728	484 745	518 217	444 810	408 843
Capital, 10^3Euro (C)	1 446 609	1 646 268	1 555 206	1 442 093	1 220 388
Tax Rate (t), %	19%	19%	19%	19%	19%
Pretax cost of debt (Rd), %	0,62%	0,61%	0,58%	0,5%	0,51%

21 step. Test the effectiveness of the 1th strategy

Since during the period under review, the company's profitability was positive, there is no need to develop a first strategy.

22 step. Test the effectiveness of the 2th strategy

Table 78 Test the effectiveness of the 2th scenario of Teixeira Duarte. Source: author

Indicators	2014	2015	2016	2017	2018
ROE (EAT/E), %	17,9	13,6	7,95	8,86	10,12
Long-Term Debt, 10^3 Euro (D)	1 085 881	1 161 523	1 003 779	1 001 836	816 487
Current Liabilities, 10^3 Euro(CL)	1 336 987	1 307 739	1 339 835	1 093 326	1 069 029
Total Debt, 10^3 Euro (TD)	2 422 868	2 469 262	2 343 614	2 095 162	1 885 516
Interest Expences, 10^3 Euro (IE)	1 515 882	1 518 300	1 366 837	1 039 365	966 254
Equity, 10^3 Euro (E)	360 728	484 745	**551 427**	**440 257**	**403 901**
Capital, 10^3 Euro (C)	1 176 339	1 250 116	1 111 774	1 005 387	865 343

Tax Rate (t)	19%	19%	19%	19%	19%
Pretax cost of debt (R_d)	0,62%	0,61%	0,58%	0,5%	0,51%
Cost of Equity (R_e)	2,22%	5,56%	18,36%	16,45%	21,3%
EVA, 10^3 Euro	190 444	116 546	89 956	68 259	517 589

Result: Company creates added value and achieves a higher yield than the required minimum - - the effectiveness of the strategy is confirmed.

23 step. Test the effectiveness of 3th strategy

Table 79 Test the effectiveness of the 3th scenario of Teixeira Duarte. Source: author

Indicators	**2014**	**2015**	**2016**	**2017**	**2018**
ROE (EAT/E), %	17,9	15,9	8,24	10,45	3,98
Long-Term Debt, 10^3 Euro (D)	1 085 881	1 161 523	1 003 779	1 001 836	816 487
Current Liabilities, 10^3 Euro(CL)	1 336 987	1 307 739	1 339 835	1 093 326	1 069 029
Total Debt, 10^3 Euro (TD)	2 422 868	2 469 262	2 343 614	2 095 162	1 885 516
Interest Expences, 10^3 Euro (IE)	1 515 882	1 518 300	1 366 837	1 039 365	966 254
Equity, 10^3 Euro (E)	360 728	**480 089**	**516 113**	**473 074**	**470 686**
Capital, 10^3 Euro (C)	1 446 609	1 641 612	1 519 892	1 474 910	1 287 173
Tax Rate (t)	19%	19%	19%	19%	19%
Pretax cost of debt (R_d)	0,62%	0,61%	0,58%	0,5%	0,51%
Cost od Equity (R_e)	2,22%	8,32%	10,4%	12,05%	2,89%
EVA, 10^3 Euro	190 444	256 591	103 569	89 236	23 698

Result: Company creates added value and achieves a higher yield than the required minimum - the effectiveness of the strategy is confirmed.

24 step. Test the effectiveness of 4th strategy

Table 80 Test the effectiveness of the 4th scenario of Teixeira Duarte. Source: author

Indicators	**2014**	**2015**	**2016**	**2017**	**2018**
ROE (EAT/E), %	19,26	15,70	10,49	10,30	11,33
Long-Term Debt, 10^3 Euro (D)	1 085 881	1 161 523	1 003 779	1 001 836	816 487
Current Liabilities, 10^3 Euro(CL)	1 336 987	1 307 739	1 339 835	1 093 326	1 069 029
Total Debt, 10^3 Euro (TD)	**2 422 868**	**2 469 262**	**2 343 614**	**2 095 162**	**1 885 516**
Interest Expences, 10^3 Euro (IE)	1 515 882	1 518 300	1 366 837	1 039 365	966 254
Equity, 10^3 Euro (E)	**360 728**	**484 745**	**518 217**	**444 810**	**408 843**
Capital, 10^3 Euro (C)	1 446 609	1 646 268	1 555 206	1 442 093	1 220 388
Tax Rate (t)	19%	19%	19%	19%	19%
Pretax cost of debt (R_d)	0,62%	0,61%	0,58%	0,5%	0,51%
Cost od Equity (R_e)	2,22%	8,32%	10,4%	12,05%	2,89%
EVA, 10^3 Euro	223 690	256 989	156 892	82 569	625 699

Result: Company creates added value and achieves a higher yield than the required minimum - the effectiveness of the strategy is confirmed.

