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DOCTORAL THESIS

-SUMMARY-

THE IMPACT OF INTELLECTUAL CAPITAL ON ECONOMIC DEVELOPMENT

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ABSTRACT

The doctoral thesis entitled 'The Impact of Intellectual Capital on economic Development ' presents an theoretical and applicative approach which comes to complete the existing literature. Its presents the theoretical aspects which constitutes a solid basis for the study cases applied in the thesis for understanding and also to fulfill the main objective of the present thesis: the research to see if there is an impact of intellectual capital in economic development at microeconomic and macroeconomic level and also to extend this objective at world wide area. Our theoretical aspects and the literature presented come in the help of dethrone the idea that Intellectual Capital cannot be measured or if it can be measure there are no methods or models that can express the real value of it. The research address to: researchers, scholars, stakeholders who needs to know the importance of human resources, intelligence and also innovation for their companies or the economies of the countries.

Key words: intellectual capital, human capital, intelligence, economic development, performance

INTRODUCTION

The key performance issues that businesses and individuals face are related to their measurement. This is why it is important that they are able to address the challenges of a new sustainable economy. To be successful, businesses and individuals need to be able to measure their performance. This can be done only through a disciplined and dedicated approach. This type of assessment can be used to evaluate the value of a company or a company's assets. It can also be used to identify potential investors and determine if a company is worth acquiring or registering.

The subject of the Intellectual Capital represents a very controversial one due to the fact that during time it receives a new definition, but all of them actually lead to some common elements: 'human factor', 'intelligence' and 'value creation'.

Nowadays, all companies and all world-economies are interested in how to develop their potential and how to grow up. This thing can be solved by making performance in a company, by developing the performance of a country, but this thing is not possible without human potential, without intelligence. Even if now, in the present, all is technology and digitalization we should be clearly and understandable that without the intelligence of the people nothing could be possible to be neither invented nor developed. In the knowledge-based economy, assessing intellectual capital is very important. This topic can help businesses and individuals take right decisions and improve their performance.

The doctoral thesis entitled 'The Impact of the Intellectual Capital on Economic Development' lay a solid foundation on economic and financial field due to its implication for the managers, policy makers, researchers and also for the general public due to the fact that human potential is the core for every business and for every country's economy.

The motivation of choosing this topic consists in the fact that even if it constitutes such an important element in an economy only in the last years it becomes to be more researched, only a few theoretical approaches are capable to explain it and as we said only in the last year the interest for it grew up but also comes from the necessity to investigate the measurement of Intellectual Capital, because over the time this was the major problem and also to see if it can have some effects on economy. So, if the Intellectual Capital represents an important element in the world and if the main goal of any country is the economic development, the presented study next to the

literature review should be the answer to the question if 'Can Intellectual Capital influence the economic development?'.

In this scientific approach we focus on the impact of intellectual capital on the performance of companies and also on the development and economic growth of a country.

The main objective of the doctoral thesis is to see if there is an impact of Intellectual Capital on Economic Development. Due to its high priority in the present thesis we have made three empirical studies: first one at microeconomic level, second one at European Union Countries and the third one is realized to see the impact of intellectual capital worldwide.

In support of our goal, we have focused on the following specific objectives:

- finding both quantitative and qualitative methods of measuring Intellectual Capital;
- finding the impact of Intellectual Capital on company's performance at microeconomic level;
- analyzing the impact of main components of Intellectual Capital on economic performance in the European Union Countries;
- analyzing the impact of Intellectual Capital on economic development.

In order to fulfil our general objective as well as the specific objectives, we used a varied research methodology including representative techniques of quantitative analysis: Panel Least Square (PLS) and Ordinary Least Square (OLS), all applied on a dynamic panel data constructed on each case study.

The current research comes to complete the existing studies on the topic in order to fulfil the main gap, the quantification methods of the main concept which is the Intellectual Capital.

In this way, the strategy of cover the identified gap represents the originality of the presented doctoral thesis which comes from the analysis of the Intellectual Capital at two levels: microeconomic and macroeconomic level, by testing the Intellectual Capital turn by turn through different indexes and methods, by finding the same results measuring the economic development through different indexes and including here the Innovation.

Our general approach starts from microeconomic to macroeconomic level in order to create an overview of the topic from multiple composing puzzle pieces.

In the first chapter of the present thesis are presented the theoretical aspects and also we have constructed a bibliometric study with the potential measures of intellectual capital. Regarding to the theoretical part we have presented the microeconomic approaches of intellectual capital which are: direct methods, methods based for estimating intellectual capital, methods based on return on assets and non-financial methods. Also here are macroeconomic and world approaches structured as follow: Intellectual Capital Index, Human Capital Index and National IQ.

