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The physical capital maintenance concept and the new requirements of the economic environment

Ionel JIANU^{1*}, Iulia JIANU² and Ionela GUSATU³

¹Bucharest Titu Maiorescu University, Romania.

²Bucharest Academy of Economic Studies, Romania.

³Bucharest University of Medicine and Pharmacy, "Carol Davila", Romania.

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This study aims at promoting the physical capital maintenance concept. In order to convince the utility of the concept in terms of performance at the level of economic entities, the paper is presented as a game in the mirror, in which the ball is the technology and the players are the economics and the accounting. Using this ball, both of them will try to score in the target land of the performance. Whether we share the specific beliefs and teachings of economics or those of the science of management, this study calls for reconciliation due to the unity of action between economics (economic science) and accounting (management science), through the combined effort of the two sciences to promote performance. The empirical research in this article will demonstrate on the one hand, the existence of the link between the technology and the performance of an economic entity, and on the other hand, the existence of the link between the technology and the economic development.

Key words: Economy, accounting, technological development, physical capital maintenance concept.

INTRODUCTION

This article supports and fights for the primacy of the economic or management science. Both of them pursue social performance goals, provide the event and the development of economic or business initiatives, are builders and initiators of development, of progress. Thus, it is formed an inter-conditioned relationship between economics and management sciences, a relationship characterized by the interconnections and interdependence of basis, structure, framework and the acting element, a relationship in which it is very difficult and even impossible to decide who favors whom, who builds for whom.

Technological advance has marked and will mark the historical evolution of the world's societies and of people. It was, it is and it will be a factor of development for the human activities, a factor of individual and institutional emancipation and a factor of change on the flight of the ideas to do business and to think economically. It is the domain which has produced and produces the greatest

paradigm shifts in business and in economic thinking, the domain for whose relaxation, energies and egos are compressed in research and development departments in the existing economic entities. Its presence at the level of the two axes, which are extremely important to the overall development of a company, gives the opportunity to demonstrate its involvement, both by the management approach (accounting) and by the economic one in obtaining real profit (the entities) and by this, to policy foundation (construction of statistical indicators) which is necessary for the economic development.

This paper spots enough traces of light for the nearby, solving and awareness guiding for the uniqueness goal of the economic and the management system - the idea of progress. The scientific paradigms and approaches are becoming more and more concrete towards specialization, identification and empowerment and independent of branches, subjects, and above all, of new scientific categories. The idea of consumption and the innovative spirit that supports these efforts made possible the appearance, or better said, the delineation of management sciences from the great family of economics. For this image to be complete, an approach of the concepts

*Corresponding author. E-mail: ionel_j@yahoo.com.



Figure 1. Influence of social progress by maintaining physical capital.

at international, regional and national levels is subsequent to what this paper offers. Gradually, due to the intrinsic qualities that abundantly prove, but especially to the needs of information which is comparable in the world of users of accounting information, the international financial reporting standard (IFRS) tends to operate as a vector of globalization. The usefulness of these standards for the success of any business, thus for success in general, makes possible their application in the most different economic environments, makes possible not only the transfer of procedural know-how, but also the creation of a culture of users of accounting information.

According to the conceptual framework issued by International Accounting Standards Board, an entity maintains its capital if at the end of the period it has the same capital as at the beginning of the period. Any difference from the one necessary for the capital maintenance represents the income. There are two concepts of capital maintenance: financial capital maintenance and physical capital maintenance. The financial capital can be assessed both in nominal monetary units and in units of constant purchasing power. The concept of financial capital maintenance in nominal monetary units defines the profit as being the increase of the nominal capital over the period. The increase in asset prices during a period, known as holding gains, means profits. They may still not be recognized until the sale of those assets. This concept is based on the preservation, at the level of balance sheet structures, of the input values which are historical values and which will be corrected by any subsequent depreciations and impairments. Therefore, this concept calls for historical cost as the valuation basis. The concept of financial capital maintenance in constant purchasing power units defines profit as being the increase of the purchasing power of the capital that was invested during the period. Given the rising asset prices, profit represents only what exceeds the general price increase.

The IFRS are based on the financial capital maintenance. However, by financial capital maintenance, the recognition as profit of the realized or unrealized holding gains, followed by the distribution of these gains as dividends, leads, on the short term, to the inability to maintain the operational capacity of the entity, and on the long term, to the bankruptcy of the entity. In this context, the physical capital maintenance is the only concept which shows the real performance for a company. Under a physical capital concept such as operating capability, capital is regarded as the productive capacity of the entity, the profit representing the increase of the physical

capital during the period. Price changes affecting the assets and liabilities of the entity are not considered profit; they are treated as adjustments to maintain the capital level that are recognized directly in equity. The advantages of physical capital maintenance are provided by Sterling and Lemke (1982) as follows:

“Many accountants have noted that in times of increasing prices, if historical cost income is paid in dividends, it does not provide the firm with adequate funds to keep what we have got – the ability to replace physical units declines – and therefore historical cost produce <<false profit>>... The argument is that <<true profit>> are those figures that reflect an increase in physical capital because that is the amount that can be paid in dividends without reducing the number of physical units of the firm”.

There are many considerations which may support the previous approach, which is the one of reflecting the common identity of the two sciences, fully revealed in the economic sector. This is why this paper will iterate the idea of similarity between the concepts of technological development and of maintenance of physical capital, offering the possibility of being aware of the benefits of the concept of physical capital maintenance (Figure 1). This paper aims to encourage economic entities to embrace the concept of physical capital maintenance, a guarantor of technological development and implicitly of socio-economic development. The results of this paper show that the concept of physical capital influences the performance of economic entities and the economic development of a country. As any system, the one represented by IFRS is prone to transformations, updates, attempts to understand the economic reality and to provide relevance and credibility of its interpretation. These rules become, with every day that passes, one of the most important scientific instruments, at the reach of public authorities, to fulfill and promote progress policies and institutional and social development.