25 step. Conclusions and discussions

EVA calculation results confirmed the effectiveness of the proposed strategies for the further development of the company's financial condition. The maximum values of EVA were obtained using the fourth development strategy.

In the annual report for 2017, it was noted that a range of different factors have contributed to a decrease in profitability [111]. Indeed, in addition to the performance of Group companies profitability was influenced by a positive change of 25,849 thousand euros in exchange rate differences, which decreased from 41,212 thousand euros in 2016 to 15,363 thousand euros in 2017. The negative impact, net of deferred taxes, of

the loss of thousands euros due to impairment of its stake in "Banco Comercial Português, SA".

Financial results were also influenced by the impact of the impairment loss of 715 thousand euros by the subsidiary VOTORANTIM Macau Investimentos, S.A.", as well as by the positive impact of the divestment of subscription rights to the capital increase in "Banco Comercial Português, S.A." [111].

According to the DuPont decomposition, the ROE is depends on the ROA and Financial Leverage, with biggest influence of ROA. During the period under review the profitability ratio stands at more than 2,5 times, which is very high. This means Teixeira Duarte's has a significant debt levels and its ability to grow profit hinges on a significant debt burden. Despite the fact that the company managed to reduce Debt, the Equity of the company also decreased; as a result, the company has a high Financial Leverage, which reduces the investment attractiveness of the company.

As noted in the company's annual report, the gradual decline in Equity primarily occurred due to the currency conversion recorded as a result of the devaluation of the Currencies and to the disposal of the Group's stake in the "Energy Sector".

In the case of Teixeira Duarte, external factors had the greatest impact on the financial situation. This emphasizes the need for the company to pay more attention to the analysis of the external environment and the forecasting of further development. According to the verification of the four strategies to improve the financial stability of the company, it is necessary first of all to increase Equity and reduce Total Cost.

First of all, it is necessary to reduce the amount of costs for the construction of facilities, to shorten the implementation time. Critical reductions are observed every year in the statutory reserve fund, which are significantly less than the allowable minimum of 5%. This attests to the inability of companies to cover losses, if incurred, as well as the redemption of bonds of the company and the repurchase of its shares in the absence of other funds. Retained earnings was minimal in 2011, after which the company managed to increase it every year, however, in 2017 its value is almost equal to Share capital, which also indicates the need to increase it.

Since decisions to increase Share capital are made by the owners and managers of the company without the need to obtain the consent of other business entities, it is recommended that the company start with increasing Share capital. Share capital may be increased by the issuance and sale of new shares.

Costs can be reduced by the introduction of new technologies, automation of production, which will lead to the possibility of reducing the staff, and, accordingly, reduce wage costs. Rising costs are also associated with rising costs of procurement material and services. One of the options for reducing this cost section is to change suppliers who offer high-level products with lower prices or reduce the number of suppliers by opening their own production of materials. Costs can also be reduced by reducing the number of contractors and subcontractors.

6 APPLICATIONS OF ACHIEVED RESULTS, DISCUSSION

Analysis of the impact of the economic crisis on the financial stability of companies showed that small and medium enterprises were more negatively affected by the financial crisis 2008 than large construction companies. Therefore, the question arises of how large companies managed to maintain their positions in this difficult time. In addition, an analysis of existing studies indicated that there is insufficient research on the impact of the crisis on the financial stability of large companies. In order to identify the influence of financial crisis on financial stability of large construction company the financial statements of large construction companies as an object of study were taken.

To determine the degree of influence of the financial crisis, the external benchmarking method was used. First of all, a general comparative analysis of the construction industry in Portugal and the Czech Republic was carried out, then a double comparative analysis of the 5 major construction companies cattying out their activity in the Czech Republic and Portugal, both within the same country and between countries. In order to obtain a more accurate result of changes in financial position has been studied for 11 years, 2008-2018, which includes the crisis and post-crisis period.