The second chapter addresses the impact of Intellectual Capital on company's performance at microeconomic level. Here we have measured the Intellectual Capital through three different methods: Economic Value Added (EVA), Market Value Added (MVA) and Value Added Intellectual Coefficient (VAIC). The economic development is measured by GDP per capita. In this case from our findings the most suitable way to measure a company's intellectual capital is through the use of the VAIC model, which is a quantitative method. Unlike traditional survey methods, this method does not require a lot of time and effort to perform. This method can also be used by other organizations to evaluate a firm's performance.

In the third chapter we have analyzed the impact of the main elements of Intellectual Capital on economic performance in the European Union Countries. In line with the results of our study, relational capital, innovation capital and human capital are the most influential factors when it comes to assessing a company's intellectual capital. This conclusion is based on the multiple methods that were used in our study. In all cases, the results of our study showed that the several components of intellectual capital, such as human capital, innovation capital, relational capital and structural capital, were positively and significantly related to a company's performance.

The forth chapter investigates the impact of Intellectual Capital on economic development, but at macroeconomic level. Here the economic development was measured GDP per capita and Human Development Index but also through Innovation, which is the one of the factors that contribute to a country's economic growth and offer competitive advantage. The results of this study showed that the most influential variable in the development of an economy was Human Capital Index. When it was compared with the GDP per capita, National IQ was the most influential factor. In all cases, we were able to achieve a positive and statistically significance of the coefficients. We can also affirm that in all cases, intellectual capital has a positive impact on economic development.

The research paper contributes to the studies in the specialized literature and provides a solid foundation for the development of financial and economic fields. It shows that human potential is the main factor that influences every business and every country's economy. This is also beneficial for the policymakers and the general public.

CHAPTER 1. THEORETICAL AND METHODOLOGICAL ASPECTS REGARDING INTELLECTUAL CAPITAL

In this chapter we tried to presents the most important theoretical aspects regarding our main concept, Intellectual Capital. Over the years, the concept of intellectual capital has been presented numerous definitions. Although it has been discussed in various ways, the main idea is that it is the accumulated knowledge and experiences of an employee that can be used to improve the company's performance. In addition to being able to assess the company's value, intellectual capital can also be used in various other ways. These include the registration of a company in a country, the sale or purchase of a company, the protection of intellectual assets, and the attracting of investors. It is additionally applicable in the fields of piracy and economic development. The measure of Intellectual Capital is computed by taking into account both its employees' value and the company's market value. There are various methods that are used to calculate this value, such as the Market Value Add, the Economic Value Added, and the Value-added Intellectual Coefficient.

One of the most common models used in the literature is the Skandia Navigator model, which takes into account the various areas of interest of a company. These include the financial area, the clients, and the development area.

Also there are various measures at macroeconomic level that can be used to measure intellectual capital. These include the Human Capital Index, the National IQ, and the Intellectual Capital Index.

The three main components of intellectual capital are human capital, relational capital, and structural capital. In our view, human capital is the most dominant type of intellectual capital due to the various definitions that it is associated with. For instance, in most cases, the experiences that employees gain through their work are related to the knowledge and skills that they have acquired. Human capital is considered to be the most important resource that a modern company has. It is therefore important that managers are able to utilize it effectively to increase its profitability. This is because doing so will allow them to increase labor productivity and improve the company's overall performance.

CHAPTER 2. EMPIRICAL STUDY REGARDING THE IMPACT OF INTELLECTUAL CAPITAL ON COMPANY'S PERFORMANCE AT MICROECONOMIC LEVEL

The second chapter focuses on the impact of intellectual capital on the performance of a company at the microeconomic level. There are various factors that have to be considered when it comes to valuing a company. First, it's important to determine the company's objective and second, the method that the company uses to value its assets should take into account other factors.

The data was first refined in order to obtain a homogenous dynamic panel. Six regressions were then constructed to test the measure of performance, namely, Return on Equity, Return on Assets, Return on Equity and Market Value Added. The measure of intellectual capital was then used to measure the value added to the market. Also in this chapter were approached two sub industries: pharmaceutical and IT industry in order to reinforce the literature review and the results obtained from the descriptive statistics part.

The results of the study revealed that the return on assets method is not very significant when it comes to assessing the intellectual capital of a company. The difference between the results when Intellectual capital is measured by EVA are more significantly then it is measured by MVA because Economic Value Added is an important measure of a company's financial health when Market Value Added is an indicator that measures the external performance. The best way to measure a company's value added intellectual capital is through a proxy that uses a quantitative method. This method eliminates the need for traditional survey methods, which can be time-consuming and costly and the VAIC model can be the best suitable model when it comes to quantify the Intellectual Capital. Was find that in pharmaceutical and IT sector is a higher impact of intellectual capital on company's performance.