LITERATURE REVIEW

Accounting is a technique or, in its contemporary dynamics, a techno science that has continuously evolved. Double entry method, a basic method of accounting technique, has its origins in the Middle Ages. The first book which talked about double entry appeared in 1340

and belongs to Massari in Genoa (Riahi-Belkaoui, 2004), preceding Luca Pacioli's book by about 150 years. But Luca Pacioli is associated with the introduction of double entry method, in 1494 publishing the book "Summa de Arithmetica Geometria, Proportioni et Proportionalita" which includes two chapters that present the double entry method. As the accounting technique was described about 700 years ago, the issues of evaluation in accounting have also existed since remote times. This is because one of the most complicated issues faced by accounting was the one linked to establishing the measurement base for the components of financial statements in order to ensure credibility and relevance to the information provided.

In the theory and the practice of accounting, various measurement bases have been proposed: historical cost, current cost, realizable value, present value, fair value. The question is: Which of these measurement bases will be chosen, taking into account the advantages and disadvantages of each of them? Finally, accounting regulators concluded that historical cost would be the best in the accounting measurement and disclosure. This is due to the advantage given by its reliability, the clarity of definition, its verifiable character; once established, it remains fixed as long as the asset is owned by the entity.

Historical cost accounting developed in the nineteenth century following the industrial revolution, but it has its origins in the fifteenth century when it was first used in textile factories. Historical cost accounting is the consequence of two fundamental principles: the principle of monetary nominalism and the prudence principle (Feleaga and Feleaga, 2007) relying on nominal financial capital maintenance concept that implies recognition of profit after maintaining the initial capital invested by shareholder expressed in nominal monetary units.

To rely on the information provided by manufacturers, internal and external users of accounting information must ensure that the information is verifiable and objective and that these qualities are provided by historical cost accounting. However, historical cost is not without drawbacks; among these we mention the historic nature of the information presented and therefore the lack of relevance of the information provided under conditions of inflation (Solomons, 1948; Barlev and Haddad, 2004; Khurana and Kim, 2003; Herrmann et al., 2006). If market prices increase, the information provided by observing the historical cost is not real. In this respect, Ristea (2004) states: "To work around this reality means that in the financial statements, misleading results are to be reported because historical costs recorded at entry previously to sales are denominated in units of account that do not have the same value as the value of achievement based on retail price at exit. Without a proper restatement of the result, there arises the situation in which an entity records a taxable profit in accounting while the actual result is a loss."

In the aftermath of World War II, during the

reconstruction of national economies, in the 1950s and in the 1960s, inflation was observed in many countries. The traditional accounting, based on the assumption of stable monetary unit and on the application of the precautionary principle, proved to be incapable in reflecting the true image in accounts. Important characters of this period have proposed models to show the impact of inflation on the financial statement and on the performance of entities, that is, relevant information from the economic and financial point of view. It was therefore, necessary to take measures to bring back the trust in financial statements by maintaining the purchasing power of money. This concept of maintaining the purchasing power of money had become particularly important in the business world because it had a great impact on decision making. Hence, it appeared the inflation accounting which is based on the concept of capital maintenance in purchasing power units and which includes recognition of profit after the entity has maintained its purchasing power of the originally invested capital. Time passed and, all around the world, different accounting methods adjusted for inflation have been applied. They may be grouped into: methods based on conversion (indexed), methods based on evaluation (current cost) and mixed methods (Tugui, 2000). The consequences of inflation on balance sheet items (in general) and on capital and reserves (in particular) have led on the legislative, national and international level to the adoption of rules to govern them.

In the course of discussions at European level regarding the reliability as opposed to the relevance of historical cost accounting, as a first step forward, the Fourth European Economic Community has allowed the use of additional evaluation bases which represent actual values. Based on this regulation, countries like Great Britain, Holland, France and Germany have passed laws to meet the minimum requirements of these rules. Great Britain is a pioneer in the use of current value assessment, being among the first countries that permitted reevaluation of assets at their current value. According to the general framework of Great Britain, there are two bases of evaluation: the historical cost and the current value. Current value can be determined as follows: $\text{current value} = \min(\text{current cost; recoverable value})$, where the recoverable value = $\max(\text{net realizable value; value use})$. From the way it is determined, it turns out that the present value reflects a dispossession value of the asset (Walton, 2008).

The United States of America have been champions for many years in using historical costs accounting (Zeff, 2007). However, in September 2006, the U.S. regulatory body, Financial Accounting Standards Board (FASB) issued SFAS 157 standard "Fair value measurement" which defines fair value, establishes a conceptual framework for fair value assessment and specifies the information to be presented about fair value. This regulation allows and encourages entities to evaluate the assets and liabilities at fair value. What was the reason

for this radical change? FASB (SFAS 157, 2006) argued this change as follows:

"... as time passes, historical cost is irrelevant to the presentation of an entity's current financial position and the financial statements must provide users with information relevant to investment, credit decisions or other types of decisions".

At international level, the current value is used more frequently in assessing the financial statement and the performance of an entity. Ionaşcu (2003) said that:

"At least for the near future, we will not witness the abandonment of historical cost, but a mixed-valuation model characterized by the cohabitation of historical cost and current value. Preparation of consolidated accounts is likely to be based more on fair value than on preparation of individual accounts because consolidated accounts are used almost exclusively by shareholders and by managers. At the level of individual companies, historical cost will survive also because it is and it will be required for establishing the tax base by tax regulations".

Jianu (2009), following the study on the impact of the use of fair value in evaluating the assets under IFRS, found that:

"Most of the assets must be valued at fair value (financial assets available for sale and assets held for trading which are valued at fair value; non current assets held for sale, biological assets and agricultural production are valued at fair value, less the transaction costs) or they may be valued at fair value if the entity chooses for this accounting treatment (which is considered the basic treatment for investing in real estate, alternative treatment for exploration and evaluation assets, alternative treatment for tangible and intangible assets)".

So far, only models for the maintenance of financial capital have been proposed: historical cost accounting (historical cost/nominal value) which requires maintaining the entry values of the items in the balance sheet, current value accounting (current cost/nominal value) which involves using specific indices in the evaluation of the nominal financial capital (FASB, 1979, FAS 33), constant purchasing power accounting (historical cost/constant value) which implies adjustment with the overall index growth price of all balance sheet items (ASSC, 1973, ED8; ASSC, 1974, PSSAP7), accounting in real terms (current cost/constant value) which combines the use of specific indices of price growth with the general adjustment indices of the financial capital (Edwards and Bell, 1961), profit accounting in current costs which combines the use of specific indices with adjustments to non-monetary items (Sandilands Committee, 1975) and

current cost accounting by adjusting the leverage effect (Richardson Committee, 1976).