Developed model is intended for use by company managers, to assess the financial condition and develop a strategy for the further development of the company, in order to increase the financial stability, profitability, and competitiveness of the company; investors, to assess the financial stability of the company, the feasibility and reliability of investing finances; customers to find a financially reliable company.

The model defines key indicators of the financial stability of the company, their dependence on external factors and on changes in macroeconomic indicators. As a result, it fulfills the forecast for the further development of the financial condition of the company.

The model was developed based on an analysis of 10 large construction companies, but this model can be also applied by medium and small enterprises. The financial statements of the companies under consideration are taken from the annual reports provided on the official website of the companies.

The mathematical form of the model was developed at Excel. Financial data for the model were taken from the Balance Sheet and Income Statement.

The model evaluates the external environment in which the company operates, checks the probability of bankruptcy, and studies the dynamics of changes in financial indicators over a certain period of time. The model proposes tasks for developing four strategies for further development. The model also checks the effectiveness of the proposed strategies performs their comparison and offers the most effective solution.

A methodology was proposed for the implementation of the financial management model and its application based on a sequence of 25 steps with description of each step.

Practical significance refers to the possibilities of applying the model by any construction company in any financial condition. The model helps to identify existing problems and timely take the necessary measures to improve the financial stability of the company. In addition, the model is able to determine the current financial condition of the company, taking into account external factors.

7 CONCLUSION

The goal of the research is creation of model of financial management of company based on determining the optimal set of key indicators of success and their interaction principle in order to improve the efficiency of Construction Company. With regard to the focus on the construction industry and the possibility of using the model by construction companies in different countries, a model has been created that links the methods of financial management and analysis. The model was designed and subsequently successfully tested on two specific companies in the Czech Republic and Portugal. It was also proposed methodology, sequence of steps for its implementation and subsequent use in practice.

The dissertation research contains two main parts: theoretical and practical parts. In the theoretical part, the relevance of the research topic was proved, a brief review of past studies of the analysis and management of the financial stability of the enterprise was conducted. The goals and objectives of the study were set, research methods were selected, and four hypotheses were formulated. Next, definition of financial stability, financial analysis, methods of financial analysis and financial management models were studied. The financial reporting systems of the Czech Republic and Portugal were also studied; as a result it was found that the financial statements of companies in both countries comply with generally accepted IFRS standards.

The relevance of the research topic is due to the negative effects of the financial crisis, increasing competition, uncertainty and discontinuity on a global market forces enterprises increase the efficiency of internal processes in order to retain competitiveness. The key to survival and the basis for a stable position of the enterprise in the current market conditions is financial sustainability. Implementation of tasks to maintain and improve the effectiveness of the company is impossible without the development and application of an effective, financial management model.

Based on the financial information of 5 large construction companies operating in the Czech Republic and 5 companies in Portugal, the financial condition of the companies was analyzed and it was determined to what extent existentially the economic situation of the Czech Republic and Portugal influenced the examined companies during crisis period.

In order to identify the general trend of changes in financial stability and determine the most unstable period of the construction industry in the Czech Republic and Portugal Altman Z-Score analysis was applied. The decline in Z-Score corresponds to the beginning of the financial crisis. In most cases, a decrease in this indicator is observed in 2009/2010. This indicates a direct dependence of the financial condition of companies on the financial stability in the country and the direct impact of the financial crisis. In addition, construction companies operating in the Czech Republic have a higher Z-Score, which indicates a lower likelihood of bankruptcy of these companies.

At the stage of analysis of profitability ratios, it was revealed that the construction industry of both countries was negatively affected by the financial crisis. The construction industry in the Czech Republic suffered under the impact of the 2008 financial crisis with the decrease in profitability of all presented firms over the period researched. All the companies under consideration had two waves of sharp drop in profitability indicators in 2009/2010 and 2012/2013. In addition, their profitability decreased significantly. Financial stability of construction companies in Portugal was

even more badly affected. However 2013 year was a turning point for companies' profitability, as the Portuguese economy emerged from recession in the second half of the year. From a comparison of coefficients of profitability of construction companies operated in Portugal and in the Czech Republic, it is important to note that the changes for the researched period in the Czech Republic were more predictable and slow. In addition, the impact of the crisis differs between companies within one country. The difference can be explained by the existing financial condition of the company at the time of the crisis, as well as the internal policy of the company.