According to our results, the study conducted on the microeconomic level of Europe, we can affirm that intellectual capital has a positive impact on the performance of a company.

CHAPTER 3. EMPIRICAL STUDY REGARDING THE IMPACT OF THE MAIN COMPONENTS OF INTELLECTUAL CAPITAL ON ECONOMIC PERFORMANCE IN THE EUROPEAN UNION

In the third chapter, we discussed the various elements of intellectual capital that contribute to the economic performance of the European Union. There are presented the most important components of Intellectual Capital: human capital, structural capital, relational capital and innovative capital.

For the Human Capital component, we choose three proxies: total employees, total researchers, and total employees with higher education. For the Structural Capital component, we choose three proxies: R&D expenditures, structural capital. The third component of our measure is relational capital, which is used to analyze companies using software solutions to analyze information about their clients. The fourth component is innovation capital, which is used to measure the amount of people working in the technology production industry.

Eight regressions were constructed to test the relationship between intellectual capital and economic development.

The study revealed that innovation, relational and human capital are the most influential elements of intellectual capital. The relational capital is also regarded as the most common type of intellectual capital.

In all cases, when it comes to the components of intellectual capital, such as human capital, structural capital, innovation capital, and relational capital, we find positive and significant results. This study was conducted on 27 European Union countries.

CHAPTER 4. WORLDWIDE EMPIRICAL STUDY REGARDING THE IMPACT OF INTELLECTUAL CAPITAL ON ECONOMIC DEVELOPMENT

The fourth chapter explores the impact of intellectual capital on the country's macroeconomic development. It shows that innovation is one of the factors that can contribute to a country's growth and offer competitive advantage.

Here, we have presented two study cases. The impact of intellectual capital on the development of the economy is studied in the first and second studies. In the first study, the impact of intellectual capital is analyzed on the growth of the Human Development Index and the GDP per capita. In the second study, the impact of intellectual capital is studied on the innovation development.

The first study case was conducted using a sample composed of data collected from various sources. It was then analyzed to create a database that was completely filled with statistical and quantitative information. There were also instances where the data were not available for certain indexes. The objective of the study was to measure the economic development of the country. The first stage of the study was to measure the economic growth by gross domestic product per capita. In the second stage, we focused on the development of the human capital. Through the various tests, the impact of intellectual capital was analyzed.

The study revealed that the most influential variable in assessing the economic development of a country was Human Capital Index. When it comes to measuring the development of the economy, the most influential variable was National IQ. In all cases, the study has shown that the positive impact of intellectual capital can be observed in the multiple aspects of the economy.

The second study case was composed of 132 countries. In order to obtain a homogenous panel data, the data were refined in order to establish a more accurate representation of the various countries. The sample was also divided into three sub-samples: the entire sample composed of 132 countries, the high income countries composed of 50 countries, and the low income countries composed of 82 countries.

The link between intellectual capital and the development of low-income nations is strong. Small evidence of the relationship between intellectual capital and development in high-income countries can also be found. To reinforce our findings, we conducted a series of robust tests to estimate the innovation in the study. This method ensures that the results of the study will not be affected by the variable's changes.

CHAPTER 5. CONCLUSIONS, DISCUSSIONS AND LIMITATIONS

According to its name, intellectual capital is a vital source of wealth that can be used to expand one's intelligence. However, no consensus has been made regarding its exact meaning. It is the key to an organization as it is made up of all the skills and knowledge that an employee has gained through their work. In various cases, intellectual capital can be evaluated. It can be used to assess the value of a company, for the registration of a company in a certain country, for the sale or acquisition of a company, or for various other purposes. This type of assessment can also be performed for various other fields such as combating piracy and attracting investors. In today's competitive environment, intellectual capital is very important for companies to consider when it comes to conducting business.

Regarding to its meaning, the intellectual capital was and is consider a controversial subject for two reasons. The first one is that from 1969 when it was launched for the first time an till nowadays, the researchers did not agree on a unanimous definition. And the second thing for which we said that is consider to be a controversial subject starts actually from its definitions because most of the are focused on intangible assets and not on monetary elements and this leads to a hard thing, the measurement of intellectual capital. But this problem seems to be in a process of being solved due to the fact that there are a lots of methods to quantify the intellectual capital not only in a qualitative way. Regarding to the methods there are classified in direct methods: Citation-Weighted Patents Method (CWP) and Technology Broker method. Another very important category is composed by the methods based on return on assets which contain: Economic Value Added (EVA), Market Value Added (MVA) and Value Added Intellectual Coefficient (VAIC). In what concern the non-financial methods we have to mention: Balanced Scorecard (BSC), Performance Prism, Knowledge Assets Map Approach, Scandia Navigator, Celemi’s intangible assets monitor, Ramboll’s holistic company model and Bates Gruppen Company IQ measurement system. All this non-financial methods are very useful for measuring the intellectual capital in a qualitative way.