None of the aforementioned approaches deal with the issue of physical capital maintenance. Physical capital maintenance requires recognition of the profit only if the operating capacity of the entity at the end of the period is higher than the operating capacity at the beginning of the period, after excluding any capital contributions or distributions from or to shareholders. Even if the idea that physical capital maintenance is the one that offers the real profit of an entity is supported, the evaluation of physical capital is more difficult than the evaluation of financial capital.

However, it is not impossible. Beach (1938) published the results of a study to reflect the results of the measurement technique of physical capital in the U.S. rail industry. The study was based on official data from journals, statistical institutes and different associations in the period 1920 to 1929.

For the valuation of physical capital it was used as measurement unit the number of years of using tangible assets of American railways. The author analyzed the problem of valuing physical capital without reaching a connection with the concept of profit.

Break (1954) believes that physical capital maintenance should be performed only by maintaining the physical characteristics of tangible assets held by the entity to carry out productive work, without trying the monetary valuation of the physical capital that should be maintained. According to this concept, any change in the existing tangible assets leads to a real positive or negative result. When an entity acquires or produces a new tangible asset, it is added to the real profit. But the changes on monetary assets that do not affect tangible assets used in the productive activity of the entity, do not affect the physical capital.

Gynther (1970) associates physical capital with the operating capacity of an entity which assumes that all assets used in production must be individually evaluated at their current cost, and where no current cost can be determined, specific price indices must be used. The author suggests three options for measuring the operating capacity of an entity:

1. All productive assets held by an entity;
2. All assets necessary to produce a given amount of goods and services;
3. All assets necessary to produce the same value of goods and services.

Security and Exchange Commission (1976, ASR, Par. I, a, b) defines production capacity as depending more on the ability of the entity to produce and distribute a certain amount of goods and services than on the ability of specific assets to maintain operating capacity:

"The operating capacity of an entity must be expressed in terms of number of goods that can be

produced and distributed in a period of time ..." (ASR, Par. I, a, b).

We believe that a great importance should be given to the verb "to distribute" in this definition because the operating capacity depends not only on the number of goods that can be produced, but also on the number of goods that can be distributed. Even if an entity has the necessary non current assets to maintain operating capacity, the fact that its products are not sold on the market will lead the entity to the impossibility of having the adequate funds to purchase raw materials for further production and hence the impossibility to maintain operating capacity .

Sweeney (1980), examining the issue of capital maintenance in the recognition of the profit, associates the concept of capital invested in a deal with the concept of capital at the macroeconomic level, asking the following question:

"If, for example, a person invests \$ 10,000,000 in a business while the whole capital at the level of economy is \$ 100,000,000,000 and if, at the level of economy, the capital falls to \$ 60,000,000,000 while the value of individual capital drops to \$ 8,000,000, should the investor be happy because his share of capital has raised at the level of the entire economy from 0.01000 to 0.01333%?"

The answer depends on how things are viewed: if the investor seeks to be better than the others, he may be pleased because his share capital increased in the total capital throughout the economy ($\$ 8,000,000 / \$ 60,000,000,000 > \$ 10,000,000 / \$ 100,000,000$); but if his objective is to increase his property, the investor cannot be satisfied because his capital has fallen as opposed to the initial investment by 20% (from \$ 10,000,000 to 8,000,000).

We believe that capital maintenance in terms of ownership is a requirement for maintaining the capital in the economy. Not maintaining the physical capital at the level of the individually analyzed entities has a direct effect on decreasing the added value created by entities and thereby on the gross domestic product of the entire economy. The effect is more pronounced in conditions of increasing prices because if the entity maintains its financial capital by recognizing price increase as profit, fictitious dividend distribution is reached with a direct effect on the de-capitalization of entities and on their entry into bankruptcy. The author states that there are three possibilities for capital maintenance:

1. Physical capital maintenance, current material which includes the conservation of the same quantity of material, physical objects. The author recommends this approach to business practice when prices are rapidly rising due to monetary inflation. However, there are two

objections to the maintenance of material capital: the first is theoretical (the maintenance of material capital is not in harmony with the usual fundamental aims of the modern economy where the individuals' wishes change frequently), the second one is practical (in this respect the author gives the example of an entrepreneur who in 1900 owned a car for offering services. Even if the developer keeps the car in good condition, even at present - apart from depreciation and amortization - he will not have the same productivity as the current cars are much better).

2. Nominal capital maintenance which requires the currency to be seen as a physical object. The author recognizes that to maintain the currency as physical drive can have very large adverse effect on the entity in terms of price increases, which is why the author advocates for the maintenance of purchasing power; however, he recommends to choose an index of price increases that is specific to a certain good that is used (either bought or sold, or produced, etc.) by the entity rather than a general index of price increases. But often managers do not provide a business plan of goods and services to be traded from the beginning, and even if they have provided such a plan, there is a risk that it will change over time depending on the rapid change of modern world.

3. Real capital maintenance which requires the maintenance of its initial degree of influence on the entire economic system and which depends on maintaining purchasing power.

Sweeney (1988) defines capital as being the present advantage of the right of receiving an expected economic benefit, a definition which is very close to that of the asset in the conceptual framework developed by the international body for issuing International Financial Reporting Standards Board (IASB, 2009, para. 49a):

"An asset is a resource controlled by the entity as a result of past events and from which future economic benefits are expected."

Since capital is seen as an asset, it has a future productivity due to the fact that shareholders expect the value of a share in terms of expected future dividends. Related to the concepts of capital maintenance, in evaluating the capital, the author recommends that the measurement unit should be firstly established and then the means to measure the number of units. There are two main types of units: a physical unit of capital measurement and a monetary unit. Each of these units determines the factor - result relation that exists between capital and profit. Sweeney (1988) defines capital as being the present advantage of the right to receive an economic benefit:

"When capital and value are measured quantitatively,

the capital produces gain; but if they are measured in value, we will find it necessary to reverse the statement in the sense that capital produces profit".

