


***ASSOCIAÇÃO DE POLITÉCNICOS DO NORTE* (APNOR)**

INSTITUTO POLITÉCNICO DE BRAGANÇA

Comprehensive economic and financial analysis of the enterprise activity: approaches, methods and implementation.

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Final Dissertation presented to *Instituto Politécnico de Bragança*

To obtain the Master Degree in Management, Specialisation in Business Management

Supervisors:

Ana Paula Monte

Liubov Kovalska

Bragança, July, 2016.

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Abstract

This thesis intends to analyse the performance and the efficiency of companies and to identify the key factors that may explain it. A comprehensive analysis based on a set of economic and financial ratios was studied as an instrument which provides information on enterprise performance and its efficiency. It was selected a sample with 15 enterprises: 7 Portuguese and 8 Ukrainian ones, belonging to several industries. Financial and non-financial data was collected for 6 years, during the period of 2009 to 2014. Research questions that guided this work were: Are the enterprises efficient/profitable? What factors influence enterprises' efficiency/performance? Is there any difference between Ukrainian and Portuguese enterprises' efficiency/performance, which factors have more influence? Which industrial sector is represented by more efficient/profitable enterprises?

The main results showed that in average enterprises were efficient; comparing by states Ukrainian enterprises are more efficient; industries have similar level of efficiency. Among factors that influence ATR positively are fixed and current assets turnover ratios, ROA; negatively influencing are EBITDA margin and liquidity ratio. There is no significant difference between models by country.

Concerning profitability, enterprises have low performance level but in comparison of countries Ukrainian enterprises have better profitability in average. Regarding the industry sector, paper industry is the most profitable. Among factors influencing ROA are profit margin, fixed asset turnover ratio, EBITDA margin, Debt to equity ratio and the country. In case of profitability both countries have different models.

For Ukrainian enterprises is suggested to pay attention on factors of Short-term debt to total debt, ROA, Interest coverage ratio in order to be more efficient; Profit margin and EBITDA margin to make their performance better.

For Portuguese enterprises for improving efficiency the observation and improvement of fixed assets turnover ratio, current assets turnover ratio, Short-term financial debt to total debt, Leverage Ratio, EBITDA margin is suggested; for improving higher profitability track fixed assets turnover ratio, current assets turnover ratio, Debt to equity ratio, Profit margin and Interest coverage ratio is suggested.

Keywords: comprehensive economic and financial analysis, efficiency determinants, performance determinants, Ukraine, Portugal.

Resumo

Este trabalho pretende analisar a performance e a eficiência das empresas e identificar os fatores chave que os possam explicar. Uma análise abrangente baseada num conjunto de rácios económico-financeiros foi explorada como instrumento que fornece informações sobre o desempenho da empresa e a sua eficiência. Foi selecionada uma amostra com 15 empresas: 7 portuguesas e 8 ucranianas, de vários setores de atividade. Recolheram-se dados financeiros e não financeiros para seis anos durante o período de 2009 a 2014. As questões de investigação que guiara este trabalho foram: as empresas são eficientes/rentáveis? Quais os fatores que influenciam a eficiência/performance das empresas? Há diferenças na eficiência/performance entre as empresas portuguesas e ucranianas, quais os fatores que têm mais influência? Qual o setor de atividade que possui empresas mais eficientes/rentáveis?

Os principais resultados mostram que em média as empresas foram eficientes. Comparando por países, as empresas ucranianas foram mais eficientes. Os setores de atividade apresentam idêntico nível de eficiência. Entre os fatores que influenciam positivamente ATR são os rácios de rotatividade do ativo fixo e ativo corrente, ROA. Os que influenciam negativamente são a margem EBITDA e o rácio de liquidez. Não há diferenças significativas entre os modelos por país.

Em relação à rendibilidade, as empresas possuem baixo nível de performance mas comparando por países, as empresas ucranianas apresentaram maior rendibilidade, em média. Relativamente ao setor de atividade, a indústria do papel é a mais rentável. Entre os fatores que influenciam o ROA, estão a margem de lucro, a rotatividade do ativo fixo, a margem EBITDA, o rácio *Debt-to-Equity* e o país. No caso da rendibilidade, existem modelos diferentes por país.

Às empresas ucranianas é sugerido que prestem atenção aos fatores: peso do passivo corrente no passivo total, ROA, rácio de cobertura de juros de modo a se tornarem mais eficientes; à margem de lucro e à margem EBITDA para melhorar a performance.

Às empresas portuguesas sugere-se, para melhorar a eficiência, a observação e melhoria da rotatividade dos ativos fixos, rotatividade dos ativos circulantes, peso do passivo de curto prazo no passivo total, rácio de endividamento e margem EBITDA. Para melhorar a rendibilidade, acompanhar a rotatividade dos ativos fixos, a rotatividade dos ativos correntes, o rácio *Debt-to-Equity*, a margem de lucro e o rácio de cobertura dos juros.

Palavras-chave: Análise económica e financeira abrangente, determinantes da eficiência, determinantes da performance, Ucrânia, Portugal

Анотація

В магістерській роботі проаналізовано ефективність і прибутковість компаній, визначено ключові фактори, які їх можуть пояснити. Комплексний аналіз, заснований на сукупності економічних і фінансових показників був вивчений як інструмент, який забезпечує інформацію про діяльність підприємства і його ефективність. Було обрано вибірку з 15 підприємств: 7 португальських та 8 українських, що належать до різних галузей. Фінансові та не фінансові дані зібрано протягом 6 років за період з 2009 по 2014 рік. Ключові питання роботи: Чи підприємства ефективні/прибуткові? Які фактори впливають на ефективність/продуктивність підприємств? Чи є різниця між ефективністю/продуктивність українських і португальських підприємств та які фактори мають більший вплив? Який промисловий сектор представлений більш ефективними/прибутковими підприємствами?

Основні результати показали, що в середньому підприємства були ефективними; порівнюючи за країнами, українські підприємства є більш ефективними; галузі мають однаковий рівень ефективності. Серед факторів, що впливають на коефіцієнт оборотності активів позитивний вплив мали коефіцієнти оборотності оборотних та необоротних активів, рентабельність активів, негативно впливали операційна рентабельність продажів і коефіцієнт ліквідності. Суттєвої різниці моделей за країнами не знайдено.

Що стосується прибутковості, діяльність підприємств має низький рівень прибутковості, однак, порівнюючи країни, українські підприємства є більш прибутковими. Стосовно галузей, целюлозно-паперова промисловість є найбільш прибутковою. Серед факторів, що впливають на рентабельність активів належать чиста рентабельність продажу, коефіцієнт обороту необоротних активів, операційна рентабельність продажів, коефіцієнт загальних зобов'язань до власного капіталу та країна походження. У разі рентабельності обидві країни мають різні моделі.

Для українських підприємств запропоновано звернути увагу на показники відношення короткострокових зобов'язань до загальної заборгованості, рентабельності активів, коефіцієнт покриття процентних платежів для більшої ефективності; чистої та операційної рентабельності продажів для більшої прибутковості.

Для португальських підприємств з метою підвищення ефективності запропоновано слідкувати та поліпшувати значення коефіцієнтів оборотності необоротних та оборотних активів, показника короткострокового фінансового боргу до загальної заборгованості, левериджу, операційної рентабельності продажів; для підвищення прибутковості запропоновано слідкувати за значенням коефіцієнтів оборотності необоротних та оборотних активів, коефіцієнта загальних зобов'язань до власного капіталу, чиста рентабельність продажу і коефіцієнтом покриття процентних платежів.

Ключові слова: комплексний економічний і фінансовий аналіз, детермінанти ефективності, детермінанти прибутковості, Україна, Португалія.

Resumen

Esta tesis tiene la intención de analizar el desempeño y la eficiencia de las compañías y identificar los factores clave que pueden explicarlo. Un exhaustivo análisis basado en un grupo de relaciones económicas y financieras fue estudiado como un instrumento, el cual brinda información sobre el desempeño de la empresa y su eficiencia. Fue seleccionada una muestra con 15 empresas: 7 Portuguesas y 8 Ucranianas, pertenecientes a varias industrias. Fueron colectados por 6 años datos financieros y no financieros durante el periodo 2009 a 2014. Las preguntas de investigación que guiaron este trabajo fueron: ¿Son las empresas eficientes/rentable? ¿Qué factores influyen en la eficiencia de las empresas'/rendimiento? ¿Hay alguna diferencia entre las empresas Ucranianas y las Portuguesas, eficiencia/desempeño, cuales factores son más influyentes? ¿Cuál sector industrial es representado por las empresas más eficiente/rentables?

Los principales resultados mostraron que en promedio las empresas eran eficientes; comparando por estados, las empresas Ucranianas son más eficientes; las industrias tienen un nivel similar de eficiencia. Entre Los factores que influyen positivamente ATR son los índices de rotación de los activos corrientes e no corrientes, ROA; los que influyen negativamente son el margen EBITDA y el ratio de liquidez. No hay diferencia significativa entre los modelos según el país.

En cuanto a la rentabilidad, las empresas tienen un desempeño bajo, pero en comparación con otras empresas, las empresas Ucranianas tienen mejor rentabilidad en promedio. En cuanto al sector industrial, la industria del papel es la más rentable. Entre los factores que influyen en ROA, están: el margen de rentabilidad, índice de rotación de los activos fijos, el margen de EBITDA, el endeudamiento y el país. En el caso de la rentabilidad ambos países tienen diferentes modelos.

Para las empresas de Ucrania, se sugiere prestar atención sobre los factores de la deuda a corto plazo del monto total de esta, ROA, cobertura de interés con el fin de ser más eficientes, margen de ganancia y margen de EBITDA para hacer su mejor desempeño.

Para mejorar la eficacia de las empresas Portuguesas, es sugerido la observación y mejoramiento del índice de rotación de los activos fijos, índice de rotación de los activos corrientes, deudas finánciales a corto plazo del total, el ratio de apalancamiento y el margen de EBITDA; para incrementar el rastreo de rentabilidad, se sugiere el índice de rotación de los activos fijos, índice de rotación de los activos corrientes, coeficiente de endeudamiento, margen de ganancia y la cobertura de intereses.

Palabras clave: análisis económico y financiero integral, determinantes de eficiencia, determinantes de desempeño, Ucrania, Portugal.

To my loving family

Acknowledgements

I would like to thank my thesis coordinators Prof. Ana Paula Monte at IPB for the support and open door whenever I had questions about my research or writing and Prof. Liubov Kovalska at LNTU for coordination of my work and support despite the distance.

I would also like to acknowledge International Credit Mobility Programme which gave me such opportunity.

Finally, I must express my very profound gratitude to my family for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis, despite long distance between us. This accomplishment would not have been possible without them. Thank you.

Abbreviations and Acronyms

ATR – Asset Turnover Ratio

BPM – Business Performance Management

BSC – Balanced Scorecard

CATR – Current Asset Turnover Ratio

CSP – Corporate Social Performance

EBIT – Earnings Before Interest and Taxes

EBITDA – Earnings Before Interest, Taxes, Depreciation and Amortization

FATR – Fixed Asset Turnover Ratio

K-S Test – The Kolmogorov-Smirnov Test

LiqR – Liquidity Ratio

LR – Leverage Ratio

NWC – Net Working Capital

ISO – Organization for Standardization

RH – Research Hypothesis

ROA – Return on Assets

ROE – Return on Equity

S.D. – Standard Deviation

TEUR – Thousand Euros

VIF – Variance Inflation Factor

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Introduction

Nowadays every enterprise set stable development and efficiency as a target to achieve. This is due to market requirements to increase efficiency, implement successful management techniques and modern technologies surrounded by continuous competitiveness conditions. Solution to those problems is results of a comprehensive economic and financial analysis which allow making optimal management decisions for the further development of the enterprise and enhancement its performance or profitability.

Research purpose of thesis work is to study theoretical basis of enterprise performance and efficiency, factors which influence them, approaches and methodological aspects of conducting comprehensive economic and financial analysis.

The following tasks were set and solved in the diploma work in order to achieve this goal:

- essence of the categories "performance", “efficiency” and “effectiveness”, was revealed, whose meaning is important for improving the efficiency of enterprise performance;
- existing determinants of the performance were studied;
- methodical approaches of comprehensive economic analysis of enterprise's economic activity were analyzed and on this basis modern and more substantiated method of its implementation was developed;
- the researched methodology was made (objectives, collecting data process, sample, applied methods were chosen)
- comprehensive economic analysis of enterprise was made in order to identify level of efficiency and performance, identify factors impact and presentation of its results was given;

The practical object of the study was to conduct economic and financial analysis of enterprise efficiency and profitability via linear regression analysis of comprehensive indicators (Asset Turnover Ratio and Return on Assets), identify factors of influence and their impact on dependable variables; use the results to define average efficiency and profitability levels among the sample in general or separately by its country (Portugal or Ukraine) or industry (paper; building materials; building; steel or engineering (automotive)).

The research sample consists of 90 observations in total: 7 enterprises from Portugal and 8 enterprises from Ukraine, which operate in industrial sector of economy. The chosen enterprises belong to 5

sectors: paper; building materials; building; steel and engineering (automotive). Each enterprise had been studied during 6 years, for the period of 2009 to 2014.

The subject of the thesis work was a set of theoretical and methodological and applied aspects of implementation of a comprehensive economic and financial analysis of enterprises efficiency and profitability.

Methodology used for data collection included document review combining case study method. Research methods were based on general scientific and empirical methodical techniques of economics. During the literature review economic-statistical and mathematical methods of analysis, abstraction techniques were used. Also such general theoretical methods of scientific knowledge as synthesis, deduction, induction and other methods were used. Concerning methodical approaches, according to specific scientific (empirical) research of selected topics was conducted, among them the most frequently used in the work were calculation and analytical methods of comparison, data grouping, summarizing.

The main method used during practical part was linear regression analysis compared with descriptive and inferential analyses were conducted using Microsoft Excel and SPSS software.

The information base for research is articles, books and other scientific works of scientists regarding the importance and role of efficiency, performance or analysis of enterprise, methodical approaches to the implementation of a comprehensive economic analysis of the enterprises activity, features of engineering enterprises and tutorial for SPSS program and books of econometrics. Secondary data was retrieved from statistical, annual reports of enterprises for the period 2009-2014.

1. Literature Review

1.1. Importance of enterprise performance

Because of continuing change of economy state and constant threat of decline, the need of entities to achieve the best possible results and make higher profit, it is imperative that companies be able to analyze their overall performance and assess the current financial state. In the end, in order to make optimal decisions, which going to result in improving the enterprise success, managers should have all the information needed. In our opinion, the best way to achieve better performance is to conduct comprehensive economic and financial analysis and to understand the factors that influence the companies' financial performance (primarily the economic and financial factors).

Efficiency is one of the main categories of the economy, which is directly linked to the achievement of the final results of the company. The world is constantly changing and is always characterized by continuous progress; also the market economy does not remain constant. All of those require from enterprises active steps to improve their activity performance. In order to get success it is obligatory to develop and provide sustainable performance.

In this way it should be discussed the concepts of enterprises' performance, determinants of performance, economic and financial indicators of enterprises' performance and methods.

In this section, a review of literature on importance of enterprise performance is performed where: differentiation between efficiency types connected to the enterprise success is reviewed; the determinants of enterprise's performance are highlighted; and, finally, present the concepts for evaluating enterprises' activity, approaches and mechanism of conducting comprehensive analysis of the enterprises' activity performance.

1.1.1. Enterprise performance, efficiency and effectiveness

The success of any enterprise can be measured in different ways. In our time commonly are made mistakes in scientific field connected to the enterprise performances. To achieve optimal required targets the meaning of efficiency is considered by its synonymous feature.

The concept of "efficiency" in the broadest sense means effectiveness, efficiency, performance etc. There are a lot of cases of misusing or misunderstanding one of those words instead of another. Lexicologically, the difference is given below (Longman Dictionary, 2009):

Effectiveness – the quality of doing something successfully, as a result working in the way it was expected to;

Efficiency – the quality of doing something well and effectively, without wasting time, money, or energy;

Performance – how well or badly a company does a particular activity (suggestively used with next adjectives such as good, strong, poor, disappointing, lackluster, economic, financial etc).

Difference between those words is that effectiveness means reach the goal by any means and efficiency – reaching goal with less resource costs. Shortly, being effective is about doing the right things, while being efficient is about doing things right.

Scientifically speaking, the difference between these categories was well researched.

Review of determination of efficiency was carried, in particular, by Adzhavenko (2014), who had determined that efficiency can be defined from different angles, as a set of properties and constituent elements: productivity, operability, economy (a measure of the use of system resources), quality, profitability, quality of working life.

The issue of determining efficiency worried scientists for a long time (Adzhavenko, 2014). Proponents of the praxeology theory defined "efficiency" as the achievement of maximum effect with minimum expenditure of resources.

Thus, economists from period of formation and development of economic theory (Smith for instance) equated the researched category to the result of production, which acquired monetary term. Ricardo (mentioned by Adzhavenko, 2014) defined efficiency as the ratio obtained result to the incurred costs. Marx considered efficiency in terms of effectiveness of use of production resources. Pareto defined "efficiency" as "a criterion for assessing the economic situation that characterizes the state of the economic system in which it is impossible to carry out changes in order to better meet the wishes of one person while not causing damage to meeting the wishes of another person" (Adzhavenko, 2014, p.266).

Ukrainian scientist (Adzhavenko, 2014) distinguished between terms "efficiency" and "effectiveness" as follows: “efficiency” is used in the sense of the production efficiency and "effectiveness" in the sense of

productivity and sounds like the category of "system performance", which is widely used in the sense of efficient use of resources, capital, land, energy and information.

Brodska and Kalmykova (2010) understood efficiency as a provision of necessary conditions of the enterprise functioning, as the ratio of outcome and expenses, and the essence of productivity an assessment of resource, as a carrier of result growth.

According to Ukrainian scientists the term “efficiency” should be used in the sense of rationality or efficiency, and the term «effectiveness» translated as efficacy or productivity.