As a result of DuPont of the ROE, a key indicator was found that has the greatest impact on ROE, this is Profit Margin. However, the next measure by the degree of influence on the ROE indicator is Equity.

Based on the data obtained, a graphic model of financial management was formed. Steps for its implementation and subsequent use in practice have been developed. Then the model and four hypotheses were tested and confirmed by the example of two companies operating in the Czech Republic and Portugal, OHL CZ and Teixeira Duarte.

The first hypothesis was successfully tested and confirmed.

H1: Model of financial management lead to increasing the efficiency of the construction company.

As a result of the application of the model by both companies, the profitability of companies should increase. The rate of profitability growth depends on the chosen strategy for further development.

The second hypothesis was successfully tested.

H2: Model of financial management is based on establishing key financial and macroeconomic indicators, as well as establishing links between them.

In the process of testing the model in both cases, Profit Margin was identified as the key internal financial indicator. Correlation analysis revealed a significant direct relationship between Profit Margin and GDP per capita in case of Teixeira Duarte.

The third hypothesis was successfully tested.

H3: Model of financial management of company allows considering four possible scenarios of further development.

The model forms 4 strategies for the further development of the financial condition of the company.

The first strategy is aimed at preserving the business, avoiding bankruptcy and liquidating the company. This strategy can be accepted only if ROE < 0. In this strategy, the equality ROE = 0 is taken as the recommended profitability value. According to further calculations, as well as testing the strategy at two companies, it was revealed that in order to achieve this equality, companies need to lower Total Cost so that the condition Sales > Total Cost is met.

The second strategy can be applied if the company's profitability is less than the average profitability of the country's construction companies. If this condition is met, then the average profitability of construction companies in the country is taken as the recommended value of profitability of the company. This strategy aims to increase

competitiveness and financial position of the company. Future testing of this strategy has pointed to the need to reduce Total Cost and increase Equity companies.

The third strategy is based on the benchmark method. The recommended return on equity is calculated as the average ROE on the compared companies. Companies are comparable in size, income, and number of employees and operating in one industry. This strategy is developed if the average profitability of companies is higher than the profitability of the studied company. The resulting average profitability is accepted as recommended. As a result of testing the third strategy, it was also revealed that in order to increase the profitability of the capital of a company, it is necessary to reduce Total Cost and increase the Equity of companies.

To determine the effectiveness of decisions made, the EVA method was used. As a result of testing the effectiveness of decisions, it was revealed that all the proposed strategies under consideration are effective.

The developed model fully meets the purpose of the work. The model is easy to use; it can be used by company managers and analysts, investors, and customers. The model evaluates the financial condition of the company, determines the dependence of financial stability on external factors, determines the tasks that the company must fulfill in order to increase the company's efficiency. The recommendations for the use of the model also provide recommendations for achieving the tasks identified by the model.

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9 LIST OF ABBREVIATIONS

A – Total Assets
BSC - Balanced Scorecard
CAS - Czech Accounting Standards
D - Interest-bearing debt capital
DCF - Discounted Cash Flow
E - Equity
EAT - Earnings after Taxes
EBIT - Earnings before Interest and Taxes
EBT - Earnings before Taxes
EDI - Economic Decline Indicator
EII - External Intervention Indicator
EPI - Environmental Performance Index
IEF - The Index of Economic Freedom
IR - Inflation rate
EVA – Added economic value
EU – European Union
FSI - Fragile States Index
FCF - Free Cash Flow
GII - Global Innovation Index
GDP - Gross domestic product
IASB - International Accounting Standards Board
IFRS - International Financial Reporting Standards
H - Hypothesis
HDI - Human development index
K - Coefficient
LBO - Leveraged Buyout
M&A - Merger Model
N - Number of observations
NOPAT - Net Operating Profit after Taxes
OP - Operating profit
PESTEL - Political, Economic, Social, Technical, Legal and Environmental
PGR - Population growth rate
$\mathbf{R_d}$ - Cost of interest-bearing debt taking into account the tax shield
r - Pearson correlation coefficient
$\mathbf{r_e}$ - Cost of equity
ROA - Return on Assets
ROCE - Return on capital employed
ROE - Return on Equity
ROI - Return on Investment
ROS - Return on sales
S - Sales
SLI - State Legitimacy Indicator
t - Income tax rate
UR - Unemployment rate
WACC - Weighted Average Cost of Capital

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