Extensive discussions on the physical capital maintenance were in the mid 1970s when the U.S. standardization body wanted to improve the conceptual framework (Young, 2006). But knowing the American regulator's preference for historical cost accounting, the introduction of the new concept in accounting practice has not been materialized yet. And since American accounting influenced and continues to influence global accounting, physical capital maintenance concept was abandoned in the accounting theory and practice. However, due to the combined efforts of the international body for issuing International Financial Reporting Standards Board on the harmonization of international accounting, physical capital maintenance concept was introduced in 1989 in the IASB's concept as an accounting alternative to financial capital maintenance. The current trend towards an evaluation in current values for more and more balance items entitles us to believe that it will not be long until the very concept of physical capital maintenance (which requires use of current values in the valuation) is one of the most discussed topics in theory and then, in accounting practice. And to support this statement, in this article we aim to show that the need to use this concept is not only a consequence of a real progress in the economic entities which are individually analyzed, but it also contributes to achieving the progress at the level of the entire national economy.

RESEARCH METHODOLOGY

The purpose of this study is to demonstrate, from the technological perspective, the joint action of sciences from slightly different domains, the domain of economic sciences, respectively the domain of management sciences towards performance, economic and social progress. The objectives of the study, aims at highlighting the links between the concept of physical capital maintenance and the level of development of an economic entity on the one hand and the links between the technological development and the level of development of an economy on the other hand. The study will be based on empirical research in order to validate the following hypotheses:

H₁: There is a link between technology and economic development of a country.

H₂: There is a link between the physical capital and the performance of economic entities.

In order to validate H₁, we analyzed and interpreted the data collected from the World Report on Human Resources Development (WRHRD) published by the United Nations in the United Nations Development Programme (UNDP). UNDP works worldwide with the aim to develop and to offer solutions to problems that concern the following issues: democratic governance, poverty reduction, crisis prevention, environment and energy and HIV/AIDS. WRHRD aims to arouse political debates at global, regional

and national levels on issues related to human resources development. WRHRD has been published annually since 1900. In 2001, in the WRHRD, the index of the technological development of countries was published for the first and the last time, which is why we use this index in the study to verify the existence of connections between the degree of technology of a country and its degree of economic development measured through gross domestic product (GDP) per capita for the same year. Information on GDP per capita for 2001 were taken from the WRHRD published in 2003.

In order to validate H₂, we analyzed and interpreted the data collected from the Bucharest Stock Exchange (BSE) for the entities listed on that exchange. The ability of an entity to maintain its physical capital depends largely on the non current assets used in the activity for at least one year, which is why we selected the value of fixed assets for listed companies on BSE among financial indicators presented in the BSE site. The best performing entities are listed on the BSE in category 1 and the least performing entities in categories 2 and 3. Entities that do not qualify for listing are presented as unlisted. The data used to validate the hypotheses are as follows:

A) The link of technology - economic development:

a. The technological development index for 2001 from WRHRD for 2001 presented in Appendix 1

b. The gross national product per capita for 2001 from WRHRD for 2003 presented in Appendix 2

B) The link of physical capital - the performance of economic entities:

a. The value of fixed assets for economic entities listed on the BSE presented in Annex 3;

b. The category of listing public entities listed on the BSE presented in Annex 3;

The testing of hypotheses was done using one of the most popular statistical tools (cross-tabulations) to generate projected matrices. The analysis of individual cells of the matrices allows the comparison of the observed frequencies with the expected ones and shows whether there are relationships or not between the categories in question. In this respect, we will start from the null hypothesis and the invalidation of null hypothesis automatically leads to the validation of alternative hypothesis corresponding to the hypothesis presented in the study.

RESULTS AND DISCUSSION

The link of technology - economic development

The quantitative analysis

To show whether there are links between technology and the economic development of a country, we created a quantitative uniformity among the categories of data by allowing the study of 72 countries on the grounds of representativeness for which they have been selected in the study of Technology Development Index (TDI) developed by the World Bank and presented in Appendix 1. According to TDI, the countries were grouped into four categories: leaders, potential leaders, dynamic adaptors and marginalized. The economic development of each country is expressed in terms of GDP per capita,



Figure 2. The technology achievement index.

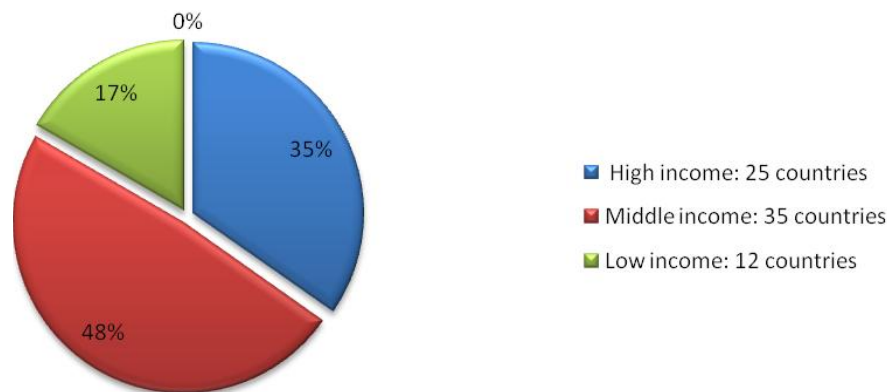


Figure 3. The degree of economic development.

countries being grouped into three broad categories: countries with high income, countries with middle income and countries with low income, as shown in Appendix 2. The graphic presentation of the degree of technology and of the level of economic development for the countries under study is shown in Figures 2 and 3.

Hypothesis testing

H₁: There is a link between technology and the economic development of a country.

H₀: There is no link between technology and the economic development of a country.

H_{1a}: There is a link between technology and the economic development of a country.

Table 1 presents the observations between economic development and technology development index. Because the statistic test χ^2 is greater than the critical value of χ^2 , the H₀ is rejected and the H_{1a} is accepted. It

therefore validates the hypothesis that there is a link between technology and the economic development of countries.

The qualitative analysis

Since the advent and acceptance of man as a rational being, since the first forms of social organization, from the remote times, the idea of technology, initially in the form of improvement tools, weapons and then in the form of the diversification and qualitative and quantitative improvement of these, manifested both as a necessity and especially as a factor of progress. The crucial role of technology has marked the history of mankind: it was and it is a constant source of more, of better, it was and it is the catalyst of the creative energies from the past and present ages, but at times, respecting the truth and accepting the evidence, it produced sorrow, pain and decadence to humanity. It was and it is both part of progress, of social well and also a tool to promote some interests of the big and powerful on the

Table 1. Cross-tabulations of observed and expected frequencies.