Kutsenko (2008) claimed that the category "efficiency" have been inherent only for purposeful actions and implied primarily the degree of achieving the goal and have provided getting desired planned positive results on the condition of productivity increase and minimization of costs. The researcher claimed that the efficiency, economy, effectiveness and productivity were performance characteristics and their identification was incorrect (Kutsenko, 2008).

Adzhavenko (2014) went through dictionaries of economists and had found following definitions: "efficiency is the ratio of result indicators (effect) and expenses (or sum of resources) used to achieve it" citing Blank (1998, p. 380-381); “efficiency in the context of organizational behaviour is an optimal ratio of production, quality, effectiveness, flexibility, satisfaction, competitiveness and development, but as criterion it is the ratio of performance results to resources” citing Gibson, Ivantsevych (2000, p. 21).

Efficiency of enterprise can be defined as summation of effective optimal well-made business decisions, which were developed, adopted and implemented at the enterprises (Bozhydarnik & Krivovyazyuk, 2014).

After researching definition of the economic efficiency made by leading scientists, Cherep and Strilets (2013) suggested the following interpretation of that category: economic efficiency is the maximum benefit that can be obtained at a minimum cost in the process of economic activity taking into account of additional conditions that occur at the moment of determining the effectiveness of relevant economic event. In that case economic event meant the introduction of new products, concluding contracts with suppliers, acquisition or modernization of new equipment, increase of production output and so on (Cherep & Strilets, 2013).

Ruda (2012, p.110) stated: “the effective activity of enterprises depends on the direct effect of gaining profit. However, it cannot be equated with the absolute amount of profit. Enterprise efficiency is determined by its profitability (return). Profitability - is a relative measure, i.e. the level of profitability, measured as a percentage”.

As written by MÍkva (2013), performance is an economic category which is closely linked to the systemic view of its measurement and evaluation. The system whose performance is to be measured and evaluated corresponds to its internal structure. To measure the performance of the enterprise is, therefore, necessary to know which (and also how) subsystems of its internal structure contribute to the overall performance.

Hamel efficiency of enterprise's management equated with performance of management processes (Hamel, 2001). A similar trend can be found in the International Organization for Standardization (ISO) standards. ISO promotes the adoption of a process approach when developing, implementing and improving the effectiveness of a quality management system, to enhance customer satisfaction by meeting customer requirements. Understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its intended results. The process approach enables enterprise to control the relations among processes and as the result company's performance enhances. For instance, in the **Figure 1** schematic representation of process and shows the interaction of its elements can be observed.

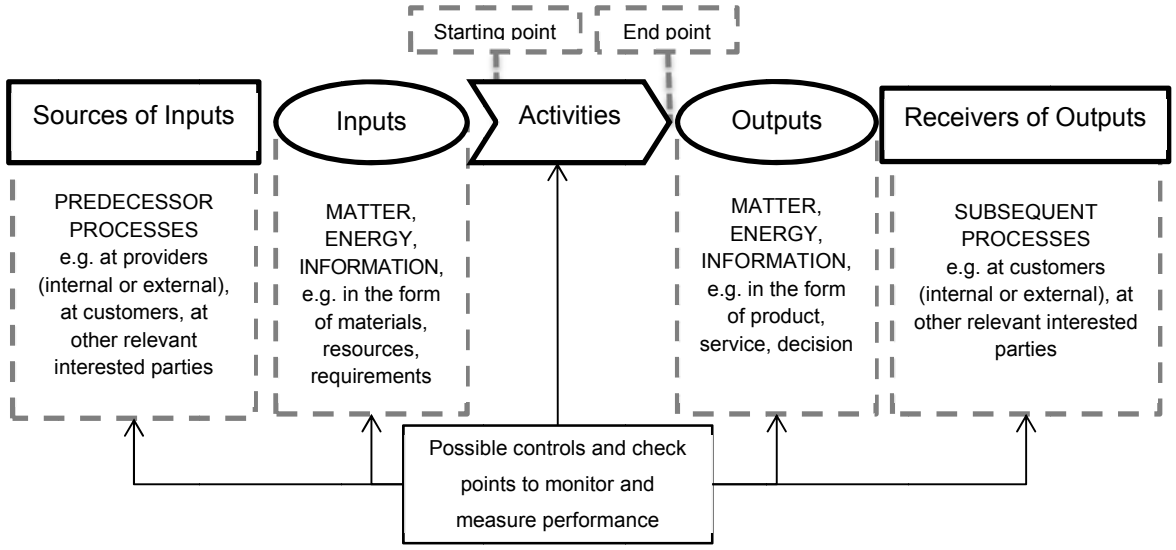

Figure 1. Schematic representation of process approach in ISO/FDIS 9001:2015.

Source: ISO (2015, p. viii).

As an economic category, efficiency is the qualitative and quantitative characteristics of performance management (Krivovyazyuk, 2012). It is typical for the whole reproduction process and all its phases separately including (production, distribution, exchange and consumption); describes the activities of any business section and economic systems at all levels (companies or industrial enterprises, households, industries, region, state economy as a whole).

Nowadays, efficiency is frequently divided into economic, social, socio-economic and environmental. Also economic science distinguish static efficiency - the ability of the economic system to provide consumer with the highest level of satisfaction of its demand at the expense of existing amount of funds, resources, technologies, and dynamic efficiency - the ability of the economy to increase the

satisfaction of consumer demand through the introduction of technological innovations and technological changes in economic systems.

Regarding the delimitation of categories "economic efficiency" and "financial efficiency" of enterprise activity, it is necessary to consider the sphere of their contextual manifestation (Turylo & Zinchenko, 2010). It is easy to show their difference by using structure of the balance sheet, which is divided into assets and liabilities. Thus the economic efficiency associated with assets, and financial performance - with its liabilities. Economic efficiency includes and reflects the entire economy of the enterprises, i.e. all types of its activities together (in its various classifications). Such set of activity types in their unity creates economic activity of the enterprise of the enterprise, which, in turn, is evaluated by economic efficiency. It is well known that efficiency is defined by the ratio of the result (effect) and expenses. Therefore, the effect of economic activity is economic.

Financial effect, in their view, is significantly different from economic, because it should reflect the specifics of enterprise's finances, contents of its financial activities. The economic effect in the form of profit is directly related to all the economic resources of the enterprise and occurs only in the process of their direct use. Such resources in the company are in the form of specific assets (material and real, not physical, financial) (Turylo & Zinchenko, 2010).

It had great importance to determine the meaning of these categories, but it also important not to miss modern trends and appearances of some new definitions.

For example, on the contrast to various researches on relations between international diversification and corporate results Aguilera-Caracuel, Guerrero-Villegas, Vidal-Salazar and Delgado-Márquez (2015) concentrated their attention on the effects of internationalization on firms' social performance. According to researchers citation, Corporate Social Performance (CSP) is ''the measurement of the general performance of organizations in protecting improvement of social well-being, compared to their main competitors, for a given period of time'' (Aguilera-Caracuel et al., 2015, p. 324).

System of methods, processes, instruments, organizational structures and their relationships that determine the content of enterprise performance management process, and solve together its main problem (ensuring continuity and sustainability of the process of efficiency increase) as the organizational-economic mechanism of performance management has been studied by Goncharuk (2009).

Great importance nowadays has performance management, which according to Armstrong (2006) is systematic process for improving organizational performance by developing the performance of individuals and teams. It is a tool for achieving better results through the understanding and management of performance and on the basis of the agreed framework of the planned objectives, standards and requirements to the competencies and behavior.

The modern way of performance evaluation is based on the assumption that the company is efficient if it is able to achieve pre-defined strategic objectives (MÍkva, 2014).

The definition of efficiency found place in a large number of studies, our vision of effectiveness, efficiency and performance according to aspects of economic practice is given next:

- Effectiveness is a measure characteristic which shows if everything is going according to made plan and if company achieves set targets;
- Efficiency is a measure which shows quality of some activity, ability not only achieve target but do it with less costs spent;
- Performance – characteristic of success connected to specific activity.

1.1.2. Determinants of the performance of an enterprise

One of the central questions in economy is why some firms succeed and others fail. Enterprise success is influenced by many factors and variables. Determining which factors influence performance had great importance for all business participants: entrepreneurs, advisors, investors, managers etc.

Determining the firm performance using a set of financial measures has been and still is an interesting and challenging problem. Every manager (decision-maker) is interested in identifying factors that influence or help to predict the firm performance. Thus, many researchers studied the factors influencing enterprise performance.

Performance is the characteristic of how well enterprise activity is and it is a measure of a firm's overall financial health over a period of time. And it can be measured by several components of enterprise activity.

Among general ways of determining how well company is functioning are:

- performing is comparing the results of initiatives to objectives and evaluating if results met targets;
- use of financial indicators to evaluate company's business performance and compare it to other companies results.

Any manufacturing requires an organic combination and interaction of four factors - labour, fixed assets, objects of labour and land (Hohlov & Balykov, 2012). Consumption of these resources is carried out during manufacturing process in order to produce final products. Performance shows whether the result achieved more efficiently (meaning less used resources); the representation of such correlation is shown in Figure 2.

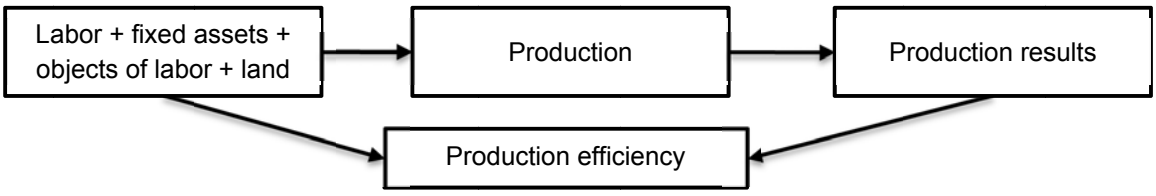

Figure 2. Efficiency Performance model.

Source: Author's own elaboration based on Hohlov & Balykov (2012, p. 68).

A lot of factors were researched by scientists in context of variety of performances' types. Among factors of influence, the literature has established that slack financial resources can play an important role in improving CSP. In particular, Aguilera-Caracuel et al. (2015) analysed whether excess financial resources can lead to better benefits of the multinational enterprises (MNEs) gained from their international cultural diversification and as a result can lead to conducting advanced corporate social responsibility activities, which improve their CSP level (Aguilera-Caracuel et al., 2015).

In order to achieve the availability of this resource companies need to conduct their activity in the best possible way resulting in good financial performance which will result in financial slack.

The results of Aguilera-Caracuel et al. (2015) research demonstrated positive correlation between international cultural diversification and the social performance of researched firms (113 USA's multinational enterprises) and that a high level of slack financial resources in firms which functioning in markets with different cultural profiles leads to improve their CSP. Thus, the presence of slack financial resources should be considered as an internal enhancing factor that allows improving the CSP.

Vătavu (2014) in order to highlight determinants of profitability made analysis based on cross sectional regressions. The performance indicators were based on the rest of variables, where performance was considered as a function of financial and non-financial indicators. The used model presented in equation 1 (Vătavu, 2014, p. 332):

$$\text{Performance} = f(\text{debt, tangibility, size, liquidity, risk, taxation, inflation, crisis}) \quad [1]$$

Return on Assets (ROA) was set as a performance proxy, the variables (factors) which had influence were debt, asset tangibility, size, liquidity, taxation, risk, inflation and crisis. Regression results indicated that Romanian companies had had higher performance when they have been using limited borrowings. Negative impact on dependent variable had tangibility, business risk and the level of taxation. Though earnings are provided by significant sales turnover, performance is affected by high levels of liquidity. Unstable economic times displayed by high inflation rates and the current financial crisis, which also had strong negative influence on total corporate performance (Vătavu, 2014).

Microeconomic determinants that influence in a positive manner a firm's performance were detected as the firm's size, its capital intensity and its human resources (Pantea, Gligor & Anis, 2014). Firm size had the most significant impact on performance; especially if measured through ROA, which indicates that during firms' growth they have more attention from stakeholders, have greater control over resources, promotional opportunities, better employees, net economies of scale etc. Analysis also showed that firm growth has no linkage to performance, contrary to the majority of current studies' results. Capital intensity strongly correlated with performance i.e. a high degree of automation enables the firms to reduce costs, errors and loss, positively influencing the selected performance indicators. Besides human resources was valuable source for firms, in terms of strategic advantages and enhancing financial performance.

In order to identify indicators that impact corporate financial performance and determine the ones with the most affect, Ching and Gerab (2012) used principal component and multiple regression analyses of 16 Brazilian listed companies for the period 2005-2009 (Ching & Gerab, 2012). Principal Component Analysis was used in their study and as the result five factors that impact financial performance were extracted from 20 variables and ratios. The variable with the biggest component loading in each one of the five factors represented it in the multiple regression analysis. The last analysis was used to confirm indicators influence on corporate profitability and define the influence level. The financial performance of companies was assessed using five factors: firm size (the most predominant accounted for 26.9 % of total variance), working capital management, solvency (liquidity), margin, financial debt (the least important, accounted for 9.1 %).

The influence of several variables on the financial performance in the context of capital structure was made by Banerjee and De (2014). In their work independent variables such as “business risk”, “size of the firm (log(sales))”, “growth rate”, “debt service capacity (interest)”, “dividend payout”, “financial leverage”, “degree of operating leverage”, “firm’s age” and “size of the firm (log(assets))” were researched to find out which might have some impact on the profitability of the Indian iron and steel industry. The study showed that “financial leverage”, “debt service capacity (interest)” and “size of the firm (log assets)” are significant factors influencing the profitability of the firms (Banerjee & De, 2014).

The “financial leverage” calculated as a ratio between total debt and total asset. Results showed that larger amount of debt in the capital structure may cause lower profitability (Banerjee & De, 2014). That is why there is an inverse relationship between the financial leverage and financial performance.

“Debt service capacity (interest)” calculated as the ratio between Earnings Before Interest and Taxes (EBIT) and interest. If variable increases, there is a probability that EBIT and profitability also increases. The firm with higher debt service capacity can bear higher interest charges without strong complications (Banerjee & De, 2014).

Size (log (assets)) research indicated that profitability increase follows increase of “size”. The authors stated that it is the most important variable for every firm because a firm’s sustainability mostly depends on its “size” (Banerjee & De, 2014).

While Bychkova and Konovalova (2013) have been researching financial activity of transnational corporation used regression analysis, in general obtained results demonstrate the direct dependence of the effectiveness of financial activity on free cash flow and the coefficient of tangible assets and the reciprocal dependence on intensity factor of products sales. The bigger tangible asset’ coefficient value more sustainable enterprise is going to be. The main feature of corporations that operate in the real economy sector, is a high weight of tangible assets in the capital structure of companies, so that is why source of financing tangible assets has great importance. With increasing proportion of tangible assets acquired with their own funds, corporations' profitability index of the invested capital increases because tangible assets potentially allow cheaper attraction additional funds on bail, reducing the weighted

average cost of capital. Significant impact on profitability index of the invested capital also has intensity factor of product sales, which describes the number of days during which the company keeps products before they sell it. In the result of slowdown in intensity factor of product sales the profitability of its activity is reduced.

Firm and business financial performance can be measured in the form from individual relationships in models linking various hypothesized causal variables to various performance measures. In which case, the causal variables describe combinations of environment's elements, firm strategy and organizational characteristics.

According to the study of Capon, Farley and Hoenig (1990), the review of financial performance's determinants included analysis of both dependent variable measuring financial performance and nonfinancial explanatory factors. Financial performance variables had included widely-used measures embracing levels, growth and variability in profit (typically related to assets, investment or owner's equity) as well as such measures as market value, assets, equity, cash flow, sales and market/book value. Nonfinancial explanatory variables include environmental, strategic, and formal and informal organizational factors. Some variables had served as both explanatory and performance characteristics (for example, sales growth).

Another study employed next methodology: the underlying dimensions of the financial ratios were identified by using exploratory factor analysis, which was followed with discovery of any possible potential relationships between the firm performance and financial ratios using predictive modelling methods (Delen, Kuzey & Uyar, 2013). Results defined next factors: liquidity (the most significant, was explaining 11.48% of the total variance); asset structure (the second most significant factor was explaining 9.59% of the total variance); asset and equity turnover ratio (9.1% of the total variance) and showed how efficiently a company used its assets and equity to generate sales revenues; gross profit margin (6.95% of the variations); financial debt ratio (6.58% of the variations); current assets (5.29% of the variance); leverage (4.83% of the variations); net profit margin (4.81% of the variance); net working capital (NWC) turnover ratio (3.99% of the variance); sales & profit growth ratio (3.92% of the variance); asset growth ratio (3.89% of the variance). In this study decision tree algorithms (like C5.0, Classification and Regression Trees (C&RT), and Chi-squared Automatic Interaction Detector (CHAID) and The Quick, Unbiased, Efficient Statistical Tree (QUEST)) were used to evaluate the financial performance of Turkish companies listed on the Istanbul Stock Exchange. According to findings of conducted prediction models, two profitability ratios (i.e., EBIT ratio and net profit margin) have the biggest impact on company performance. These ratios indicate the potential ability of a company to control their costs and expenses. The leverage and debt ratios had impact on a company performance as well and the sales growth and Asset Turnover Ratio (ATR) had indicated the ability of a company to generate sales. For improving its overall performance firm must have high sales performance. Finally,

findings corroborated the Dupont analysis, which decomposed Return on Equity (ROE) into the three multiplicative ratios of Profit margin, Asset Turnover, and Leverage.

The relations of capital structure and performance were a topic of Salameh, Al-Zubi and Al-Zu'Bi (2012). The results have shown absence of relationship between capital structure determinants or Leverage Ratio (LR) and ROE. For instance there was no relationship between some of the capital structure determinants (Tangibility & Risk) and ROA, and positive relationship between other determinants such as Liquidity, Size and Growth and ROA. Finally, the results declare that there is negative relationship between LR and ROA. Obtained results authors explained by the specialty of the Islamic Economy.