All these methods that we have presented are used for measure the intellectual capital at a company’s level. Regarding to its quantification at country level of course that during the years were developed methods based on scores which can be used. We have discovered and also used three of them like: Intellectual Capital Index, Human Capital Index and National IQ.

Regarding to the first empirical study, made in the second chapter, the objective of the study was to collect and analyze the extracted data from various sources in order to create a useful database for process the empirical evidence. The sample was constituted from 2000 companies from several sectors of activity: pharmaceutical, IT, wireless telecommunication, healthcare, etc. The empirical evidence is made in three stages: in the first one we have analyzed all industries, in the second one were analyzed companies from pharmaceutical sector and in the last one was investigated the influence of Intellectual Capital on company's performance on IT sector. In all cases, the results revealed an impact of Intellectual Capital on company's performance.

The second empirical presented in the third chapter, was approached in four phases. It analysed each component of intellectual capital in 27 European Union states from 2015 to 2020. These included human capital, structural capital, innovation capital and relational capital. In our study, we choose as first component human capital, the second component we consider was structural capital as a proxy for R&D expenditures an the third component of our measure of relational capital is through the use of software solutions, which helps organizations analyze information about their clients. The last component is innovation capital, which is quantified by the total number of people working in the technology industry.

Eight regressions were constructed to test the link between intellectual capital and economic development. The variables were added to the analysis in order to test the effect of the various changes in the public governance framework on the results. The data were processed using the Panel Least Square Method. The first two components were tested using the random effects method which was the most suitable one according to the Haussmann Test. The last two components were analyzed using the OLS method because it was the best way to express the results.

The results of the study show that human capital, relational capital and innovation capital are the most influent components of intellectual capital. However, these results can be influenced by the methods used in the analysis.

For the third empirical study presented in the fourth chapter we have made an analysis to underline the factors that contribute to the development of the country's economy. The study was conducted in two levels: the first stage of the study measured the economic development by gross domestic

product per capita and the second one measured the economic development by Human Development Index. Six regressions were constructed to test the effects of several variables on the development of the country. These included the public governance, trade openness, and doing business index. All of the regressions were tested using the Panel Least Square Method. The analysis showed that the random effects of the variables were the most suitable ones. The results revealed that the most influential independent variable during the first stage was Human Capital Index and when the economic development was measured by Human Development Index the results did not significantly changed.

The second case study of the fourth chapter comes to reinforce our results but this time measuring the economic development through Innovation. In this case the entire sample was split into two sub-samples: high-income countries and low income countries. The empirical processes were made on: entire sample, on high-income countries and low-income countries. Here, the impact of intellectual capital was surprised only on the entire sample and on low-income countries.

The limitation of the present research can consist in the fact that we do have data only for some specific indicators or years, by using just two statistical methods and also by the short time span used, five years.

Concluding, we can say that even if the researchers did not agreed to a unanimous definition and even if there are opinions which affirm that it can be measured, we demonstrate next to others researchers that Intellectual Capital can be measured and also it has an impact on company's performance and also on economic development.

The added value of the presented thesis consists in the fact that at microeconomic level were applied all three methods based on return on assets and study was made on approximatively all industries. Also, to reinforce the literature and our findings we have made a particularly case study applied only at pharmaceutical and IT sectors.

Another significant side of the research consists in the fact that the second empirical study made in the fourth chapter is the first existing study which analyzed the impact of intellectual capital on innovation, in a comparable manner, on the two large groups of countries (developed and developing). We find the marginal effect of one unit growth in the intellectual capital is 2.8 higher

for the developing than for the developed countries and also the theory of Schumpeter (1942) come to support our different findings. Also regarding to the measurement of Intellectual Capital as a score measure as far as we know, there are not yet studies were it was measure through Intellectual Capital Index provided by SolAbility.

Summing up, the value of the paper consist in the fact that the present doctoral thesis include both theoretical and practical aspects, more than that the theoretical aspects regarding the quantitative measures presented in the first chapter were applied in the second, third and fourth chapter of the thesis. Each empirical study is sustained by a solid theoretical basis and also by the literature.

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