Economic development (GDP per capita)	Technology development index				Total
	Leaders	Potential leaders	Dynamic adaptors	Marginalized	
(O) Observed frequencies					
High income	18	7	-	-	25
Middle income	-	12	23	-	35
Low income	-	-	3	9	12
Total	18	19	26	9	72
(E) Expected frequencies					
High income	$\frac{18 \times 25}{72} = 6.25$	$\frac{19 \times 25}{72} = 6.5972$	$\frac{26 \times 25}{72} = 9.0278$	$\frac{9 \times 25}{72} = 3.125$	
Middle income	$\frac{18 \times 35}{72} = 8.75$	$\frac{19 \times 35}{72} = 9.2361$	$\frac{26 \times 35}{72} = 12.6389$	$\frac{9 \times 35}{72} = 4.375$	
Low income	$= \frac{18 \times 12}{72} = 3$	$\frac{19 \times 12}{72} = 3.1667$	$\frac{26 \times 12}{72} = 4.333$	$\frac{9 \times 12}{72} = 1.5$	

Test statistic: $\chi^2 = \sum \frac{(O-E)^2}{E} = 100,7901$; Critical value: $\chi^2_{(4-1)(3-1);0,05} = \chi^2_{6;0,05} = 12,59$.

small and weak, a promotion that often brings the black clouds on human condition, a promotion that darkens minds and promotes illusory ideals at least through the deployment which, historically speaking, has had such campaigns (World Wars are topical and they proved that technology can destroy everything which is done with much effort and hard work at a time).

Not surprisingly, most technological innovation centers are in Europe, Japan and in the U.S. Developing countries have plunged in the race of technology development, some of them becoming potential world leaders, others being just dynamic in adopting new technologies, while others are completely marginalized. It is interesting from now that there is a correlation between the economy where they come from and the reached level or, better said, the achieved results.

Just as it has been defined, TDI is a composite measure of technological progress which ranks countries on a comparative global scale (Desai et al., 2002). It must be mentioned that while defining it, the latest realities, trends - the network of systems, biotechnologies, nanotechnologies, genetic engineering, doubling computing capacity at every 18 months, cost savings by using electronic commerce, production, transmission and storage of knowledge, global financial markets, a global network in which specialists gravitate from one place to another, capital, and technology (knowledge bearer) have been taken into consideration. In calculating this indicator, the focus was on research and development, an activity sector that ensures the continuous technological upgrade. TDI is a useful tool for any economy in an attempt

to evaluate its condition, to find its place in the hierarchy of tech companies and to design its technological policies in line with the idea of progress. The study on TDI, although published in 2001, in the WRHRD, seems to be the most useful tool in measuring a country's technological development, considering the high degree of objectivity provided by the "time of its birth." TDI lacks a possible dose of subjectivity because of the absence of possible criticism from the domain analysts. The fact that it is widely used in various studies and researches shows its operational objectivity.

It is noted that leading countries in the standings based on TDI have a well developed economy. To keep pace in the race of technology, investments in national capacities should increase. It must be invested primarily in education and research, "brain drain" should be stopped, experiences such as those of China or India by supporters with gray matter of the world's largest research centers must be avoided, the national policy should be oriented so as to ensure the institutional, legal and financial climate for the development of ideas, their application in the local business and thus, economic progress should be ensured.

The new political, economic and intellectual context stimulates the emergence of new economic realities - the knowledge-based economy. Starting from this undeniable reality of our times, we must accept the idea of nature, living space, the environment (the economy) for the heart that beats and sustains (economic entity). We, those in the management sciences world, revolve around this idea of "wrapper", of framework offered by the economy for

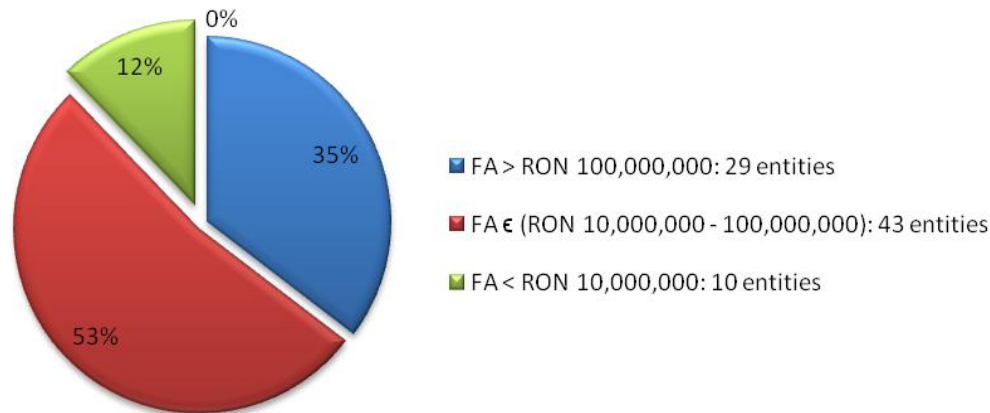


Figure 4. The value structure of the fixed assets.

"its basic cell", the economic entity. In recent years, the entity's environmental issues (the impact it has on the entity) had been the focus for those who attempted to enter this very complex category both by its multiple components and especially by the interdependencies between them. Thus, the environment includes all exogenous entities of technical, political, demographic, cultural, scientific, organizational, legal, psychological, educational and environmental nature that mark the establishment of their objectives, the acquisition of the necessary resources, the adoption and implementation of decisions on their realization (Nicolescu and Verboncu, 2007).

Being a major component of the national economy, the entity, which is found in a multitude of facets (international, national and local companies), runs its activities in the context of a market economic mechanism. In turn, the organization system of the economy clearly puts its mark on the entity by the amount and the structure of the assignments, responsibilities and powers of various structural components of the economy. The link between the entity and the economy appears obvious and also does the requirement for quality: the economic development requires composing entities a quality made by the level and the degree of technological development.