Capon et al. (1990) in his research used a meta-analysis which refers to research approach, where results from several studies are examining relationships between similar variables. Obtained results showed existence of such factors that had great impact on financial and economic activity:

- Industry concentration had clear direct effect on firm performance;
- Growth was consistently related to higher financial performance. Besides, growth in assets and sales individually showed positive relationships to performance at both industry and firm/business levels of analysis.
- Market share was positively associated with financial performance;
- Firm/business size of firm or business was revealed as unrelated to financial performance, there was connection when the size was measured as industry level sales.
- Capital investment intensity had a positive relationship to financial performance at the industry level. But higher investment was related to lower performance at individual level.
- Influence of certain strategic factors, like advertising intensity, Research and Development (R&D) spending is positively related to financial performance etc.

Basic results of the meta-analysis can be rechecked by conducting individual analysis.

In the end, factors contributing to increased financial performance include (Capon et al., 1990): industry concentration, growth, capital investment, size and advertising, market share and R&D. The study also identified geographic dispersion of production, barriers to entry and economies of scale, product and service quality, vertical integration, corporate social responsibility, and lower levels of debt and less diversification as positive performance contributors (Capon et al., 1990).

More theoretical approach in order to define determinants was done by Babeľová, Kučerová and Homokyová (2015). In their opinion sustainable performance is impossible to achieve without best employee performance. In authors' work, highly importance of assessment systems, which were used to measure and evaluate performance of employees have been researched and proved. The description of the gaps in interconnections of workforce performance assessment systems with the whole enterprise performance measurement in surveyed enterprises in Slovakia was made: 142 enterprises were asked to highlight what is the enterprises performance. 66.9% understood it as the

ability of the enterprise to achieve stated objectives in most of the enterprises, 27.8% - as the amount of work done in a specified time. Rest of answers related to characteristics of employee performance (3%), or combination of this options, revenues or ability of enterprise to achieve the stated objectives and to be competitive (2.3%). The results showed that only the minimum number of representatives of enterprises associated enterprise performance with the performance of its staff. Such results implicates that workforce performance is not a priority for most of them and unlikely to be systematically managed, which may cause serious lacks in performance management of the enterprise as a whole (Babeľová et al., 2015).

Labour as a factor was studied by Novotná and Volek (2015). They precisely researched close connection between labour productivity growth in agricultural enterprises (1098 enterprises from the Albertina database) and rise of their financial performance. Results of the study confirmed close relationship between indicators of efficiency of labour production factor and those showing financial performance.

The importance of financial and non-financial indicators for evaluating company's performance was researched in the work of Kotane (2015). Made analysis showed that the highest evaluation in the groups of financial factors are provided by indicators of Gross profitability, Net turnover, Inventory turnover, Total debt ratio in the balance, Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) profitability, and Return on investments; and non-financial by indicators of Company reputation, Development of new products or services, and Level of employees satisfaction.

Comparing the financial and non-financial indicators within the factor groups, the non-financial indicators of Role and influence of consumers and Role and influence of employees are evaluated higher than financial indicators of 'Solvency and profitability', 'Efficiency of assets use and financial stability' and 'Evaluation of investment possibilities', which confirmed the necessity to use the non-financial indicators in the evaluation of the performance of companies.

Kotane and Kuzmina-Merlino (2012) suggested for more effective analysis to use the system of financial indicators which should have taken into account content dependable from industry and conditions of companies. According to them, the basis for mentioned system of financial indicators should have included: Current ratio; NWC to Sales ratio; Debt to Equity; Financial cycle; Sales margin; ROE; Maturing. Those financial indicators were optimal and correlated and correspond to each other. Besides indicators, financial analysis made by owner (manager), interpretation of information has great importance. That is why circumstances must be always taken into consideration while calculating financial indicators.

The performance measurement should include five main dimensions: financial, market and customers, processes, employee development and of standards for the future (Rylková & Bernatík, 2014). Where sales, profits and return on investment reflect financial dimension; the dimensions of the market and customers evaluate customer satisfaction, retention and quality of services; in process' dimension the

length and quality of processes is evaluated; the dimension of employee development evaluate employee's motivation and capacity of information system and, lastly, standards for the future include assessing strategic planning, forecasting and preparing for unexpected changes. Innovation activities, written strategy, management method and cooperation have significant impact on business performance measurement (Rylková & Bernatík, 2014)

Efficiency of the enterprise also could be associated with profitability. Lim (2014) stated that profitability driven by operating activities is more strongly associated with returns than profitability driven by financing activities.

The role of financial indicators in the improvement of company's performance indicators and how an organization can improve its financial results and capacity presented in the Figure 3 below.

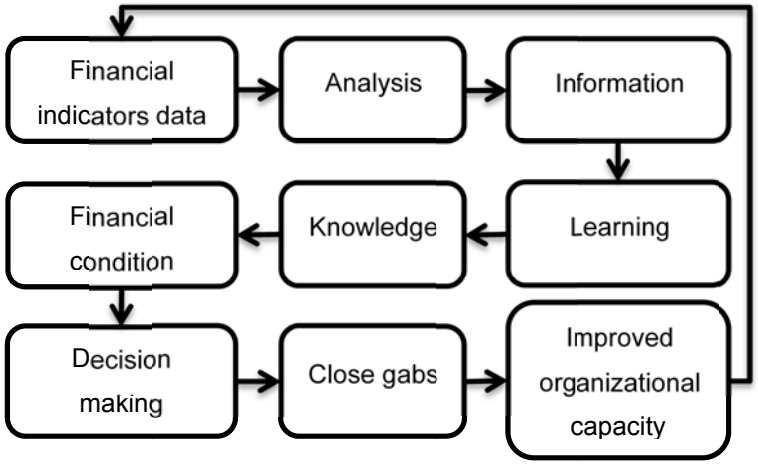

Figure 3. Use of financial indicators with continuous quality improvement to improve organizational capacity.

Source: Author's own elaboration based on Suarez, Lesneski and Denison (2011, p. 420).

In addition to the financial indicators MÍkva (2014) examined also the non-financial indicators, taking into account all involved entities.

The growing proportion of the non-financial indicators in the systems of measurement and evaluation of enterprises is associated with introducing quality management systems. Author analysed concepts of International Standardization Organization and Total Quality Management, which systems of indicators focus on monitoring the non-financial indicators in the following areas:

- Customers of the enterprise;
- Suppliers;
- Human resources management;
- Area of the enterprise processes.

Non-financial indicators provide valuable information in several areas of the enterprise; they focus on those factors that cannot be captured using the financial indicators. According to MÍkva (2014), their monitoring had a major impact in terms of the ultimate performance of the enterprise in the area of achieved economic results.

Strategy can be one of the most important enterprise's success factors (Boguslauskas & Adlytė, 2010).

Determinants forming the financial and economic results of the enterprise activity could be a set of strategic resources (intellectual, innovation, information and organizational). Exactly those resources have been generating the level and balance of traditional resources and created conditions for forming competitive advantages based on potential resource combinations that produce increasing financial and economic performance in the long run (Ishchenko, 2013).

Ishchenko (2013) suggested a conceptual approach to formalizing influence of strategic resources which is based on the pyramid of resource provision. Expedience of assessing the level of strategic resources that determine the pyramid height was proven in the light of, firstly, condition and effective use of traditional resources; secondly, their balance and structural and component compliance. Consequently, strategic resources identified as endogenous factors forming sustainable competitive advantages that are precondition for increasing financial and economic performance.

Jain and Prakash (2016) examined the relation between multinationality and firm performance in Indian software firms. The results showed the evidence that the relation between firm performance and internationalization is nonlinear. Also analysis revealed that active market-seeking relative to labour-seeking motives do have a positive effect on performance, and it does moderate the relation between performance and internationalization.

The effectiveness of activity is influenced by internal and external factors, the last are not related to management, for instance - resource prices, demand, political factors, macroeconomic factors. Random events like changes in raw material quality, weather conditions, etc. may also affect the enterprise activity (Lobov, 2015).

According to Moser (2015) the readiness to implement latest technologies and management techniques on the enterprises was factor which contributed to the strong performance.

1.2. Evaluation of the enterprises' efficiency, approaches and mechanism of conducting comprehensive economic and financial analysis of enterprises activity

One of the key factors of industrial enterprises success certainly is their sustainable performance. The procedure for evaluating the efficiency of management enterprises activity raises the problem of selecting the method based on which the analysis has to be done.

The effective measuring of performance is the key to ensure that the enterprise strategy is implemented successfully that is why examination of methods for performance evaluation is given below.

Financial results of enterprises are an important economic category which has to be considered as a multidimensional (Mashliy & Mosiy, 2015). Firstly, they are the result of a certain level of involvement and the use of a wide range of available resources and indicate the efficiency of business system in specific conditions of the market environment. Secondly, net income as the main final financial result of enterprise activity is a source of enterprise's self-financing; it also creates preconditions for realizing its investment opportunities both in the field of real and financial investment. Thirdly, interests of enterprise's owners are made due to the positive final financial results, which directly influence the market price of the company. Considering important role of system of financial results of enterprise activity in the financial management system, Mashliy and Mosiy (2015) concluded the necessity of use of modern approaches of their management.

Shliaga and Gal'tsev (2014) describe two approaches to evaluating the effectiveness of the company - monetary and resources. For monetary approach, results and costs are determined in revenues (inflow) and expenditures (outflow) of cash. For resource approach results characterized by the volume of made production and the costs – the amount of various types' resources spent.

In modern conditions of development of Ukraine's businesses in Trokoz and Orlikovsky' (2014) opinion the most promising of latest management concepts for efficiency control is the concept of Business Performance Management (BPM) and Balanced Scorecard (BSC).

BPM - a relatively new concept of governance denotes a holistic, process-oriented approach to management decisions aimed at improving the capacity of enterprises to assess their financial state and manage performance of its activities at all levels by bringing together owners, managers, staff and external contractors within the overall integrated environment management (Trokoz & Orlikovsky', 2014).

Concept of BSC is the core part of the enterprise management system cannot be called simple accounting system (Trokoz & Orlikovsky', 2014). It is a system of strategic management based on the measurement and evaluation of its effectiveness on a set of indicators, selected in such a way that

consider all significant (in terms of strategy) aspects of its activities (financial, production, marketing, etc.)

Among two basic approaches of monitoring enterprise performance are (Mĺkva, 2014):
1) Based on defining and evaluating the strategic objectives for four basic areas (financial, customer, internal processes of learning, and growth), which means use of the system of balanced indicators.
2) Based on measuring the organization performance through measuring the performance of processes (Performance Management).

The statistical techniques, which can be used in describing performance and recognizing the influence of which factors are bigger include: regression; descriptive statistics; correlation; analysis of variance; other multivariate methods; other (primarily nonparametric) (Capon et al., 1990).

Statistical, regression analysis and cluster analysis are widely used in economic research. In particular those methods were used by Boguslauskas and Adlytė (2010) in their work on enterprise performance, where they classified 100 Lithuanian enterprises into profitable, loss-making, mixed; generated variables using Monte Carlo simulation; calculated Mahalanobis distances for those companies; evaluated influence of enterprise's performance changes due to obtained classification results.

The choice of specific method for assessing efficiency of management of enterprise's activity is determined by the following criteria: interpretation of the results, identification of weaknesses, variety of indicators, the number of analysts, waste of time, financial costs, the level of objectivity, availability of use, timeliness of application, prevalence of use, accessibility of software and reliability of results (Dudukalo, 2012).

Enterprise efficiency is complex characteristic, so in order to fully analyze the enterprise activity, make the right conclusions about its condition; the following indicators should be considered (Dudukalo, 2012):
1. Profit margin (net profit in the end of year divided by sales and multiplied by 100 %).
2. Total assets return (total assets in the end of year divided by sales and multiplied by 100 %).
3. Fixed assets return (fixed assets in the end of year divided by sales and multiplied by 100 %).
4. ROE (net profit in the end of year divided by equity and multiplied by 100 %).
5. Return on investment (net profit in the end of year divided by sum of equity and long-term liabilities; multiplied by 100 %).
6. Residual Income (operational profit minus investments multiplied by time-deposit interest rate).

Financial ratios have played an important role in evaluating the enterprise's performance. Almost all existing methods include them. Financial ratios together with financial statements are instruments that help managers to monitor the company's performance and figure the best financial strategies out (Ching & Gerab, 2012).

Although, nowadays the usage of nonfinancial indicators is frequently more promoted, financial indicators are able to evaluate condition of an enterprise precisely based on its previous development (Kotane, 2015).

Theoretically financial ratios are divided into 5 groups (Robinson, Greuning, Henry & Broihahn, 2009):

- Activity ratios indicate efficiency of day-to-day tasks performed by company (for example, collection of receivables and management of inventory);
- Liquidity ratios (LiqRs) shows whether company has ability to meet its short-term obligations;
- Solvency ratios shows whether company has ability to meet long-term obligations;
- Profitability ratios shows whether company is able to generate profitable sales from its resources (assets);
- Valuation ratios measure the quantity of an asset or flow (e.g., earnings) connected to ownership of a specified claim (e.g., a share or ownership of the enterprise).

As it was mentioned, financial economic analysis is widely used by scientists in evaluation of efficiency of their performance. It can be used while analyzing individual enterprises, their groups (Kryvoviaziuk, 2014) or economic fields (Mandzinovskaya, 2015).

Kijewska (2016) identified the determinants of ROE using original and five-factor version of the DuPont formula was analysed on the example of two Polish companies from mining and metallurgy sector. The last method was used in order to analyse in more detail ROE dependence and possible ways to improve return of the firm.

According to Hurbean (2005) such additional software like Cognos, Business Objects, SPSS, CorVu, ProClarity, SAP, Oracle, Microsoft, Scala, Bit Software has found its place in market and nowadays is one of suggested “must-haves” for managers needed in order to review performance of enterprise.

The Business Intelligence (BI) software instrument went beyond simple measuring sales, profit, quality, costs, and many other indicators within an enterprise, it includes planning and forecasting and gives needed additional feedback and because of that Hurbean (2005) considered it as the most competitive one. The researcher determined the difference between corporate performance management (CPM) and BI as the first one is the goal and another one is the way to reach that goal.

The choice of software used for evaluation of enterprise’s performance should take into account staff knowledge, difficulty of programme, firm type/size and its previous performance.

As it was researched by Faruk and Habib (2010), a lot of researchers while talking about performance evaluation can highlight different ratios from profitability ratios, LiqRs, debt ratios to performance and investment evaluation ratios (Faruk & Habib, 2010). These researchers compared two pharmaceutical companies by calculating all of the mentioned ratios and giving separate conclusions on each type.

The economic diagnosis – is a multistage evaluation of enterprise's performance based on system of economic indicators, which are co-dependent and supplementing each other (Krivovyazyuk & Bozhydarnik, 2012).

Existing approaches to estimation of efficiency of management of enterprise's activity not allow considering efficiency in comprehensive description of activity management (Dudukalo, 2012). This is due to the fact that each approach ignores the impact of all factors of functional subsystems as a whole.

In our opinion, only comprehensive assessment can provide the most useful information for future decision making process. For the evaluation of past periods and to develop appropriate strategies for the future, comprehensive analysis should be carried out by the management of the company, it is so, because managers are better informed on the reasons of indicators' changes and what will be potential opportunities for their improvement.

Sustainable improvement of enterprise performance in the current economic environment is a necessity which could be achieved with analysis of key economic indicators, Larka and Lisowska (2013) suggested using financial analysis.

Unlike previous researchers it is suggested concentrating attention on comprehensive approach and if possible trying to include analysis of every field of enterprise activity, after all the efficiency of the enterprise activity is a complex and multidimensional characteristic. The characteristics of two basic approaches for comprehensive evaluation of enterprise activity (resource & economic) is given below.

The Resource approach to comprehensive evaluation of enterprise activity implies an assessment functioning of an enterprise on indicators forming economic potential, based on quantitative and qualitative analysis of the parameters of enterprise's activity. This is carried out by indicators characterizing parameters of providing of economic activity (quantity), indicators characterizing parameters of enterprise's functioning (quality) and indicators that evaluate parameters of the results analysis of economic activity (performance). Economic approach involves the assessment enterprise's functioning on effectiveness indicators of its activities on the basis of using indicators which characterize completeness and efficiency of the use of economic potential of the enterprise (Skorobogata, 2004).

Among the approaches for implementing a comprehensive analysis, Skorobogata (2004) in order to ensure stable functioning and sustainable development of native enterprises suggested new information approach that will optimally combine resources and economic approaches. Information approach implies constructing a model of research of enterprise's potential, which allows simulating the situation on indicators of enterprise adaptation to unstable external and internal environment in order to obtain benefits. This approach includes process of creating model of analysis which helps improving the decision-making process and coordinate the range of interests of different groups of users. It

justifies modelling operation activity, where after applying relevant indicators on the field of matrix "adaptation of the enterprise to the dynamic environment" (in dimension of capabilities, capacity and economic benefits), the conclusions about the trends that have emerged in the enterprise could be made.

Otenko (2013) studied theoretical principles and practical regulations of evaluation and analysis of the effectiveness of the company. As the result the author suggested sequence of stages of conducting comprehensive analysis of enterprise efficiency (Table 1).

Table 1. The main stages and the analytical toolkit of comprehensive economic and financial analysis of economic activity of enterprise.