The link of physical capital – the performance of economic entities

The quantitative analysis

Wanting to capture the realities of the Romanian economic environment, we conducted the study on listed entities in Romania. To obtain the data with which we worked on the study, we accessed the Bucharest Stock Exchange (BSE) website (www.bvb.ro). The valuation of physical capital was based on the value of fixed assets. The data on the value of fixed assets were taken

from the financial information of listed entities published on the website of BSE. Depending on the value of fixed assets, entities have been grouped into three categories: entities with fixed assets of more than RON 100,000,000, entities with fixed assets between RON 10,000,000 and 100,000,000 and entities with fixed assets less than RON 10,000,000.

We used the category for listing the economic entities as a criterion in evaluating the performance: Category 1, Category 2, Category 3 and unlisted entities. There are 99 companies listed on BSE. The situation of entities at the time of data collection, depending on the listing category on the BSE was, as it follows: 23 entities in category 1, 48 entities in category 2, 1 entity in category 2 and 27 unquoted entities. For the study, 16 financial and insurance entities were eliminated, for which the activity does not meet the requirements of measuring physical capital through the fixed assets, and also the only company that was included in Category 3 of listing on BSE. Therefore, a number of 82 entities listed on the BSE have been under study for testing the correlation of physical capital - performance. The value of fixed assets and the listing category for the 82 analyzed entities are presented in Appendix 3.

The graphic presentation of the structure of listed entities in accordance with the value of fixed assets (FA) and BSE category listing is shown in Figures 4 and 5.

Hypothesis testing

H₂: There is a link between the physical capital and the performance of economic entities.

H₀: There is no connection between the physical capital and the performance of economic entities.

H_{2a}: There is a connection between the physical capital and the performance of economic entities.

Table 2 presents the observation between physical

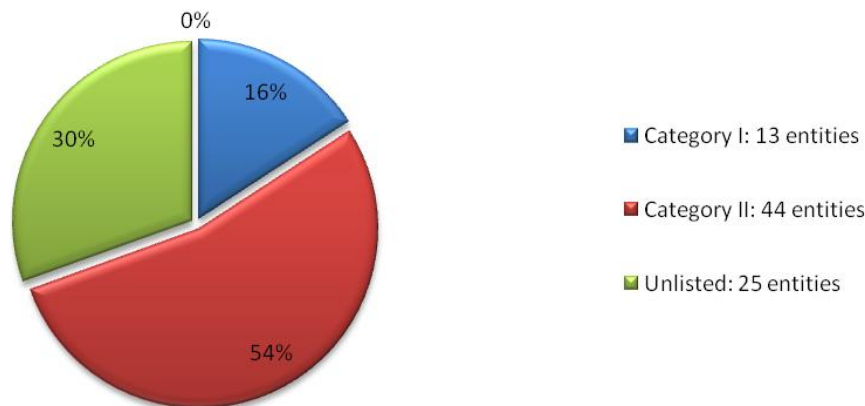


Figure 5. The entities' structure based on listing category of BSE.

Table 2. Cross-tabulations of the observation between physical capital and the performance of economic entities.

Entity category on BSE	Fixed assets			Total
	> RON 100,000,000	RON 10 -100,000,000	< RON 10,000,000	
(O) Observed frequencies				
Category I	10	3	-	13
Category II	15	27	2	44
Unlisted	4	13	8	25
Total	29	43	10	82
(E) Expected frequencies				
Category I	$\frac{29 \times 13}{82} = 4.5976$	$\frac{43 \times 13}{82} = 6.8171$	$\frac{10 \times 13}{82} = 1.5854$	
Category II	$\frac{29 \times 44}{82} = 15.561$	$\frac{43 \times 44}{82} = 23.0732$	$\frac{10 \times 44}{82} = 5.3659$	
Unlisted	$\frac{29 \times 25}{82} = 8.8415$	$\frac{43 \times 25}{82} = 13.1098$	$\frac{10 \times 25}{82} = 3.0488$	

Test statistic: $\chi^2 = \sum \frac{(O-E)^2}{E} = 23,5633$; Critical value: $\chi^2_{(3-1)(3-1);0,05} = \chi^2_{4;0,05} = 9,49$.

capital and the performance of economic entities. Because the statistic test χ^2 is greater than the critical value of χ^2 , H_0 is rejected and H_{2a} is accepted. It therefore validates the hypothesis that there is a connection between the physical capital and the performance of economic entities.

The qualitative analysis

The confirmation of the working hypothesis supports our attempt to demonstrate that there is a connection between physical capital and the performance of economic

entities. We consider it a strong enough argument for reconsidering the physical capital maintenance concept, having as actionable premises the socio-economic realities in which the entity operates. The physical capital maintenance contributes to both keeping operating capacity of entities at the level required by the market and especially to provide a true picture of their performance.

Physical capital maintenance concept requires an entity to recognize profit only if it maintained the operating capacity and only for the share that surpasses the physical capital originally invested. Thus, the distribution of dividends is avoided by recognizing only the real profit in accounting. As it is known, now an entity records profit if it maintained the financial capital originally invested,

expressed in nominal monetary units. In this context, price increases are recorded in accounting as profit and once distributed as dividends, they lead to de-capitalization of the entity and to the impossibility to maintain the physical capital. Thus, entities that report profit can get in a position to no longer continue their activity because they no longer have the ability to maintain their current level of activity.

This study showed that there is a connection between the physical capital and the performance of an entity, which entitles us to say that by physical capital maintenance at the level of economic entities, the performance of these entities will be much higher and the risk of bankruptcy due to fictitious dividends distribution will be non-existent. It is obvious that it is easily avoided the confusion that can occur by raising the role of physical capital maintenance concept to preserve the substance of technology and equipment in production, since it is noted the aspect of maintaining their power to participate in achieving performance. This comes from today's economic reality that offers the chance only to those who operate with equipment, technology and new concepts. It is the way of capital maintenance that provides certainty about the distinction between capital and profit. It is the concept which does not allow the payment of unjustified dividends because it takes into account the real profit.

CONCLUSIONS AND SUGGESTIONS

The socio-economic context in which we live and operate is generous with each one of us, with our ideas, especially with our desire to succeed in what we propose. We are contemporary to our society, economy and knowledge-based entity. We see all around us business and creative capabilities, we see how around the world, as a global network, billions of bits of knowledge are moving and we see how everyone and everything is changing, transforming and evolving. In these circumstances, one thing is very clear: we must find our place, we must not remain on the outside and we must keep up with technology, with innovation, with training, with knowledge in general. In our view, of those who work hard in the "incubator" of management sciences, bending over the physical capital maintenance concept could open the way for continuous empowerment of economic entities in their attempt to be competitive, efficient, socially useful and advanced.

Our attempt to associate the physical capital with the performance of economic entities, firstly by reference to the value of fixed assets, provides a useful basis for discussion of further in-depths and developments necessary for a complete perspective of the determinants of this concept. A first evaluation can be made in connection with the provision of operating capacity at least in terms of technology, by using the concept in question. It is widely accepted that the huge advances in

living standards, caused by global economies, are largely due to the technological progress. Now, there are produced technologies that have not even been imagined by the generations of the 1800s.

The cornerstone of economic growth is the technological progress. The standard of living is much higher now in most nations of the world than it was a hundred years ago. The reason is related to the fact that productivity, at the level of the economic entities, increased significantly and the cause of this progress is seen by the domain specialists as being the technological changes which took place.

Some changes were dictated by the level of capital investment, but most of them are related to the pace of innovation, particularly to the allocation of resources to research - development. Research-development appears as a major component, as a key element of technological progress, one of the most important aspects of or for the life or an entity, one of its most important duties being close to production. And if we associate these creative and progress incubators to the emergence of ideas, patents and technological achievements by which real leaps in production capacity are produced, we will still have a strong point of reference in assessing the importance of physical capital maintenance concept.

Innovations allow entities to enjoy higher profits and, on the financial markets where there is competition, the one who does not innovate, he does not survive. We must not overlook the issue of relatively high cost of research and development programs which makes large entities prevail, which means that the areas of activity where the research-development activity is significant will be dominated by a small number of entities. On this background, it becomes necessary the response of governments in creating conditions necessary for developing an economic environment to favor innovations also at the level of smaller entities. To encourage them, governments need to: ensure the protection of intellectual property rights; to fund basic research programs; to develop measures of economic development that would lead to the development of financial markets that are so necessary for the funding to develop new business ideas; to directly contribute to the formation of a labor force willing to take hiring risks at the newly formed entities, where the risk of failure is high; to support the efforts of academic centers to attract the best specialists and to encourage the partnerships between them and the business environment.

Investing in people and for the people becomes or is about to become the most powerful argument in the evolution of social structures. We refer here to the inclusion of the human capital and of the 'knowledge' capital in the composition of the integrating concept which we consider to be the physical capital maintenance. In the further studies regarding the contribution of physical capital maintenance to increase the performance of individually analyzed entities and through these, the

contribution of physical capital maintenance to increase the performance throughout economy, we will address another extremely important issue: the human being as an object of knowledge, as a resource, as being identifiable with the idea of performance and its promoter. Thus, the preparation of human resource becomes one of the most important determinants of social progress. The 21st century education will have to meet four objectives: learning to know, learning to do, learning to be, and learning to live together; the entity must take into account this last approach in order to be efficient for society also (Detrie, 2005). These are just some of the dimensions that can help to really measure the economic activity, to provide objective data in building real indicators of the business environment to serve as standard in the growth of economic and social performance.

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REFERENCES

- Accounting Standards Steering Committee (1973). Exposure Draft (ED) No. 8 Accounting for changes in the purchasing power of money.
- Accounting Standards Steering Committee (1974). Provisional statement of standard accounting practice (PSSAP) No. 7. Accounting for changes in the purchasing power of money.
- Barlev B, Haddad JR (2004). Fair value accounting and the management of the firm. *Crit. Perspect. Account.*, 14: 383-415.
- Beach EF (1938). A measure of physical capital. *Rev. Econ. Stat.*, 20(1): 11-20.
- Break GF (1954). Capital maintenance and the concept of income. *J. Polit. Econ.*, LXII(1): 48-62.
- Desai M, Fukuda-Parr S, Johansson C, Sagasti F (2002). Measuring the technology achievement of nations and the capacity to participate in the network age. *J. Hum. Dev.*, 3(1): 95-122.
- Detrie P (2005). *L'entreprise durable*. Paris: Dunod.
- Edwards EO, Bell PW (1961). *The theory and measurement of business income*. Berkeley: University of California Press.
- FASB (1979). *Financial Accounting Standards No. 33. Financial reporting and changing prices*.
- FASB (2006). *Statement of Financial Accounting Standards No. 157. Fair value measurements*.
- Feleaga L, Feleaga N (2007). *Financial accounting – An European and International approach*. Bucharest: Economica.
- Gynther RS (1970). Capital maintenance, price changes, and profit determination. *Account. Rev.*, 45(4): 712-730.
- Herrmann D, Saudagaran SM, Thomas WB (2006). The quality of fair value measures for property, plant, and equipment. *Account. Forum*, 30(1): 43-59.
- IASB (2009). *International Financial Reporting Standards*. Bucharest: Ceccar.
- Ionaşcu I (2003). *Dynamics of contemporary accounting doctrines - Studies on the paradigms and practices of accounting*. Bucharest: Economica.
- Jianu I (2009). New hypostases regarding the valuation at historical cost or fair value. *J. Account. Manage. Inform. Syst.*, 8(1): 78-99.
- Khurana IK, Kim MS (2003). Relative value relevance of historical cost vs. fair value: Evidence from bank holding companies. *J. Account. Public Policy*, 22: 19-42.
- Niculescu O, Verboncu I (2007). *Management organisation*. Bucharest: Economica.
- Riahi-Belkaoui A (2004). *Accounting theory*. Thomson Edition.
- Richardson Committee (1976) *The Report of the committee of inquiry into inflation accounting*.
- Ristea M (2004). *Advanced accounting*. Bucharest: Universitara.
- Sandilands Committee (1975). *Inflation accounting: report of the inflation accounting committee under the chairmanship of F.E.P. Sandilands*.
- Securities and Exchange Commission (1976). *Accounting standard relies No. 7*.
- Solomons D (1948). Income – true and false. *Accountants J.*, Octobre: 363-370.
- Sterling RR, Lemke KW (1982) *Maintenance of capital: financial versus physical*, USA: Scholars Book Co.
- Sweeney HW (1980). Maintenance of the capital. *Account. Rev.*, V(4): 277-287.
- Sweeney HW (1988). *Capital*. *Account. Rev.*, VIII(8): 185-199.
- Tugui A (2000). *Inflation accounting*. Bucharest: Economica.
- Walton P (2008). *Anglo-Saxon accounting*. Paris: La Découverte.
- Young JJ (2006). Making up users. *Account. Organ. Soc.* 31(6): 579-600.
- Zeff SA (2007). The SEC rules historical cost accounting: 1934 to the 1970s. *Account. Bus. Res.*, 37: 48-62.