Stages	Toolkit	Provision
1. Clarification of the object, purpose and task of development of plan of analytical work	Analytical method, synthesis, induction, deduction, comparison	Objectives and strategies for enterprise, strategic plan for the company
2. Development of the system of synthetic and analytical indicators	Facto-graphic method, analytical method, generalization, grouping	Methods of performance evaluation; scientific and educational-methodological work on assessing efficiency
3. Collection and preparation of information required for analysis	Facto-graphic method, analytical method, generalization, grouping	Accounting, financial and statistical reports, the State Statistics Service data, Stock Market site's data, official legislation and regulations
4. Analysis of the structure and dynamics of performance indicators	Systematic, comparative, horizontal and vertical analysis clustering, graphics and spreadsheet techniques, coefficient method, logic simulation, synthesis	Methods and guidelines for analyzing the efficiency of enterprise activity
5. Identification of factors influencing the outcomes of economic activity	Factor analysis, correlation and regression analysis, generalization, analytical	The performance indicators of the enterprise, application program package
6. Comprehensive dynamic assessment of potential and competitiveness	Integral method, graphical and spreadsheet techniques	Methodologies and approaches to assess the potential and competitiveness of enterprises
7. Identification of efficiency problems and unused opportunities	Fundamental, analytical method and generalization	Data of analytical findings
8. Consideration of development scenarios, searching the means for improving efficiency through innovation, tactical and strategic decision-making	Abstraction, analysis, synthesis, comparison, modelling, discounting, systems analysis, business planning and design	Data of analytical findings, tactical and strategic plans, management reports

Source: Otenko (2013, p. 235).

The comprehensive analysis was used in researches: in Kryvoviaziuk' (2014) article the comprehensive approach was used to the diagnosis of innovative engineering companies of Volyn, results were given, based on which the ways of further development were suggested; Kryvoviaziuk and Krivovyazyuk' (2014) article contained comprehensive economic analysis as an instrument for improving efficiency of activity of engineering enterprises of Volyn region; or it was used for decision-making process for choosing strategy for the enterprises after conducted diagnostics of the enterprises (Kryvoviaziuk, Krivovyazyuk & Strilchuk, 2013).

Therefore, all areas should be analyzed in order to improve the efficiency of business activity of enterprises: organizational component, volumes of production and sales of products, condition and usage efficiency of fixed and working assets, availability and usage efficiency of material and labor resources, costs and production costs, efficiency of investment performance and financial condition.

The suggested comprehensive economic and financial analysis of the enterprise includes (Kryvoviaziuk & Krivovyazyuk, 2014):

- disclosure of economic and organizational characteristics of the company;
- analysis of production and sales volumes;
- analysis of state and efficiency of use of fixed and current assets;
- analysis of provision and efficiency of material and labor resources;
- analysis of costs and production costs;
- analysis of investment performance;
- analysis of financial state;
- generalizing comprehensive assessment.

This approach allows us to consider fully economic phenomena and processes of industrial and economic activities as component parts of a single enterprise system, interconnected in complex. Thus, we get an objective and complete information on the situation in the company.

To assess dynamic of potential enterprises need to check following conditions (see equation 2):

$$\frac{\Delta P}{\Delta t} > \frac{\Delta R}{\Delta t} > \frac{\Delta C}{\Delta t}, \qquad [2]$$

where P - a net profit; R - revenues from sales; C - cost of sales; t – time; Δ- variation of variable.

If the conditions of inequality are fulfilled, growth rate of net income is higher than growth rate of revenue from product sales and growth rate of cost of sales, the economic potential of the enterprise have a possibility for further growth (Liubushyn, 2005).

Evaluation of competitiveness of enterprise is offered to conduct using a method based on the theory of effective competition (Niemtsov & Dovhan, 2001). The methodology of comprehensive financial and economic analysis is given below (see Table 2).

Table 2. Criteria and indicators of competitiveness of the organization.

Criteria and indicators of competitiveness	The role of the index in the evaluation	The rule for the indicator calculation
1. Indicator of efficiency of enterprise's production activity (EE)		
1.1. The relative indicator of costs per unit (C)	Shows efficiency of costs while product production	C = Gross costs / Volume of output
1.2. The relative ratio of Return on Assets (ROA)	Characterizes efficiency of use of fixed assets	ROA = Volume of output / average value of fixed assets
1.3. The relative ratio of goods profitability (RP)	Characterizes the level of product profitability	RP = Profit from 100% sale / Total production costs
1.4. The relative indicator of labor productivity (LP)	Shows the level of organization of production and usage of labor force	LP = Volume of output / Average number of workers
2. Financial position of the enterprise (FP)		
2.1. Autonomy ratio (AR)	Characterizes the company's independence from external sources of funding	AR = Equity capital / Total assets
2.2. Solvency ratio (SR)	Shows ability to meet its financial obligations and determines probability of bankruptcy	SR = Equity capital / Total liabilities
2.3. Absolute liquidity ratio (ALR)	Shows the qualitative structure of assets, which are sources for covering current liabilities	ALR = Cash and liquid tradable securities / Current Liabilities
2.4. Current Asset Turnover Ratio (CART)	Analyze the efficiency of usage of current assets.	CART = Sales / average current assets
3. The effectiveness of the sales organization and goods promotion (ES)		
3.1. Profit margin (PM)	Characterizes the degree of profitability of enterprise activity on the market	PM = Net profit / Sales
3.2. Coefficient of marketing cost effectiveness (SC)	Shows economic efficiency of marketing costs	SC = marketing costs / growth of profit from sales
4. Competitiveness of the goods (GC)		
4.1. Growth in revenue from sales (TP)	Shows growth in sales	TP = revenue of this year / revenue of previous year
4.2. Ratio of return on material costs (RMC)	Shows how much of product produced from each consumed euro of material resources	RMC = Sales / Material costs

Source: Kryvoviaziuk (2014) improved based on Niemtsov and Dovhan (2001, p.236).

According to this theory, the most competitive are those companies where the work of all departments and services is organized in the best way. The effectiveness of each service is influenced by many factors – resources of the firm. Estimation of efficiency of each unit will include an evaluation of

efficiency of use of those resources. The method is based on evaluating four group of indicators or criteria of competitiveness. Competitiveness of the organization may be determined by the arithmetic average, all of the indexes near factors were defined based on expert opinion method (setting weight of each factor based on expert thoughts Kryvoviaziuk (2014) - see equation 3:

$$CO = 0,15EE + 0,29FP + 0,23ES + 0,33GC, \quad [3]$$

All indicated criteria can accordingly be calculated in the following way as described in equations 4 to 6 (Niemtsov & Dovhan, 2001).

$$EE = 0,31C + 0,19ROA + 0,4RP + 0,1LP, \quad [4]$$

$$FP = 0,29AR + 0,2SR + 0,36ALR + 0,15CA, \quad [5]$$

$$ES = 0,7PM + 0,3SC, \quad [6]$$

The meaning of the letters for equation 3 to equation 6 is given in Table 2.

Next conclusion could be made about last mentioned methodology. Such assessment of competitiveness covers all important evaluation of business activity, eliminates duplication of certain indicators and allows effectively getting the picture of the state of selected enterprises. Considered method has obvious advantages – it is convenient for use in the study of competitiveness manufacturing enterprises and covers the main activities of this organization. However, in its foundation founded an expert evaluation of the weight of each factor, and this assessment cannot be considered completely reliable. The proposed approach provides a comprehensive approach to identifying potential reserves increase enterprise efficiency.

2. Research Methodology

2.1. Objectives and Research Hypotheses

Enterprises are interested in designing and using best methodology of analysis (economic and financial) that can be used not only to identify key factors and correlations between them which influence enterprise performance and its efficiency but also they are searching ways to manage those factors. Defining whether enterprise activity is efficient or not is an important question. On one hand, it is condition to get better competitiveness. On the other hand, this definition can help to set or change enterprise's policies and strategies. And, finally, determination of level of enterprises efficiency in combination with further measures and observation can provide the efficiency level.

In this manner, the main purpose of this work is to analyse the performance and the efficiency and to identify the key factors that may explain it of a set of companies from Portugal and Ukraine, in order to answer the following main research questions: Are the enterprises efficient and profitable? What are the factors that influence their efficiency and performance? So, one of objectives of the present work is to analyse and compare efficiency and performance of a set of companies in Ukraine and Portugal and make a comparison. Another objective is the identification of the factors that determine efficiency and profitability (and consequently the performance) of the companies. As third goal the test if those factors have same impact in both subsamples is set.

Firstly, in order to conduct the comprehensive financial and economic analysis and determine enterprise efficiency, using as proxy the Asset Turnover Ratio (ATR) and the factors that may explain it, the use of indicators such as: Quick ratio; LiqR; Cash ratio and debt ratio; Asset utilization or turnover ratios; Profitability ratios; Growth ratios; Asset structure and solvency ratios was suggested. Secondly, in order to analyse profitability (company's performance) the ROA was used and among factors that explain it the EBITDA margin; Profit margin; NWC turnover ratio; Fixed asset to total

assets; Current asset to total assets; Net operation expenses to net sales ratio; Sales growth ratio; LR; Debt-to-Equity (as capital structure proxy); Interest coverage ratio.

Based on the literature review (namely Vătavu (2014); Banerjee & De (2014); Bychkova & Konovalova (2013); Pantea, Gligor and Anis (2014); Kryvoviaziuk (2014); Horngren, Harrison Jr. and Oliver (2012)) and set objectives the following Research Hypothesis (RH) was settled as follows:

RH_1: On average the companies in the sample are efficient.

As companies efficiency can be measured by ATR, if this ratio is higher than one, it has been said that the company is being efficient in the use its entire asset base (Pantea, Gligor & Anis, 2014).

Within this hypothesis we are going to check one more sub-hypothesis: there is no difference in efficiency between Ukrainian and Portugal companies.

RH_2: On average performance of companies is positive.

As company's performance is often measured by ROA, it is expected that companies on average have positive performance (Pantea, Gligor & Anis, 2014).

Within this hypothesis we are going to check a sub-hypothesis: there is no difference in performance level among Ukrainian and Portugal companies in sample.

RH_3: Companies efficiency is influenced by Fixed Asset Turnover Ratio (FATR), Current Asset Turnover Ratio (CATR), EBITDA margin, ROA, LiqR, LR.

As ATR is the sales to total asset relation, some variables that may contribute to changes to this relation will be checked.

RH_4: companies performance is influenced by EBITDA margin; Profit margin; NWC turnover ratio; FATR, CATR; Net operation expenses to net sales ratio; Sales growth ratio; LR; Debt-to-Equity; Interest coverage ratio.

Based on Dupont analysis, some variables that may contribute to ROA explanation will be analysed.

2.2. Description of Data Collection

Instruments used to collect the data were based on conduction of document review combining case study method (advantages and disadvantages of which are given in Table 3). In order to get to know how enterprise is functioning and to provide comprehensive examination, in our opinion, is better to use these two methods.

The research data was collected using the financial reports available online, namely their balance sheets, income and cash flow statements and some other information that can be found in annual reports.

Table 3. Advantages and disadvantages of used methods for data collection.

Instruments	Pros	Cons
Document review	+ comprehensive and historical information; + Doesn't interrupt strategy or stakeholder's routine in strategy; + Information already exists.	– Takes significant amount of time; – Possibility of Information missing; – Requires clearness of target; – Not flexible means to get data; data is restricted to what already exists.
Case study	+ Fully represent stakeholder's experience in strategy input, process and results; + Powerful means to portray strategy to outsiders.	– Usually quite time consuming to collect, organize and describe; – Represents depth of information, rather than breadth.

Source: Improved based on Smith and Albaum (2012, p.17-18).

The duration of researched data was the period of 2009 to 2014. All of the data was collected in February-April of 2016. The last 2015 was not taken into account because deadline for releasing annual reports is until April-May, and only few enterprises released information by the end of collection phase.

The data for Portuguese enterprises was collected using information available in Euronext website, which sited to the pages of companies and as for Ukrainian ones the information was found in Smida database and official pages of companies.

2.3. Description of Data Analysis

During the research descriptive analysis, inferential analysis and regression analysis were used. All analyses were made in SPSS software and Windows Excel.

Descriptive analysis is used throughout data analysis in a number of different ways. They refer to means, ranges, and numbers of valid cases of one variable. In our work, descriptive analysis was used while presenting results of calculated ratios.

Descriptive statistics are important in data cleaning. It has been used for reviewing and monitoring the variables being used. It is very important to monitor the number of valid cases for each variable. If the number of valid cases differs greatly between variables, it is considered as a warning of problems that may arise when the variables are examined together later on. In that case there is a need to track down why cases are being lost between variables. In this work the main reason for appearance of such cases means absence of information. At the same time, out of range values with unexpectedly high (or low) means and standard deviations, and other simple parameters, are looked for.

To characterise our sample for each variable number of valid cases (n), Minimum, Maximum, Mean, and Standard Deviation (hereinafter S.D. to represent standard deviation will be used) were chosen as representatives of descriptive statistics, although there were numerous other optional descriptive indicators to choose from in the SPSS program. In order to represent the data and its distribution in each variable, when appropriate it was used. Also for data presentation histograms, graphs and other charts were used.

Histograms were used to show the distribution of a quantitative variable by its relative frequency of data points in an interval (in this case the intervals are S.Ds. on a z-score distribution). If there is a strong deviation from the bell curve or if the distribution mean is off-set far from 0, then this might point out possible problems with the data.

Although scatter plotting is normally used to examine the association of two continuous variables, it has a restricted practical use here to examine descriptively the scatter of values when the sample size is quite small (in case of growth ratios).

Inferential Analysis used to draw inferences regarding the association or difference between two or more variables. With inferential statistics, you are trying to reach conclusions that extend beyond the immediate data alone. Provide measures of how well your data support your hypothesis and if your data are generalizable beyond what was tested (significance tests).

In inferential analysis parametric tests and non-parametric tests is used. Normally distributed sample size must be more or equal to 30 cases ($n \geq 30$) and have the same variance on the variables being measured (Gupta, 1999). Non-parametric tests are used with ordinal or nominal data, and do not make any assumptions about the characteristics of the sample in terms of its distribution.

The most important part of inferential analysis is hypothesis testing. Hypothesis is a made assumption about some characteristic of the sample under study (Greene, 2003). Hypothesis testing consists of following steps: (i) stating the hypothesis (Null hypothesis - H0; Alternative hypothesis – H1); (ii) choosing the appropriate test statistic; (iii) calculating the value of the test statistic; (iv) stating the conclusion.

The inferential analysis is used for researching statistical significance. If the p-value is smaller than α, it indicates that the difference is statistically significant at level α (Gupta, 1999). This level is also used as a threshold for rejecting the null hypothesis (it is accepted that $\alpha = 0.05$). If the p-value is lower α then the value is statistically significant and H0 is rejected, otherwise H0 is not rejected because the difference between H0 and data is not statistically significant (Gupta, 1999).

Also great importance has choosing the right elementary statistic test, which includes following steps:

- to determine the type of research question to be answered by the statistical analysis (The degree of relationship or dependence among variables or the significance of group differences);
- to determine the nature of the variables under discussion, and whether they meet the assumptions of a particular test;

- to consider types of data: ordinal; nominal and scale.

A one sample t-test used to check whether sample means (of a normally distributed interval variable) significantly differs from a hypothesized value (Gupta, 1999; Green, 2003). An independent samples t-test is used to compare the means of a normally distributed interval dependent variable for two independent groups. A paired (samples) t-test is used in order to observe two related observations and check if their means are normally distributed interval variables and differ from one another (or $n \geq 30$).

Mann-Whitney U - is a non-parametric test used to compare distributions in independent samples in case when the dependent variable is not normally distributed and $n < 30$.

Kruskal Wallis Test and The Shapiro–Wilk Test used for comparing two or more independent samples of equal or different sample sizes and indicate whether there is stochastic domination in the samples.

Regression analysis is a statistical process for estimating the relationships among variables. It was used in determining indexes near parts of final comprehensive indicator.

The multiple linear regression model is used to study the relationship between a dependent variable and one or more independent variables. The model is able to identify the independent effects of a set of variables on dependent variable (Greene, 2003). The general form of the linear regression model is given in equation 7:

$$y = f(x_1, x_2, ..., x_k) + \varepsilon \quad [7]$$

Where y – the dependent variable; x_k – the independent variable; ε - a random disturbance of stable relationship; n=1,2,…,k.

The generalized model to be applied in this work is as follow (equation 8):

$$Y_i = \beta_{0,i} + \beta_{1,i} \cdot X_1 + \beta_{2,i} \cdot X_{2,i} + ... + \beta_{k,i} \cdot X_{k,i} \quad [8]$$

Where: Y_i is the dependent variable for observation i (for comprehensive efficiency indicator the variable of ATR was used; for performance indicator the variable of ROA was used), with i = 1 to n;

$\beta_{0,i}$ is the constant; $\beta_{1,i}$ to $\beta_{k,i}$ are the coefficients of independent variables $X_{1,i}$ to $X_{k,i}$ for observation i

$X_{1,i}$ to $X_{k,i}$, are the variables that may explain the efficiency or performance like calculated indicators given in Table 4.

Table 4. Indicators used in the work and their formulas and meaning.

Group	Indicator	Meaning	Formula
Liquidity ratios	Quick ratio	Shows ability to meet its short-term obligations with liquid assets (excluding inventories); Higher is better.	$\frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$
	Current ratio	A measure of short-term liquidity; Higher - larger margin of safety.	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$
	Cash ratio	Shows ability to pay its short-term debts by cash	Cash/Current liabilities
Asset utilization or turnover ratios	Receivable turnover ratio	Indicates the efficiency with which a firm manages the credit it issues to customers and collects on that credit.	$\text{Sales}/\text{Accounts Receivable}$
	Inventory turnover ratio	Shows how many times a company's inventory is sold and replaced over a period.	$\frac{\text{Cost of Goods Sold}}{\text{Inventory}}$
	NWC turnover ratio	Shows how effectively a company is using its working capital to generate sales; Higher is better.	$\frac{\text{Sales}}{\text{NWC}}$
	Total asset turnover ratio (ATR)	Shows ability to generate more revenue per euro of assets.	$\frac{\text{Sales}}{\text{Total Assets}}$
	Equity turnover ratio	Determine the efficiency with which management is using equity to generate revenue.	$\frac{\text{Sales}}{\text{Total Equity}}$
	Fixed asset turnover ratio	Measures operating performance	$\frac{\text{Sales}}{\text{Net Fixed Assets}}$
	Current asset turnover ratio	Analyze the efficiency of usage of current assets.	$\frac{\text{Sales}}{\text{Current Assets}}$
Profitability Ratios	Gross profit margin	Used to assess a firm's financial health.	$\frac{\text{Gross Profit}}{\text{Sales}}$
	EBITDA margin	A measurement of a company's operating profitability as a percentage of its total revenue.	$\frac{\text{EBITDA}}{\text{Sales}}$
	Return on equity	Measures a corporation's profitability.	$\frac{\text{Net Income}}{\text{Total Equity}}$
	Return on assets	Shows how efficient management is at using its assets to generate earnings.	$\frac{\text{Net Income}}{\text{Total Assets}}$
	Operating expense-to-Net sales ratio	The smaller ratio shows the greater the organization's ability to generate profit if revenues decrease.	$\frac{\text{Operating Expense}}{\text{Net Sales}}$
	Profit margin	Shows how much out of every dollar of sales a company actually keeps in earnings.	$\frac{\text{Net income}}{\text{Net Sales}}$

Table 4. Indicators used in the work and their formulas and meaning**.**

Group	Indicator	Meaning	Formula
Growth Ratios	Assets growth ratio	Growth rates refer to the amount of increase that a specific variable has gained within a specific period and context.	$\frac{\mathrm{TA}_t - \mathrm{TA}_{t-1}}{\mathrm{TA}_{t-1}}$
	Net Profit growth ratio		$\frac{\text{Net Income }_t - \text{Net Income }_{t-1}}{\text{Net Income }_{t-1}}$
	Sales growth ratio		$\frac{\mathrm{Sales}_t - \mathrm{Sales}_{t-1}}{\mathrm{Sales}_{t-1}}$
Asset Structure Ratios	Current assets-to-Total assets ratio,	Indicate the extent of total funds invested for the purpose of working capital	$\frac{\text{Current Assets}}{\text{Total Assets}}$
	Inventory-to-Current assets ratio	Shows part of inventory in structure of current assets.	$\frac{\text{Inventory}}{\text{Current Assets}}$
	Cash and cash equivalents-to-Current assets ratio	Shows part of cash and cash equivalents in structure of current assets.	$\frac{\text{Cash and Cash Equivalents}}{\text{Current Assets}}$
	Long-term assets-to-Total assets ratio	Shows part of fixed assets in structure of total assets.	$\frac{\text{Long} - \text{term Assets}}{\text{Total Assets}}$
Solvency Ratios	Short-term financial debt-to-Total debt	Shows part of short-term financial debt in structure of total debt.	$\frac{\text{Short} - \text{term Financial Debt}}{\text{Total Liabilities}}$
	Short-term debt-to-Total debt	Shows part of short-term debt in structure of total assets.	$\frac{\text{Current Liabilities}}{\text{Total Liabilities}}$
	Interest coverage ratio	Determine how easily a company can pay interest on outstanding debt.	$\frac{\text{Earnings before interest and tax}}{\text{Interest}}$
Debt Ratio	Leverage ratio	Shows how much capital comes in the form of debt (loans), or assesses the ability of a company to meet financial obligations.	$\frac{\text{Total Liabilities}}{\text{Total Assets}}$
	Debt to Equity ratio	Indicates how much debt a company is using to finance its assets relative to the amount of value represented in shareholders' equity	Debt / Equity
	Total financial debt-to-Total debt	Shows part of financial debt in structure of total debt.	$\frac{\text{Total financial debt}}{\text{Total liabilities}}$

Source: based on Ross, Westerfield and Jordan (2008).

Adjusted R-square is one of indicators used in regression analysis (Model Summary table) shows proportion of variance in the dependent variable that can be explained by the independent variables or R-square adjusted for a number of independent variables. Its value should be below 1, although the bigger the better. This statistic is commonly used to choose the best model as rule of thumb it is chosen the model that has higher Adjusted R-squared.

Stepwise linear regression is a method of conducting regression analysis of the variables while simultaneously removing those that are not significant. Stepwise regression essentially does multiple regression a number of times, each time removing the weakest correlated variable. At the end you are left with the variables that explain the distribution best. The only requirements are that the data is normally distributed (or rather, that the residuals are), and that there is no correlation between the independent variables (collinearity) (Greene, 2003).

Reliable regression analysis requires fulfillment of certain conditions "classical" assumptions (Greene, 2003):

a) Collinearity between variables is always present. It means that two or more of the independent/explanatory variables in a regression have a linear relationship. This causes a problem in the interpretation of the regression results. If the variables have a close linear relationship, then the estimated regression coefficients and T-statistics may not be able to properly isolate the unique effect/role of each variable and the confidence with which we can presume these effects to be true. The close relationship of the variables makes this isolation difficult. A problem occurs if the degree of collinearity is high enough to bias the estimates (Gupta, 1999).

Durbin-Watson and collinearity statistics was used. A diagnostic approach to check for multicollinearity after performing regression analysis is to display the Variance Inflation factor (VIF). VIF is a measure of how much the variance of an estimated regression coefficient increases if the explanatory variables are correlated. The length of the confidence interval for the parameter estimates is increased by the square root of the respective VIF as compared to uncorrelated variables. The higher the value of VIF the greater is the degree of collinearity. Some authors suggest that if the VIF is >10 there is strong evidence that collinearity is affecting the regression coefficients and consequently they are poorly estimated. For comparison we next examine the VIF in the full model of the same data set where we know that two explanatory variables are correlated (“Regression diagnostics”, 2016, p.47).

Another check for collinearity is the Durbin-Watson statistic. Normally its value should lie between 0 and 4. A value close to 2 suggests no correlation; one close to 0 – negative correlation, and a value close to 4 – positive correlation (“Regression diagnostics”, 2016, p.47).

b) Normality (normal distribution) can be checked using quantile-quantile (Q-Q) plots and the Kolmogorov-Smirnov Test (K-S Test). Both of them are used to make a more confident statement on the distribution. The percent-percent (P-P) plot allows assess whether the distribution of the sample is

normal. The made analysis can be reviewed in the graphs with built line and stated dots. By observing the distance between the diagonal line and the dotted curve we can make a conclusion (the smaller the gap between the two, the higher the chance of normal distribution). If there is huge distance there is outlier (Gupta, 1999).

K-S Test is a nonparametric test of the equality of continuous, one-dimensional probability distributions that can be used to compare a sample with a reference probability distribution (one-sample K-S Test), or to compare two samples (two-sample K-S Test). If the p-value (given in results output as Sig.) is less than 0.05 then data cannot be considered as normally distributed.

c) Homoscedasticity is assumption that S.Ds. of the error terms are constant and do not depend on the *x*-value. Consequently, each probability distribution for dependent variable has the same S.D. deviation regardless of the independent variable value.

Breusch-Pagan and Koenker test is used to test for heteroskedasticity in a linear regression model. It tests whether the estimated variance of the residuals from a regression are dependent on the values of the independent variables. In that case, heteroskedasticity is present. The test assumes that heteroskedasticity is not present. If the resulting p-value of Breusch-Pagan and Koenker is less than significance level of 5 %, the obtained differences in sample variances are occurred based on random sampling from a population with equal variances.

The research design of this work includes the following steps:

1 – Sample characterization, with a brief profile of selected enterprises.

2 – Conducting descriptive statistical analysis of economic and financial ratios (calculating mean, minimum, maximum and standard deviation).

3 – Estimation of efficiency determinants: checking enterprise efficiency level using the t-test statistic applied to efficiency proxy variable (ATR); checking the model assumptions (multicollinearity, normality and homoscedasticity using Durbin-Watson and collinearity statistics for multicollinearity; Visual check of P-plot and K-S Test statistics for normality; Breusch-Pagan and Koenker test); conducting regression analysis in order to identify the determinants of enterprises' efficiency and define general model of it; conducting regression analysis and defining model by country.

4 – Estimation of factors that determine the company's performance: checking profitability of enterprise using the t-test statistic applied to proxy variable (ROA); checking the model assumptions; conducting regression analysis in order to identify the determinants of enterprises performance and define general model of it; conducting regression analysis and defining model by country.

2.4. Population *vs.* Sample

To perform the empirical analysis, we used a sample of Ukrainian and Portuguese enterprises. Seven out of 640 220 enterprises in Portugal and eight out of 1 932 161 enterprises in Ukraine were chosen. The choice was guided by subsequent requirements: companies should have been listed and had free access of data.

The search of the sample started in Euronext website, among Portuguese enterprises we have chosen the ones which are listed in Lisbon stock exchange, we end up getting some information on 51 enterprises. The next selection of industrial enterprises had shortened our choice to 13 enterprises. We collected almost all required information during 2009-2014, but because of lack of annual reports for some years or absence of it in English the final number of Portuguese enterprises is 7.

The chosen enterprises belong to next industries: paper, pulp and energy; building materials; construction and real estate; steel and engineering (automotive). These industries, in our opinion, are presenting production sector for both countries.

That is why while researching data for the Ukrainian part we considered selection of the enterprises listed on Smida (database of Stock market infrastructure development agency of Ukraine), which belong to the same industries.

The final sample consists of 90 cases: 7 enterprises from Portugal and 8 enterprises from Ukraine; each had been studied during six years, for the time horizon of 2009 to 2014. All of the chosen companies operate in industrial sector of economy, which shows in more or less similar principles of forming capital and assets structure.

3. Presentation and Analysis of Results

3.1. Sample Characterisation

The sample consists of 15 enterprises: 7 enterprises from Portugal (Table 5) and 8 enterprises from Ukraine (Table 6), which operate in industrial sector of economy (paper, pulp and energy; building materials; construction and real estate; steel; automotive industries).

Below there are some general information about Portuguese enterprises is given:

- Altri operates in wood pulp production, cultivation of forests for the timber and paper industry and co-generation of energy, including energy production from renewable resources (www.altri.pt).
- Cimpor involved in manufacturing and marketing cement, hydraulic lime, concrete and aggregates, precast concrete and dry mortars (www.cimpor.pt).
- Martifer – is a multinational group, which activity focused on the metal construction and renewable energy areas (www.martifer.pt).
- Mota-Engil is a Portuguese Group, which is a leader in the sectors of civil construction, public works, port operations, waste, water, and logistics. The main services of this company are in infrastructure and real estate construction and engineering; water treatment; waste management; logistics; port operation; transport concessions (en.mota-engil.pt).
- Sonae Industria is one of the largest wood-based panel producers in the world with a total of 17 plants located in 5 countries on 3 continents (www.sonaeindustria.com).
- Teixeira Duarte is one of the largest construction companies in Portugal, which operates in countries and regions like Angola, Mozambique, Macau, Venezuela and Algeria. Currently, the firm operates in eight different sectors of activity: construction; concessions and services; real estate; hotel services; distribution; energy; automotive (www.teixeiraduarte.pt).

Table 5. Information on Portuguese enterprises.

Name	Code	Industry	Products	Employees	Total assets (TEUR)*	Address of headquarters
Altri, SGPS, S.A. Public Company	PTALT0AE0002	Paper and pulp, energy	Bleached wood pulp, biomass power plants	662	1239256	Rua do General Norton de Matos, 68 - R/C 4050-424 Porto
Cimpor - Cimentos de Portugal, SGPS, S.A.	PTCPR0AM0003	Building materials	Cement, construction aggregate, concrete, mortar	8451	6552868	Rua Alexandre Herculano, 35 1250-009 Lisboa
Martifer GROUP	PTMFR0AM0003	Metallic construction, energy, electricity generation	Steel Structures Aluminium Stainless Steel wind and solar energy	2667	632730	Zona Industrial, Apartado 17 3684-001 Oliveira de Frades
Mota-Engil SGPS, S.A.	PTMEN0AE0005	Conglomerate	Infrastructure and real estate construction and engineering	22808	3961761	Rua do Rego Lameiro, Nº 38 4300-454 Porto Portugal
Sonae Indústria, SGPS, S.A.	PTS3P0AM0017	Manufacturing	Engineered wood	3596	1085933	Lugar do Espido - Via Norte Apartado 1096 4470-177 Maia Portugal
Teixeira Duarte, S.A.	PTTD10AM0000	Construction	Construction	13261	2954007	Lagoas Park, Edifício 2, Porto Salvo, Oeiras, Portugal
Toyota Caetano Portugal, S.A.	PTSCT0AP0018	automotive industry	Vehicles	1492	248470	Av. Vasco da Gama, nº1410 4431-956 Vila Nova de Gaia Portugal

*these values are in end of the year 2014

Source: Euronext website and companies' websites (2016).

- Toyota Caetano Portugal is the company which imports, assembles, and commercializes vehicles, buses, and coaches. It sells commercial and passengers vehicles, as well as their parts; load movement machines; and mini-buses. Its products are distributed under the brand names Toyota and Lexus, in Portugal and internationally (www.toyotacaetano.pt).

Next there is some general information about Ukrainian enterprises (see Table 6).

Table 6. Information on Ukrainian enterprises.

Name	Code	Sector	Products	Number of employees	Total assets (TEUR)*	Address of headquarters
PJSC "AC" Bogdan Motors" (Corporation Bogdan)	05808592	Automotive	Bogdan buses, LuAZ cars, trolleybuses	1517	251552	Elektrikov st., 29a, Kyiv, 04176, Ukraine
PJSC ArcelorMittal Kryvyi Rih	24432974	Steel	Steel, coke, Slag	28731	4741118	Ordzhonikidze str., Kriviy Rih, 150095, Ukraine
PJSC "Zaporizhstal"	00191230	Steel	Raw steel and finished steel products	14387	1447558	72, Yuzhnoye Shosse Zaporozhye, 69008, Ukraine
PJSC HC "Kyivmiskbud"	23527052	Construction	Building; real estate	726	334084	4-6, Suvorova Str. Kyiv, 01010, Ukraine
PJSC "Kyiv cardboard and paper mill"	05509659	Paper and pulp	Cardboard and paper products	2517	148929	130, Kyivska Str. Obukhiv, 08700, Ukraine
PJSC "Slavic wallpaper-KFTP"	00278876	Paper and pulp	Wallpaper	1091	67206	4, Peredzavodska St., Koriukivka, 15300, Ukraine
JSC RKTK (Rubezhnoye Cardboard and Packaging Mill)	01882551	Paper and pulp	Liner and fluting, corrugated board and boxes	1427	114178	67, Mendeleyev St., Rubezhnoye, 93010 Ukraine
PJSC "Heidelberg Cement Ukraine"	00292923	Building materials	Cement, concrete and building materials	1252	119241	15a, Barykadna St. Dnipropetrovsk 49044 Ukraine

*these values are in end of the year 2014

Source: Smida website and companies' websites (2016).

- Corporation Bogdan – dynamically-growing entity in Ukraine, which includes facilities manufacturing buses and trolleybuses, passenger cars, trucks and commercial vehicles; and its own commercial and service network. Trade and service network of Corporation is represented

by “Bogdan-Auto Holding”, which has its subsidiaries in all regions of the country and is one of the largest operators at the Ukrainian market (bogdan.ua).

- PJSC ArcelorMittal Kryvyi Rih – is the leading company among the largest enterprises of Mining and Steel Complex of Ukraine. It is part of the international company ArcelorMittal, the world steel producer (ukraine.arcelormittal.com).
- PJSC "Zaporizhstal" is Ukraine's fourth largest steel maker with an annual capacity of 4.5 mil. tonnes of steel, 3.3 mil. tonnes of pig iron, 4.1 mil. of finished steel products, and ranks 54th in the world. The company is Ukraine's only manufacturer of cold-rolled sheets, used in car manufacturing, as well as tinplates and polished stainless and alloyed steel (www.zaporizhstal.com/uk/).
- PJSC HC "Kyivmiskbud" is the largest real estate market operator in capital and almost single developer in Ukraine, which activities are oriented for assurance of citizens necessities with a middle income (www.kyivmiskbud.ua).
- PJSC "Kyiv cardboard and paper mill" manufactures cardboards, papers, and corrugated cardboards from waste papers in Ukraine and internationally. It is one of the largest enterprises in Europe on cardboard and paper products, is part of the Austrian Pulp Mill Holding. In general the share of release of pulp and paper products in Ukraine is about 30%. The main raw material used for the production is recycled paper. Kyiv Cardboard and Paper Mill consists of three main production plants: cardboard, paper production and corrugated packaging plant (www.papir.kiev.ua).
- PJSC "Slavic wallpaper-KFTP" is one of the largest and the most famous on the market of wallpaper manufacturers. Products manufactured under the brand name "Slavic wall" have a well-deserved reputation in the markets of CIS (Commonwealth of Independent States) countries, Baltics and Poland (www.slav-oboi.pat.ua).
- JSC RKTK (Rubezhnoye Cardboard and Packaging Mill) a leader in production of corrugated board transit packaging in Ukraine and exports its products outside the country (www.rktk.com.ua).
- PJSC “HeidelbergCement Ukraine” is part in consolidated leader in aggregates and one of the biggest producers of cement, concrete and building materials (www.heidelbergcement.ua).

Data included 27 quantitative variables of monetary nature (items from companies balance sheet and income statements), 1 quantitative variable which showed labour resources, 4 qualitative variables and 28 quantitate variables that are the financial ratios which were calculated. During the research the variables were entered, rechecked and formatted. The outliers were crossed out from variables.

Average assets structure among all enterprises (Portuguese and Ukrainian) is given in Table 7.

Table 7. Balance structure for all sample.

	Minimum (%)	Maximum (%)	Mean (%)	Std. Deviation (S.D.)
Equity to total assets	2,00	82,00	33,09	0,223212
Total debt to total assets	14,41	367,61	68,75	0,447257
Current assets to total assets ratio	19,42	65,36	38,73	0,142110
Long-term assets to total assets ratio	34,36	80,58	61,05	0,143502

Structure of total assets: in average 38.7 % (S.D. = 0.14) of total capital considered as working. Long-term assets in average are 61.1 % (S.D. = 0.14) of total assets. Equity has 33.1 % (S.D. = 0.22) and debt has 68.8 % (S.D. = 0.45) in average in total assets.

Main goal of this project is to estimate enterprise efficiency, profitability and the factors explaining them using regression analysis. The following chapter will analyse some descriptive statistics on economic and financial ratios for the whole sample and each country.

3.2. Descriptive analysis of economic and financial ratios

As mentioned in previous chapter for each company of the sample, it was collect financial and non-financial data for the period 2009 to 2014. On Table 8 is presented descriptive statistics for economic and financial ratios for all companies in the sample.

As it can be seen from the Table 8, some enterprises are straggling (the minimum of 0.219) and some providing almost 3 euros of liquid assets available for each euro of current liabilities (the maximum of 2.989). The average quick ratio is 0.978 (S.D. = 0.515). The observable average (which value is lower than one) indicates the general poor ability of companies to cover short-term obligations with liquid assets. According to descriptive statistics, the level of average debt coverage (LiqR) is high (1.388 > 1) with S.D. equals to 0.810, which mean that companies are able to pay off their short-term debts. The average value of cash ratio shows that researched enterprises are struggling to pay off their short-term debt with cash, which implies low level of company's short-term liquidity (mean= 0.226; S.D. = 0.283).

Table 8. Descriptive statistics for economic and financial indicators for the all sample.

	n	Minimum	Maximum	Mean	Std. Deviation
Quick ratio	65	0,2187	2,9890	0,9783	0,5915
Liquidity Ratio	65	0,4336	4,0098	1,3876	0,8099
Cash ratio	65	0,0006	1,1736	0,22574	0,2828
Receivable turnover ratio	65	1,5263	28,1696	7,5606	5,5610
Inventory turnover ratio	65	0,7292	37,8419	5,5827	5,0431
Net Working Capital turnover ratio	65	-574,690	513,5072	-3,7471	106,7656
Asset Turnover Ratio	65	0,2044	1,6740	0,73120	0,3835
Equity turnover ratio	65	0,7473	13,7721	3,2278	2,6058
Fixed Asset Turnover Ratio	65	0,2594	4,5916	1,3020	0,8569
Current Asset Turnover Ratio	65	0,5219	5,4500	2,1008	1,2362
Gross profit margin	65	-0,1140	0,8088	0,3956	0,2505
EBITDA margin	65	-0,3518	0,7887	0,1140	0,1525
Profit margin	65	-0,5800	0,2100	0,0019	0,1261
Return on Equity	65	-4,6606	0,5333	-0,0562	0,6218
Return on Assets	65	-0,1369	0,1574	0,0089	0,0629
Operating expense to net sales ratio	62	0,7819	1,2798	0,9626	0,1110
Assets growth ratio	51	-0,2298	1,5307	0,0675	0,2583
Net profit growth ratio	51	-1640,17	13,6624	-32,230	229,6824
Sales Growth ratio	51	-0,4337	1,4442	0,0954	0,3132
Current assets to total assets ratio	65	0,1942	0,6536	0,3873	0,1421
Inventory to current assets ratio	65	0,0421	0,9095	0,2828	0,1580
Cash and cash equivalents to current assets ratio	65	0,0007	0,6061	0,1617	0,1610
Long-term assets to total assets ratio	65	0,3436	0,8058	0,6105	0,1435
Short-term financial debt to total debt	65	0,0000	0,7377	0,2074	0,1536
Short-term debt to total debt	65	0,0721	1,0000	0,5600	0,2357
Interest coverage ratio	65	-20,9144	70,5693	6,1414	16,4901
Leverage Ratio	65	0,1441	3,6761	0,6875	0,4473
Total financial debt to total debt	65	0,0000	0,9519	0,5446	0,2237
Debt to equity ratio	65	0,2300	40,2300	4,2384	5,6180

Receivables turnover, in sample, there are companies with strict credit policy (the minimum of 1.526) and more reliable on creditors but efficiently managing them (the maximum of 28.17 times). Its average is 7.56 times (S.D. = 5.56), that indicates that on average the companies in the sample gives approximately 58 days of credit to its clients. A low inventory turnover (minimum of 0.729) implies existence of poor sales and excess inventory. A high ratio (37.842) implies strong sales in company. Average value of NWC turnover ratio is negative meaning that companies tend to use more money to fund sales than generating (mean = -3.747; S.D. = 90.562). As S.D. on this variable is very high compared to mean indicates that this ratio varies significantly among companies. The result of ATR shows that average equal to 0.731 times (S.D. = 0.383) which is less than 1 and indicates that companies generate not enough revenue. Equity turnover ratio shows that companies are using their capital more efficiently to generate revenue (3.228 > 1). The table results show that in general

enterprises effectively utilized investment in fixed assets to generate revenue. Average current assets that mostly firms use their current assets to generate revenue efficiently.

According to Gross profit margin, average value shows that cost of goods sold exceeds money from revenues (0.40 euros gained per euro spent). The average performance level of companies (EBITDA margin) is 11 % (S.D. = 15.25%) of operating profitability in its total revenue. ROE measures company's profitability. The average percentage of ROE is negative (-6%; S.D. = 62.18 %), which indicates existence of losses. The average ROA is positive (mean = 0.009, S.D. = 0.063) which indicates that more enterprises manage their investing and turning it into income, but overall result shows that the income values are low. The smaller Operating expense to net sales ratio is better. Results showed high value of indicator, thus 96 % of operating expenses belong to net sales and there is no correlation between organization's ability to generate profit and their revenues. Profit margin has low positive mean of 0.02 (S.D. = 0.13).

Assets growth ratio indicates that, during the period 2009 to 2014, the average value of assets increased in 6.75 % (S.D. = 26%). Net profit growth ratio indicates decrease in 32 times. Sales growth ratio grow for 9.54 % (S.D. = 31%).

The interest coverage ratio used to determine how easily a company can pay interest on outstanding debt. The observable in results average value implies that companies could pay six times its current interest payment with its available earnings. The indicator equals to 6.14 (which is more than 1.5) with S.D. equals to 16.49, which not to close to bare minimum acceptable ratio for a company and a tipping point below which lenders will likely refuse to lend the company more money, thus the company's risk for default is low. According to LR, 68.8 % (S.D. = 45%) of assets belong to debt. Total financial debt to total debt indicates that in the average 54.5 % (S.D. = 22%) of total financial debt belongs to total debt. Debt to equity ratio average value equal to 4.23 (S.D. = 5.62), which indicates that debt are greater than equity by three times.

High S.D. varies a lot and it seems to have some extreme values. Because of that reasons a normal p-plots were performed to check outliers' existence and after a more robust tests were conducted as explained previously. Outliers were observed in most variables, which will be removed from the sample later on.

The descriptive statistics of economic and financial indicators for subsample of Ukraine and Portugal is exhibited on Table 9.

Higher quick ratio' mean of Ukrainian enterprises shows that their ability to cover short-term obligations with liquid assets is slightly better than Portuguese one (see Table 9). LiqR ratio is also slightly better in Ukrainian enterprises showing higher ability to pay off its short-terms debts obligations with its current assets. In case of the cash ratio shows higher availability of cash and cash equivalents in Portuguese enterprises, also in both countries the level of liquidity in terms of cash is poor.

Table 9. Descriptive statistics of economic and financial indicators by country sample (Portugal and Ukraine).

	Country									
	Portuguese					Ukrainian				
	n	Minimum	Maximum	Mean	Standard Deviation	n	Minimum	Maximum	Mean	Standard Deviation
Quick ratio	42	0,258	1,479	0,802	0,240	48	0,107	7,519	1,356	1,314
Liquidity Ratio	42	0,434	2,128	1,078	0,357	48	0,465	12,084	2,672	2,759
Cash ratio	42	0,032	0,997	0,240	0,245	48	0,001	1,689	0,171	0,340
Receivable turnover ratio	42	1,526	11,959	5,134	2,773	48	0,000	28,170	7,400	8,283
Inventory turnover ratio	42	0,918	12,709	4,214	2,555	48	0,411	37,842	6,840	5,742
Net Working Capital turnover ratio	42	-574,690	513,507	0,237	121,537	48	-327,787	80,740	-5,238	51,290
Asset Turnover Ratio	42	0,204	1,464	0,628	0,306	48	0,000	2,230	0,626	0,656
Equity turnover ratio	42	0,747	12,308	3,645	2,478	48	0,000	13,772	1,516	2,246
Fixed Asset Turnover Ratio	42	0,259	3,487	1,166	0,765	48	0,000	7,231	1,319	1,794
Current Asset Turnover Ratio	42	0,525	4,153	1,721	0,958	48	0,000	7,875	1,772	1,914
Gross profit margin	42	0,126	0,809	0,547	0,159	48	-0,179	0,350	0,122	0,098
EBITDA margin	42	-0,173	0,484	0,137	0,119	29	-0,352	0,836	0,145	0,291
Profit margin	42	-0,320	0,190	0,010	0,090	48	-2,430	0,210	-0,060	0,380
Return on Equity	42	-4,661	0,533	-0,104	0,756	48	-0,574	2,179	0,039	0,393
Return on Assets	42	-0,113	0,082	0,001	0,042	48	-0,275	0,210	0,007	0,111
Operating expense to net sales ratio	42	0,782	1,280	0,945	0,104	45	0,517	3,354	1,033	0,376
Assets growth ratio	35	-0,230	0,410	-0,016	0,129	40	-0,475	1,531	0,077	0,305
Net profit growth ratio	35	-1,640,18	1,485	-47,45	277,143	40	-4,712	91,282	3,369	15,281
Sales Growth ratio	35	-0,434	0,773	0,016	0,237	40	-0,714	1,444	0,056	0,365
Current assets to total assets ratio	42	0,194	0,607	0,401	0,145	48	0,190	0,939	0,412	0,204
Inventory to current assets ratio	42	0,042	0,471	0,246	0,129	48	0,045	0,945	0,424	0,235
Cash and cash equivalents to current assets ratio	42	0,031	0,606	0,210	0,172	48	0,001	0,303	0,057	0,068
Long-term assets to total assets ratio	42	0,393	0,806	0,597	0,147	48	0,061	0,810	0,587	0,205
Short-term financial debt to total debt	42	0,019	0,503	0,230	0,110	48	0,000	0,811	0,191	0,238
Short-term debt to total debt	42	0,127	0,930	0,532	0,208	48	0,072	1,000	0,612	0,296
Interest coverage ratio	42	-9,308	70,569	4,784	13,985	48	-331,766	101,631	-0,661	53,261
Leverage Ratio	42	0,360	0,976	0,769	0,154	48	0,071	3,676	0,521	0,525
Total financial debt to total debt	42	0,355	0,862	0,603	0,149	48	0,000	0,952	0,473	0,292
Debt to equity ratio	42	0,560	40,23	5,760	6,370	48	-8,930	9,310	1,420	2,500

The receivables turnover mean in both countries has high value, but it is slightly better in Ukrainian enterprises, where they are seemed to have efficient collection of accounts receivable and that companies have more customers that pay off their debts quickly. Inventory turnover ratio mean has higher level in Ukrainian companies, which implies their inventory will be sold and replaced over a period more times. Despite the fact that Ukrainian enterprises have almost all requirements (preconditions) of good performance, subsequent indicator – NWC turnover ratio shows negative value, which means their use of working capital to generate sales, is not efficient. On the other hand, Portuguese companies in these terms are efficient. The ATR mean has similar low meaning implying not enough sum of revenue generated. Equity turnover ratio showing more efficient use of equity to generate revenue in Portuguese enterprises, which mean is higher and equals to 3.645 (S.D. = 2.478). Ukrainian enterprises utilized investment in fixed assets to generate revenue more effectively (FATR mean is higher). Average current assets means have similar meaning indicating efficient use of current assets to generate revenue.

Gross profit margin in Portuguese companies is higher than in Ukrainian. Profit margin value is also better in Portuguese companies (mean: 0.01 > -0.06; S.D.: 0.09 > 0.38). EBITDA margin is slightly higher in Ukrainian enterprises and equal to 13.7 %. Both sides of enterprises have low ROA, Portuguese companies 0.1 % and Ukrainian – 0.7 % which shows effective but not efficient use of assets to generate earnings. The Operating expense to net sales ratio equals to 1.033 (S.D. = 0.38) in Ukrainian side of firms, which indicates high value of costs. In Portuguese enterprise its value is 0.945 (S.D. = 0.10) showing more positive proportion (sales higher than expenses).

Mean growth rates for assets, net profit and sales better in Ukrainian enterprises indicating the clear trend of increase. Portuguese assets and net profit growth rates have negative meaning and indicate the decline trend.

Researching structure of total assets: average of Current assets to total assets ratio in both sides are around 40%, but Ukrainian companies show more variability in its capital structure (Ukrainian S.D. = 20.4% against 14.5% for Portuguese companies). Long-term assets in average are 59 % of total assets (again, according to S.D., the ratio varies more among Ukrainian companies). Accordingly, average percentage of stocks in current assets is higher in Ukrainian enterprises 42.4 %; average percentage of Cash and cash equivalents is higher in Portuguese enterprises and is 21 %. In those cases better S.D. was presented by Portuguese side.

Analysing the structure of total debt, may be concluded that in average the short term financial debt higher in Portuguese enterprises (23 %; S.D. = 11%), but short term in general is higher in Ukrainian firms (61.2 %, S.D. = 29.6%). Total financial debt in total debt higher in Portuguese entities (60.3 %, S.D. = 14.9%).

According to interest coverage ratio, Portuguese entities on the contrast to Ukrainian can pay interest on outstanding debt (4.78 > -0.661). LR has slightly higher meaning in Portuguese side, where 77 % (S.D. = 15.4%) of capital comes in the form of debt (loans).

The descriptive statistics of economic and financial ratios for each country is given in Appendix I.

3.3. Analysis of factors determining companies' activity efficiency

In this subchapter, firstly the check of basic assumptions for conducting regression analysis was made. Secondly analysis was performed while estimating the model and determining factors of efficiency and measuring the impact of each variable in average in the whole sample and also for each country. Thirdly, the analysis of efficiency was made in the whole sample, for each country and industry.

3.3.1. Check of assumptions

Durbin-Watson and collinearity statistics while conduction of regression analysis, showed the existence of collinearity for the dependent variable (ATR). The check of collinearity before and after excluding outliers is given in

Table 10. There is no clear collinearity, although while conducting linear regression analysis, we checked closer collinearity statistic and there was several cases with VIF higher than 10 – which indicated influence of collinearity on the regression coefficients and consequently they are poorly estimated. After eliminating outliers the results indicate that there is no collinearity between variables.

Normality was visually checked using Q-Q plots, which showed existence of outliers. K-S Test checked if residuals had normal distribution and because the p-value was higher than 0.05, they have normal distribution. Homoscedasticity check showed that indicator meanings have the same finite variance after eliminating outliers.

The statistics on made assumption and corresponding tests are given in Appendix II, the results also represented in

Table 10.

Table 10. Results of assumptions check for efficiency model.

Test	Indicator	Before crossing out of outliers	After crossing out of outliers
Regression analysis	Adjusted R Square	0,975	0,989
	Durbin-Watson	1,825	1,707
	Number of possible models	12	6
	Predictors	(Constant) including FATR, CATR, LiqR, Quick ratio, Inventory to current assets ratio, Current assets to total assets ratio, ROA, EBITDA margin	(Constant) including FATR, CATR, EBITDA margin, ROA, LiqR, LR
Check of residuals			
Kolmogorov-Smirnov Test	Sample size	90	65
	Asymp. Sig. (2-tailed)	0,058	0,082
Koenker test	(Sig.)	0,018	0,629

3.3.2. Identification of factors which have influence on efficiency

Considering Appendix III, it can be defined which model is optimal due to the rule: "the higher adjusted R square is better". As this way, the most optimal one from all models is the 6th one, which Adjusted R square equals to 0.989. This chosen model is presented in Table 11 and equation 9.

Table 11. The models of calculation ATR.

Model	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
				Tolerance	VIF
(Constant)		6,289	<0,001		
Fixed Asset Turnover Ratio (FATR)	0,701	40,661	<0,001	0,747	1,338
Current Asset Turnover Ratio (CATR)	0,451	26,065	<0,001	0,740	1,351
EBITDA margin	-0,136	-6,652	<0,001	0,531	1,883
Return on Assets (ROA)	0,126	5,742	<0,001	0,457	2,187
Liquidity Ratio (LiqR)	-0,076	-4,446	<0,001	0,759	1,317
Leverage Ratio (LR)	-0,039	-2,409	0,020	0,857	1,167

The final model is presented below:

ATR = 0.701* FATR + 0.451* CATR – 0.136*EBITDA margin + 0.126* ROA – 0.076* LiqR – 0.039*LR [9]

From Table 11 it could be seen that all variables are statistically significant, and each factor have different level of influence on the dependable variable. The biggest positive influence has FATR (0.701) and CATR (0.451), smaller positive influence has ROA (0.126). Negatively influencing enterprise efficiency are EBITDA margin (-0.136), LiqR (-0.076) and LR (-0.039).

According to observed results it can be stated that RH_3 (Companies efficiency is influenced by FATR, CATR, EBITDA margin, ROA, LiqR, LR) is not corroborated.

3.3.3. Identification of efficiency model and factors influencing it in each country

Results of regression analysis of efficiency for Portugal and Ukraine (Dependent variable is ATR) shown in Table 12 (all possible models are given in Appendix IV).

The final models of efficiency for Portuguese and Ukrainian enterprises are given in equation 10 and 11, respectively.

ATR (Port) = 0.727*FATR + 0.464*CATR + 0,037* Short-term financial debt to total debt – 0.058*LR – 0.04*EBITDA margin. [10]

ATR (Ukr) = 0.825* Short-term debt to total debt + 0.511*ROA – 0.351*Interest coverage ratio [11]

Table 12. The model of efficiency for Portuguese and Ukrainian enterprises.

	Portugal			Ukraine		
Variables	**Standardized Coefficients Beta**	**T**	**Sig.**	**Standardized Coefficients Beta**	**T**	**Sig.**
(Constant)		3,608	0,001		1,702	0,111
Fixed Asset Turnover Ratio (FATR)	0,727	38,433	<0,001			
Current Asset Turnover Ratio (CATR)	0,464	32,208	<0,001			
Short-term financial debt to total debt	0,037	2,551	0,017			
Leverage Ratio (LR)	-0,058	-3,479	0,002			
Net profit growth ratio	0,045	2,962	0,006			
EBITDA margin	-0,040	-2,857	0,008			
Short-term debt to total debt				0,825	8,571	<0,001
Return on Assets (ROA)				0,511	5,593	<0,001
Interest coverage ratio				-0,351	-3,640	0,003
Adjusted R Square	0,994			0,859		
Durbin-Watson	1,785			1,530		
F-test	919,053			35,508		
Sig.	<0,001			<0,001		

From Table 12 it could be seen that all variables are statistically significant, and each factor influence dependable variable differently. The biggest positive influence on ATR has FATR (0.727) and CATR (0.464), smaller positive influence has Net profit growth ratio (0.045) and Short-term financial debt to total debt (0.037). Small negative impact made by LR (-0.058) and EBITDA margin (-0.136).

In model for Ukrainian enterprises it also could be seen that all variables are statistically significant, and each factor has different level of influence on ATR. The biggest positive influence has Short-term debt to total debt (0.825), also ROA has positive impact (0.511), the opposite correlation with ATR has Interest coverage ratio (-0.351).

The factors that explain efficiency among Portuguese enterprises are different from Ukrainian ones.

3.3.4. Efficiency analysis

Our sample consists of 90 cases. Review of normality showed existence of several outliers. Correction of sample was made using the regression analysis, calculation of p-value and selecting reliable variables. In the end we get 49 valid cases. In this part the research hypothesis (RH_1: Enterprise efficiency indicator (comprehensive indicator – ATR) equals to 1) was checked using the one sample t-test (Table 13). The model results can be described as next: 0 – means inefficiency; 1 – efficiency.

Table 13. Result of One-Sample T-test for Asset Turnover Ratio.

Descriptive statistics	n	Mean	Std. Deviation	Std. Error Mean
	65	0,731204	0,3834501	0,0475611

One-Sample T-test for Asset Turnover Ratio (Test Value = 1)	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
	-5,652	64	<0,001	-0,2687961	-0,363810	-0,173782

After checking significance p-value which is less than 0.05, the null hypothesis cannot be corroborated.

Given the results (Table 13), ATR mean is 0.73 (S.D. = 0.38) which is statistically significantly different from the test value of 1. It has been concluded that enterprises are efficient.

It can be concluded that RH_1, which states that on average the companies in the sample are efficient, cannot be corroborated.

3.3.5. Efficiency analysis comparing by countries

Nonparametric 2-independent samples t-test is used to compare the means of efficiency for two independent groups of Ukrainian and Portuguese enterprises. First of all the distribution should be checked (Table 14).

Table 14. Result of Mann Witney after eliminating outliers.

Ranks				
	Country	n	Mean Rank	Sum of Ranks
Asset turnover ratio	Portuguese	42	27,90	1172,00
	Ukrainian	23	42,30	973,00
	Total	65		

Test Statistics for ATR	
Mann-Whitney U	269,000
Wilcoxon W	1172,000
Z	-2,936
Asymp. Sig. (2-tailed)	0,003

P-value is less than 0.05 which means that efficiency of Ukrainian and Portuguese enterprises have statistically significant different efficiency, that is why RH_1 (sub-hypothesis stating that there is no difference in efficiency between Ukrainian and Portugal companies) is corroborated.

In order to compare efficiency by country the descriptive statistics are displayed in Table 15.

Table 15. The level of efficiency results by country.

	n	Minimum	Maximum	Mean	Std. Deviation
Asset Turnover Ratio (Portugal)	34	0,2044	1,4639	0,6280	0,3064
Asset Turnover Ratio (Ukraine)	30	0,2356	1,6740	0,9197	0,4419
Valid n (listwise)	64				

Given the average of efficiency by country it seems that in average Ukrainian enterprises are more efficient.

3.3.6. Efficiency analysis comparing by industrial sector

In order to find out if there is difference in efficiency by sector in which enterprise is functioning, Shapiro-Wilk test was used. Reasoning why it was used connected to that the sample does not follow normal distribution and n<30. Descriptive statistics and results of Kruskal Wallis test is shown in Table 16.

Table 16. The level of efficiency results by industrial sector.

Asset Turnover Ratio		n	Minimum	Maximum	Mean	Standard Deviation	Shapiro-Wilk sig.
Industry*	Paper	24	0	2,2304	0,7407	0,7370	0,002
	Automotive	12	0	1,4639	0,6923	0,5640	0,067
	Building materials	18	0	1,0403	0,5547	0,3562	0,040
	Steel	18	0	1,5248	0,6351	0,5134	0,113
	Building	18	0	0,6814	0,4965	0,1976	0,000

After checking significance p-value in Shapiro-Wilk test to standard $\alpha=0.05$ – in this case $\alpha>0.05$ in some cases, so efficiency level by sectors have significant difference. Thus, there is difference in efficiency regarding the industry sector. As in descriptive statistics of Table 16 is shown, the average efficiency is slightly higher in paper industry and slightly lower in building enterprises.

3.4. Analysis of factors that determine companies performance

In this subchapter, firstly the check of basic assumptions for conducting regression analysis was made. Secondly analysis was made while defining the model and factors that have influence on enterprise performance and measuring the impact of each variable in average in the whole sample and also dividing by countries. Thirdly, the analysis of profitability was made in the whole sample, for each country and industry.

3.4.1. Check of assumptions

The results of collinearity check before and after excluding outliers given in

Table 10, do not show collinearity but closer look highlighted few cases which prove existence of collinearity, which was avoided by eliminating outliers. K-S Test for normality resulted in improved significance after crossing outliers. Homoscedasticity check showed that heteroskedasticity is not present indicator.

The statistics on made assumption and corresponding tests are given in Appendix V, the results also represented in

Table 10.

Table 17. Results of assumptions check for profitability model.

Test	Indicator	Before crossing out of outliers	After crossing out of outliers
Regression analysis	Adjusted R Square	0,917	0,923
	Durbin-Watson	1,619	1,396
	Number of possible models	8	5
	Predictors	(Constant) including Profit margin, EBITDA margin, log(TA), Debt to equity ratio, Number of employees, Operating expense to net sales ratio	(Constant) including Profit margin, FATR, EBITDA Margin, Country, Debt to equity ratio
Check of residuals			
Kolmogorov-Smirnov test	Sample size	68	63
	Asymp. Sig. (2-tailed)	0,840	0,986
Koenker test	(Sig.)	0,748	0,095

3.4.2. Identification of factors which have influence on performance

Considering Appendix VI, the most optimal model is the 5th one, which results are presented in Table 11 and equation 12.

The final model is presented below, according to which it can be stated that RH_4 (companies performance is influenced by EBITDA margin; Profit margin; NWC turnover ratio; FATR, CATR; Net operation expenses to net sales ratio; Sales growth ratio; LR; Debt-to-Equity; Interest coverage ratio) is corroborated:

ROA = 0.678*Profit margin + 0.236* FATR + 0.277*EBITDA margin + 0.137*Country + 0.122* Debt to equity ratio [12]

Table 18. The models of calculation ROA.

Model		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		Beta			Tolerance	VIF
5	(Constant)		-5,721	<0,001		
	Profit margin	0,678	12,555	<0,001	0,525	1,904
	Fixed Asset Turnover Ratio	0,236	4,552	<0,001	0,572	1,749
	EBITDA Margin	0,277	4,976	<0,001	0,495	2,018
	Country	0,137	2,986	0,005	0,727	1,376
	Debt to equity ratio	0,122	2,581	0,013	0,681	1,468

According to Table 11, it could be seen that all variables are statistically significant, and each factor have different level of influence on the dependable variable. All of the variables have positive influence, the biggest impact belong to Profit margin (0.678). These factors explain 92.3 % of performance's variance.

3.4.3. Identification of performance model and factors influencing it in each country

Due to the p-value of factor of the country in general performance model (Table 18), there is indications of difference between models by state (appendix VII).

The final model for Portuguese enterprises is:

ROA (Port) = 0.137*FATR – 0.221*CATR + 0,152* Debt to equity ratio + 1.110* Profit margin – 0.102* Interest coverage ratio. [13]

ROA (Ukr) = 0.668* Profit margin + 0.433* EBITDA margin [14]

In case of Portuguese enterprises, variables are statistically significant, and each factor influence dependable variable differently. The biggest positive influence on ROA has Profit margin (1.110), a bit smaller impact have Debt to equity ratio (0.152) and FATR (0.137). Small negative impact is made by CATR (-0.221) and Interest coverage ratio (-0.102).

Table 19. The model of profitability for Portuguese and Ukrainian enterprise.

	Portugal			Ukraine		
Variables	**Standardized Coefficients Beta**	**T**	**Sig.**	**Standardized Coefficients Beta**	**T**	**Sig.**
(Constant)		0,548	0,588		1,314	0,206
CATR	-0,221	-8,224	<0,001			
FATR	0,137	4,572	<0,001			
Debt to equity ratio	0,152	4,785	<0,001			
Interest coverage ratio	-0,102	-2,895	0,007			
Profit margin	1,110	30,729	<0,001	0,668	7,375	<0,001
EBITDA margin				0,433	4,781	<0,001
Adjusted R Square	0,979			0,883		
Durbin-Watson	1,830			0,546		
F-test	311,594			68,991		
Sig.	<0,001			<0,001		

In model for Ukrainian enterprises it also could be seen that two factors has different level of influence on ROA. The biggest positive impact has Profit margin (0.668), EBITDA margin also has positive impact (0.433).

Profit margin influences both models of performance for Ukrainian and Portuguese enterprises, but there is significant difference between those two models.

3.4.4. Analysis of performance

Our sample consists of 90 cases. Analysis of normality showed existence of several outliers. Correction of sample was made using the regression analysis, calculation of p-value and selecting reliable variables. In the end we get 63 valid cases.

In this part the research hypothesis (RH_1) was checked using the one sample t-test (Table 20).

After checking significance p-value which is less than 0.05, the null hypothesis cannot be corroborated.

Table 20. Result of One-Sample T-test for Return on Assets.

Descriptive statistics	n	Mean	Std. Deviation	Std. Error Mean
	63	0,018210	0,0622157	0,0078384

One-Sample T-test for Asset turnover ratio (Test Value = 1)	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
	-125,652	62	<0,001	-0,9817898	-0,997459	-0,966121

Given the results (Table 20), ROA mean is 0.018 (S.D. = 0.062) which is statistically significantly different from the test value of 1. It has been concluded that enterprises are not as profitable and they could be characterised as enterprises with low performance level. Thus, RH_2 (on average performance of companies is positive) is corroborated.

As company's performance is often measured by ROA, it is expected that companies on average have positive performance (Pantea, Gligor & Anis, 2014).

3.4.5. Analysis of performance comparing by countries

Results of nonparametric 2-independent samples t-test shown that meaning of p-value is smaller than 0.05 indicating the difference between countries performance models.

Table 21. Result of Mann Witney independent samples T-test after eliminating outliers for ROA.

Ranks					Test Statistics for ATR[a]	
	Country	n	Mean Rank	Sum of Ranks	Mann-Whitney U	233,000
Asset turnover ratio	Portuguese	41	26,68	1094,00	Wilcoxon W	1094,000
	Ukrainian	22	41,91	922,00	Z	-3,143
	Total	63			Asymp. Sig. (2-tailed)	0,002

In order to compare profitability descriptive statistics by state are displayed in Table 15.

Table 22. Profitability statistics by country.

	n	Minimum	Maximum	Mean	Std. Deviation
Return on Assets (Portugal)	41	-0,1131	0,0823	0,0002	0,0419
Return on Assets (Ukraine)	22	-0,1338	0,1947	0,0517	0,0793
Valid n (listwise)	64				

As can be observed from Table 22, Ukrainian enterprises have higher average ROA, and then performance, than Portuguese ones. This indicates that there is a difference in performance level

among Ukrainian and Portugal companies in sample that is why the sub-hypothesis of RH_2 is not corroborated.

3.4.6. Analysis of performance comparing by industrial sector

In order to find out if there is difference in profitability in enterprises by sector they are functioning in, reasoning by small samples of enterprises performance by industrial sectors, Shapiro-Wilk Test (Table 16) was used.

After checking significance p-value in Shapiro-Wilk Test some industries does not follow normal distribution and have less than 30 cases, which imply that level profitability by sectors have significant difference.

Table 23. Profitability level by industrial sector.

Return on Assets		n	Minimum	Maximum	Mean	Standard Deviation	Shapiro-Wilk sig.
Industry*	Paper	15	-0,0106	0,1947	0,0855	0,0609	0,500
	Automotive	6	-0,0144	0,0410	0,0115	0,0230	0,478
	Building materials	14	-0,1338	0,0499	-0,0167	0,0477	0,212
	Steel	12	-0,1131	0,0823	-0,0193	0,0621	0,630
	Building	16	-0,0790	0,0416	0,0163	0,0271	0,000

Thus, there is a slightly difference in profitability between industrial sectors, for example paper industry is the most profitable one among studied sample. Automotive and building enterprises also give profit, and according to the results of descriptive analysis steel and building materials sectors of economy in the sample have losses regarding the industry sector.

Conclusions, Limitations and Future Research Lines

Having in mind the research questions that guided this thesis and the objective settled: analyse the efficiency and performance of enterprises and determine the factors that may explain it, a sample of Portuguese and Ukrainian companies was selected to test three hypothesis related to research questions. Economic, financial and non-financial data for these companies were collected. Descriptive and inferential analysis was performed as well as multivariate regressions (through OLS regressions) were applied to identify the factors that may explain the efficiency (measured by ATR) and performance as profitability (measured by ROA).

According to the results presented in previous chapter, it can be concluded that average efficiency (ATR) of all enterprises equal to 0.73 (S.D. = 0.38) which in the interval from 0 to 1 is significantly closer to efficient level that is why enterprises are considered as efficient. While assessing efficiency by country better efficiency belonged to Ukrainian enterprises (mean = 0.92; S.D. = 0.44) compared to Portuguese (mean = 0.63; S.D. = 0.31). When looking for difference of efficiency in industrial sectors, it was revealed that there is no significant difference, but average efficiency is slightly higher in paper industry and slightly lower in building enterprises. Regression analysis revealed value of each factor influence. The factors which are influencing efficiency are fixed asset turnover ratio, current assets turnover ratio, return on assets, EBITDA margin and liquidity ratio. The biggest positive influence had fixed asset turnover ratio and negative influence had liquidity ratio. Significant difference between models by country was not detected.

Average of ROA enterprises (mean = 0.02; S.D. = 0.06) showed that enterprises has low performance level but comparing between Ukrainian and Portuguese enterprises, first ones have better profitability. Results of assessing industries performance highlighted paper industry as the most profitable industry sector and steel and building materials sectors of economy as the lossmaking ones. Linear regression for ROA showed following factors of influence: profit margin, fixed asset turnover ratio, EBITDA margin, Debt to equity ratio and the country where entity is functioning. All of them have positive relation.

In terms of hypothesis validation, conclusion is followed:

RH1: On average the companies in the sample are efficient – corroborated.

Sub-hypothesis RH1: there is no difference in efficiency between Ukrainian and Portugal companies – is not corroborated.

RH2: On average performance of companies is positive – corroborated.

Sub-hypothesis RH2: there is no difference in performance level among Ukrainian and Portugal companies in sample is not corroborated.

RH3: Companies efficiency is influenced by FATR, CATR, EBITDA margin, ROA, LiqR, LR – corroborated.

RH4: companies performance is influenced by EBITDA margin; Profit margin; NWC turnover ratio; FATR, CATR; Net operation expenses to net sales ratio; Sales growth ratio; LR; Debt-to-Equity; Interest coverage ratio – corroborated.

Suggestions for Ukrainian enterprises included paying attention after factors of Short-term debt to total debt, ROA, Interest coverage ratio in order to be more efficient; Profit margin and EBITDA margin to make their performance better.

Suggestions for Portuguese enterprises involve to improve efficiency to observe and develop factors of fixed assets turnover ratio, current assets turnover ratio, Short-term financial debt to total debt, Leverage Ratio, EBITDA margin. As for profitability fixed assets turnover ratio, current assets turnover ratio, Debt to equity ratio, Profit margin and Interest coverage ratio are suggested to be tracked.

This research indicated robust results with statistical significance, and thus the conclusions are relevant. The lack of scientific research related to the use of comprehensive economic analysis in management system of the enterprise activity determined the choice of research topic and its practical value for enterprises in market conditions of economic activity. Among limitations of the present thesis work were set of requirements that companies should have been listed and had free access of data and function industrial sector.

In the future it is advised to consider expand the sample to other countries and include more enterprises, sub-sampling based on individual enterprises and non-researched sectors of economy, also, testing the model on sub-periods.

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Appendices

Appendix I

Table A1. Average meaning of economic and financial indicators by enterprises.

	CompanyName														
	ALTRI SGPS	CIMPOR SGPS	Martifer	Mota-Engil	Sonae Indústria	Teixeira Duarte	Toyota caetano	Corporation Bogdan	PJSC ArcelorMittal Kryvyi Rih	PJSC "Zaporizhstal"	PJSC HC "Kyivmiskbud"	PJSC "Kyiv cardboard and paper mill"	PJSC "Slavic wallpaper-KFTP"	JSC RKTK	PJSC "Heidelberg Cement Ukraine"
Quick Ratio	0,683	1,143	0,941	0,841	0,440	0,728	0,834	1,114	1,567	0,757	1,481	0,590	2,532	2,637	0,396
Liquidity Ratio	0,819	1,587	1,005	0,971	0,713	0,989	1,465	1,387	2,424	1,063	2,382	0,949	3,851	3,624	1,097
Cash Ratio	0,392	0,734	0,096	0,109	0,053	0,155	0,144	0,037	0,092	0,141	0,083	0,031	0,783	0,830	0,017
Receivable Turnover Rate	5,787	8,127	2,035	2,337	8,855	3,250	5,548	12,451	11,008	22,324	8,216	10,291	7,007	7,644	15,854
Inventory Turnover Rate	3,827	1,929	8,745	4,528	5,015	1,607	3,846	3,806	6,453	12,429	15,756	7,990	5,213	6,836	3,216
Net Working Capital Turnover Rate	80,323	6,425	21,745	-105,45	-12,837	2,859	8,597	6,035	4,987	13,609	2,939	-88,99	3,261	3,496	0,484
ATR	0,403	0,358	0,424	0,619	0,907	0,491	1,194	0,381	0,940	1,200	0,554	1,510	1,578	0,597	0,791
Equity Turnover Rate	3,241	1,532	3,538	4,639	6,850	3,441	2,274	1,487	1,349	2,220	6,835	3,124	1,933	0,935	1,229
Fixed ATR	0,556	0,471	0,868	1,432	1,201	0,892	2,744	0,761	1,733	1,656	0,997	2,288	4,592	0,788	1,182
Current Assets Turnover Rate	1,541	1,492	0,839	1,127	3,767	1,142	2,139	0,771	2,724	4,474	1,617	4,512	2,414	2,499	2,415
Gross Profit Margin	0,624	0,664	0,465	0,508	0,535	0,678	0,355	-0,994	0,116	0,050	0,089	0,203	0,219	0,161	0,158
EBITDA Margin	0,249	0,279	-0,025	0,188	0,070	0,130	0,069	-0,121	0,078	0,017	0,046	0,123	0,789	0,147	-0,109
Earnings Before Tax to Equity Ratio	0,234	0,121	-0,837	0,230	-0,268	0,046	0,034	-0,329	0,036	-0,100	0,196	0,265	0,247	0,052	-0,196
Return on Equity	0,193	0,064	-0,904	0,166	-0,280	0,006	0,025	-0,319	0,011	-0,088	0,192	0,212	0,193	0,112	-0,026
Return on Assets	0,031	0,024	-0,044	0,022	-0,039	0,004	0,012	-0,085	0,006	-0,042	0,023	0,104	0,157	0,072	0,006
Operating Expense to Net Sales Ratio	0,870	0,818	1,069	0,956	0,998	0,919	0,987	.	0,985	1,053	0,924	0,892	0,879	1,082	1,204
Assets Growth Rate	0,021	0,073	-0,146	0,066	-0,074	-0,028	-0,022	0,002	0,579	0,123	0,105	0,284	0,346	0,226	0,151
Net Profit Growth Rate	-1,183	-1,032	-0,219	0,008	-0,009	-1,359	-328,36	-0,504	-2,162	5,558	6,639	0,169	0,631	0,527	-2,054
Sales Growth Rate	0,174	0,094	-0,158	0,037	-0,042	0,061	-0,051	0,778	0,305	0,225	-0,052	0,228	0,083	0,326	0,059
Current Assets to Total Assets Ratio	0,265	0,239	0,515	0,551	0,241	0,435	0,558	0,481	0,375	0,272	0,405	0,335	0,654	0,240	0,329
Inventory to Current Assets Ratio	0,169	0,274	0,063	0,134	0,385	0,266	0,429	0,192	0,360	0,320	0,369	0,377	0,342	0,277	0,650
Cash and Cash Equivalents to Current Assets Ratio	0,473	0,461	0,095	0,111	0,074	0,156	0,103	0,028	0,037	0,110	0,039	0,032	0,203	0,215	0,013
Longterm Assets to Total Assets Ratio	0,735	0,761	0,485	0,433	0,756	0,564	0,442	0,519	0,625	0,727	0,597	0,661	0,344	0,757	0,669
Short Term Financial Debt to Total Debt	0,257	0,118	0,241	0,186	0,178	0,278	0,349	0,259	0,000	0,117	0,000	0,240	0,230	0,032	0,711
Short Term Debt to Total Debt	0,384	0,240	0,665	0,658	0,416	0,516	0,844	0,493	0,650	0,660	0,571	0,705	0,923	0,194	0,982
Interest Coverage Ratio	2,522	4,032	-0,924	4,942	0,016	13,424	9,473	-0,955	5,131	0,129	15,317	16,650	38,949	-1,499	16,620
Leverage Ratio	0,858	0,715	0,781	0,865	0,849	0,852	0,462	0,740	0,229	0,438	1,329	0,506	0,184	0,357	0,335
Total Financial Debt to Total Debt	0,835	0,717	0,528	0,400	0,619	0,666	0,455	0,714	0,123	0,406	0,027	0,520	0,267	0,791	0,711

Appendix II

Table A2. Durbin-Watson result for ATR.

Model	Adjusted R Square	Durbin-Watson	Predictors: (Constant) including: (Dependent Variable: Total assets turnover ratio)
Before stepwise crossing out of outliers			
1	0,582		a. FATR
2	0,872		b. FATR, CATR
3	0,915		c. FATR, CATR, S-tD to TD
4	0,932		d. FATR, CATR, S-tD to TD, ROA
5	0,938		e. FATR, CATR, S-tD to TD, ROA, LiqR
6	0,952		f. FATR, CATR, S-tD to TD, ROA, LiqR, QR
7	0,966		g. FATR, CATR, S-tD to TD, ROA, LiqR, QR, Inventory to CA ratio
8	0,966		h. FATR, CATR, ROA, LiqR, QR, Inventory to CA ratio
9	0,965		i. FATR, CATR, LiqR, QR, Inventory to CA ratio
10	0,969		j. FATR, CATR, LiqR, QR, Inventory to CA ratio, CA to TA ratio
11	0,973		k. FATR, CATR, LiqR, QR, Inventory to CA ratio, CA to TA ratio, ROA
12	0,975	1,825	l. FATR, CATR, LiqR, QR, Inventory to CA ratio, CA to TA ratio, ROA, EBITDA margin
After stepwise crossing out of outliers			
1	0,752		a. FATR
2	0,975		b. FATR, CATR
3	0,980		c. FATR, CATR, EBITDA margin
4	0,984		d. FATR, CATR, EBITDA margin, ROA
5	0,988		e. FATR, CATR, EBITDA margin, ROA, LiqR
6	0,989	1,707	f. FATR, CATR, EBITDA margin, ROA, LiqR, LR

Where CA – Current Assets; TA - Total Assets; QR - Quick Ratio; TD – Total Debt; S-tD - Short-term Debt.

Table A4. Results of Kolmogorov-Smirnov Test.

One-Sample Kolmogorov-Smirnov Test			After cleaning
N		90	65
Normal Parameters[a,b]	Mean	0,627086	0,731204
	Std. Deviation	0,5199200	0,3834501
Most Extreme Differences	Absolute	0,133	0,177
	Positive	0,133	0,177
	Negative	-0,114	-0,088
Kolmogorov-Smirnov Z		1,265	1,428
Asymp. Sig. (2-tailed)		0,081	0,034

a. Test distribution is Normal.
b. Calculated from data.

Table A5. Breusch-Pagan and Koenker test statistics and sig-values for efficiency model.

Before crossing out outliers	LM	Sig.
BP	130,914	<0,001
Koenker	44,695	0,018

After crossing out outliers	LM	Sig.
BP	29,039	0,359
Koenker	24,024	0,629

Appendix III

Table A6. The models of calculating efficiency in whole sample.

Model		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		Beta			Tolerance	VIF
1	(Constant)		4,582	<0,001		
	Fixed Asset Turnover Ratio	0,870	12,101	<0,001	1,000	1,000
2	(Constant)		,633	,530		
	Fixed Asset Turnover Ratio	0,696	28,375	<0,001	0,878	1,138
	Current Asset Turnover Ratio	0,499	20,338	<0,001	0,878	1,138
3	(Constant)		1,951	,057		
	Fixed Asset Turnover Ratio	0,715	31,497	<0,001	0,826	1,211
	Current Asset Turnover Ratio	0,483	21,438	<0,001	0,841	1,190
	EBITDA margin	-0,075	-3,474	0,001	0,925	1,081
4	(Constant)		3,782	<0,001		
	Fixed Asset Turnover Ratio	0,694	33,521	<0,001	0,766	1,305
	Current Asset Turnover Ratio	0,472	23,674	<0,001	0,825	1,212
	EBITDA margin	-0,135	-5,465	<0,001	0,537	1,863
	Return on Assets	0,097	3,785	<0,001	0,501	1,996
5	(Constant)		5,828	<0,001		
	Fixed Asset Turnover Ratio	0,704	38,878	<0,001	0,752	1,329
	Current Asset Turnover Ratio	0,464	26,586	<0,001	0,811	1,232
	EBITDA margin	-0,131	-6,124	<0,001	0,536	1,867
	Return on Assets	0,124	5,332	<0,001	0,459	2,181
	Liquidity Ratio	-0,071	-3,955	<0,001	0,772	1,295
6	(Constant)		6,289	<0,001		
	Fixed Asset Turnover Ratio	0,701	40,661	<0,001	0,747	1,338
	Current Asset Turnover Ratio	0,451	26,065	<0,001	0,740	1,351
	EBITDA margin	-0,136	-6,652	<0,001	0,531	1,883
	Return on Assets	0,126	5,742	<0,001	0,457	2,187
	Liquidity Ratio	-0,076	-4,446	<0,001	0,759	1,317
	Leverage Ratio	-0,039	-2,409	0,020	0,857	1,167

Appendix IV

Table A7. The models of calculating efficiency for Portuguese enterprises.

Model		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		Beta			Tolerance	VIF
1	(Constant)		4,304	<0,001		
	Fixed Asset Turnover Ratio	0,892	11,161	<0,001	1,000	1,000
2	(Constant)		2,095	0,044		
	Fixed Asset Turnover Ratio	0,764	37,992	<0,001	0,921	1,085
	Current Asset Turnover Ratio	0,457	22,754	<0,001	0,921	1,085
3	(Constant)		-0,074	0,941		
	Fixed Asset Turnover Ratio	0,748	38,874	<0,001	0,839	1,192
	Current Asset Turnover Ratio	0,466	25,008	<0,001	0,896	1,116
	Short-term financial debt to total debt	0,050	2,675	0,012	0,904	1,106
4	(Constant)		2,073	0,047		
	Fixed Asset Turnover Ratio	0,722	33,656	<0,001	0,593	1,688
	Current Asset Turnover Ratio	0,471	26,774	<0,001	0,881	1,135
	Short-term financial debt to total debt	0,046	2,640	0,013	0,897	1,115
	Leverage Ratio	-0,046	-2,281	0,030	0,664	1,506
5	(Constant)		2,572	0,016		
	Fixed Asset Turnover Ratio	0,739	35,808	<0,001	0,532	1,880
	Current Asset Turnover Ratio	0,466	28,880	<0,001	0,870	1,149
	Short-term financial debt to total debt	0,040	2,497	0,019	0,879	1,137
	Leverage Ratio	-0,054	-2,874	0,008	0,648	1,542
	Net profit growth ratio	0,045	2,623	0,014	0,783	1,277
6	(Constant)		3,608	0,001		
	Fixed Asset Turnover Ratio	0,727	38,433	<0,001	0,504	1,982
	Current Asset Turnover Ratio	0,464	32,208	<0,001	0,868	1,152
	Short-term financial debt to total debt	0,037	2,551	0,017	0,873	1,145
	Leverage Ratio	-0,058	-3,479	0,002	0,642	1,557
	Net profit growth ratio	0,045	2,962	0,006	0,783	1,277
	EBITDA margin	-0,040	-2,857	0,008	0,907	1,103

Table A8. The models of calculating efficiency for Ukrainian enterprises.

Model		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		Beta			Tolerance	VIF
1	(Constant)		1,573	0,135		
	Short-term debt to total debt	0,730	4,278	0,001	1,000	1,000
2	(Constant)		1,363	0,193		
	Short-term debt to total debt	0,712	5,799	<0,001	0,999	1,001
	Return on Assets	0,491	3,993	0,001	0,999	1,001
2	(Constant)		1,702	0,111		
	Short-term debt to total debt	0,825	8,571	<0,001	0,896	1,116
	Return on Assets	0,511	5,593	<0,001	0,995	1,005
	Interest coverage ratio	-0,351	-3,640	0,003	0,893	1,120

Appendix V

Table A9. Durbin-Watson result for ROA.

Model	Adjusted R Square	Durbin-Watson	Predictors: (Constant) including (Dependent Variable: Return on Assets)
Before stepwise crossing out of outliers			
1	0,716		Profit margin
2	0,844		Profit margin, FATR
3	0,864		Profit margin, FATR, EBITDA Margin
4	0,879		Profit margin, FATR, EBITDA Margin, log(TA)
5	0,889		Profit margin, FATR, EBITDA Margin, log(TA), Debt to equity ratio
6	0,900		Profit margin, FATR, EBITDA Margin, log(TA), Debt to equity ratio, Number of employees
7	0,898		Profit margin, EBITDA Margin, log(TA), Debt to equity ratio, Number of employees
8	0,917	1,619	Profit margin, EBITDA Margin, log(TA), Debt to equity ratio, Number of employees, Operating expense to net sales ratio
After stepwise crossing out of outliers			
1	0,724		Profit margin
2	0,871		Profit margin, FATR
3	0,905		Profit margin, FATR, EBITDA Margin
4	0,914		Profit margin, FATR, EBITDA Margin, Country
5	0,923	1,396	Profit margin, FATR, EBITDA Margin, Country, Debt to equity ratio

Table A11. Results of Kolmogorov-Smirnov Test.

One-Sample Kolmogorov-Smirnov Test			After cleaning
N		68	63
Normal Parameters[a,b]	Mean	0,0006294	0,0010555
	Std. Deviation	0,01893304	0,01309312
Most Extreme Differences	Absolute	0,075	0,057
	Positive	0,075	0,057
	Negative	-0,070	-0,051
Kolmogorov-Smirnov Z		0,618	0,454
Asymp. Sig. (2-tailed)		0,840	0,986

a. Test distribution is Normal.
b. Calculated from data.

Table A12. Breusch-Pagan and Koenker test statistics and sig-values for profitability model.

before crossing out outliers	LM	Sig.
BP	22,189	0,053
Koenker	9,327	0,748

after crossing out outliers	LM	Sig.
BP	25551	0,020
Koenker	20,014	0,095

Appendix VI

Table A13. The models of calculating performance in whole sample.

Model		Standardized Coefficients	T	Sig.	Collinearity Statistics	
		Beta			Tolerance	VIF
1	(Constant)		1,786	0,080		
	Profit margin	0,854	11,510	<0,001	1,000	1,000
2	(Constant)		-3,906	<0,001		
	Profit margin	0,767	14,757	<0,001	0,951	1,052
	Fixed Asset Turnover Ratio	0,393	7,547	<0,001	0,951	1,052
3	(Constant)		-5,417	<0,001		
	Profit margin	0,650	12,422	<0,001	0,690	1,449
	Fixed Asset Turnover Ratio	0,281	5,454	<0,001	0,710	1,408
	EBITDA margin	0,258	4,279	<0,001	0,521	1,921
4	(Constant)		-4,818	<0,001		
	Profit margin	0,619	11,961	<0,001	0,644	1,553
	Fixed Asset Turnover Ratio	0,225	4,113	<0,001	0,575	1,738
	EBITDA margin	0,287	4,878	<0,001	0,498	2,008
	Country	0,113	2,366	0,022	0,759	1,317
5	(Constant)		-5,721	<0,001		
	Profit margin	0,678	12,555	<0,001	0,525	1,904
	Fixed asset turnover ratio	0,236	4,552	<0,001	0,572	1,749
	EBITDA margin	0,277	4,976	<0,001	0,495	2,018
	Country	0,137	2,986	0,005	0,727	1,376
	Debt to Equity ratio	0,122	2,581	0,013	0,681	1,468

APPENDIX VII

Table A14. The models of calculating profitability for Portuguese enterprises.

Model		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		Beta			Tolerance	VIF
1	(Constant)		-0,718	0,478		
	Profit margin	0,957	19,014	<0,001	1,000	1,000
2	(Constant)		3,147	0,004		
	Profit margin	0,966	23,304	<0,001	0,997	1,003
	Current Assets Turnover Ratio	-0,170	-4,095	<0,001	0,997	1,003
3	(Constant)		1,303	0,202		
	Profit margin	0,969	27,487	<0,001	0,997	1,004
	Current Assets Turnover Ratio	-0,207	-5,646	<0,001	0,918	1,089
	Fixed Assets Turnover Ratio	0,134	3,642	0,001	0,921	1,086
4	(Constant)		-1,194	0,242		
	Profit margin	1,054	30,856	<0,001	0,673	1,487
	Current Assets Turnover Ratio	-0,204	-6,964	<0,001	0,918	1,090
	Fixed Assets Turnover Ratio	0,173	5,665	<0,001	0,839	1,191
	Debt to equity ratio	0,154	4,353	<0,001	0,627	1,594
5	(Constant)		0,548	0,588		
	Profit margin	1,110	30,729	<0,001	0,483	2,070
	Current Assets Turnover Ratio	-0,221	-8,224	<0,001	0,872	1,147
	Fixed Assets Turnover Ratio	0,137	4,572	<0,001	0,697	1,434
	Debt to equity ratio	0,152	4,785	<0,001	0,627	1,595
	Interest coverage ratio	-0,102	-2,895	0,007	0,512	1,952

Table A16. The models of calculating profitability for Ukrainian enterprises.

Model		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		Beta			Tolerance	VIF
1	(Constant)		1,314	0,206		
	Profit margin	0,865	7,097	<0,001	1,000	1,000
2	(Constant)		-0,360	0,724		
	Profit margin	0,668	7,375	<0,001	0,793	1,262
	EBITDA margin	0,433	4,781	<0,001	0,793	1,262