APPENDIX**Appendix 1.** Technology development index for year 2001.

Leaders	Potential leaders	Dynamic adaptors	Marginalized
Finland	Spain	Uruguay	Nicaragua
United States	Italy	South Africa	Pakistan
Sweden	Czech Republic	Thailand	Senegal
Japan	Hungary	Trinidad and Tobago	Ghana
Korea, Rep. of	Slovenia	Panama	Kenya
Netherlands	Hong Kong, China	Brazil	Nepal
United Kingdom	Slovakia	Philippines	Tanzania, U. Rep. of
Canada	Greece	China	Sudan
Australia	Portugal	Bolivia	Mozambique
Singapore	Bulgaria	Colombia	
Germany	Poland	Peru	
Norway	Malaysia	Jamaica	
Ireland	Croatia	Iran, Islamic Rep. Of	
Belgium	Mexico	Tunisia	
New Zealand	Cyprus	Paraguay	
Austria	Argentina	Ecuador	
France	Romania	El Salvador	
Israel	Costa Rica	Dominican Republic	
	Chile	Syrian Arab Republic	
		Egypt	
		Algeria	
		Zimbabwe	
		Indonesia	
		Honduras	
		Sri Lanka	
		India	
Total: 18 countries	Total: 19 countries	Total: 26 countries	Total: 9 countries

Source: (World Bank classification) <http://hdr.undp.org/en/media/completnew1.pdf>.

Appendix 2. World economic development based on GDP pe capita for year 2001.

High income (GDP per capita > \$ 9.206)	Middle income (GDP per capita = \$ 746-9.206)	Low income (GDP per capita < \$ 746)
Andorra	Albania	Macedonia, TFYR
Australia	Algeria	Malaysia
Austria	Antigua and Barbuda	Maldives
Bahamas	Argentina	Malta
Bahrain	Barbados	Marshall Islands
Belgium	Belarus	Mauritius
Brunei Darussalam	Belize	Mexico
Canada	Bolivia	Micronesia, Fed. Sts.
Cyprus	Bosnia and Herzegovina	Morocco
Denmark	Botswana	Namibia
Finland	Brazil	Occupied Palestinian Territories
France	Bulgaria	Oman
Germany	Cape Verde	Palau
Greece	Chile	Panama
Hong Kong, China	China	Paraguay
Iceland	Colombia	Peru
Ireland	Costa Rica	Philippines
Israel	Croatia	Poland
Italy	Cuba	Romania
Japan	Czech Republic	Russian Federation
Korea, Rep. of	Djibouti	Saint Kitts and Nevis
Kuwait	Dominica	Saint Lucia
Liechtenstein	Dominican Republic	Saint Vincent and the Grenadines
Luxembourg	Ecuador	Samoa (Western)
Monaco	Egypt	Saudi Arabia
Netherlands	El Salvador	Serbia and Montenegro
New Zealand	Estonia	Seychelles
Norway	Fiji	Slovakia
Portugal	Gabon	South Africa
Qatar	Grenada	Sri Lanka
San Marino	Guatemala	Suriname
Singapore	Guyana	Swaziland
Slovenia	Honduras	Syrian Arab Republic
Spain	Hungary	Thailand
Sweden	Iran, Islamic Rep. of	Tonga
Switzerland	Iraq	
		Afghanistan
		Angola
		Armenia
		Azerbaijan
		Bangladesh
		Benin
		Bhutan
		Burkina Faso
		Burundi
		Cambodia
		Cameroon
		Central African Republic
		Chad
		Comoros
		Congo
		Congo, Dem. Rep. of the
		Côte d'Ivoire
		Equatorial Guinea
		Eritrea
		Ethiopia
		Gambia
		Georgia
		Ghana
		Guinea
		Guinea-Bissau
		Haiti
		India
		Indonesia
		Kenya
		Korea, Dem. Rep. of
		Kyrgyzstan
		Lao People's Dem. Rep.
		Lesotho
		Liberia
		Madagascar
		Malawi
		Nicaragua
		Niger
		Nigeria
		Pakistan
		Papua New Guinea
		Rwanda
		São Tomé and Príncipe
		Senegal
		Sierra Leone
		Solomon Islands
		Somalia
		Sudan
		Tajikistan
		Tanzania, U. Rep. of
		Timor-Leste
		Togo
		Uganda
		Ukraine
		Uzbekistan
		Viet Nam
		Yemen
		Zambia
		Zimbabwe

Appendix 2. Contd.

United Arab Emirates	Jamaica	Trinidad and Tobago	Mali
United Kingdom	Jordan	Tunisia	Mauritania
United States	Kazakhstan	Turkey	Moldova, Rep. of
	Kiribati	Turkmenistan	Mongolia
	Latvia	Uruguay	Mozambique
	Lebanon	Vanuatu	Myanmar
	Libyan Arab Jamahiriya	Venezuela	Nepal
	Lithuania		
Total: 39 countries	Total: 86 countries		Total: 66 countries

Source: (World Bank classification) http://hdr.undp.org/en/media/hdr03_complete.pdf.

Appendix 3. Economic entities listed on Bucharest Stock Exchange.

No.	Entities	Category	Industry	Department	Fixed assets value (RON)
1	AEROSTAR	2	Manufacturing	Bacau	37,192,819
2	AEROTEH	Unlisted	Electricity, gas and water	Bucharest	14,871,752
3	ALBAPAM	Unlisted	Manufacturing	Alba	1,404,849
4	ALRO	1	Manufacturing	Olt	1,529,251,060
5	ALTUR	2	Manufacture of automotive	Olt	99,998,224
6	ALUMIL ROM	2	Transport and storage	Bucharest	24,087,063
7	AMCO	Unlisted	Manufacturing	Ilfov	14,008,920
8	AMONIL	2	Manufacturing	Ialomita	48,416,015
9	AMYLON	Unlisted	Manufacturing	Sibiu	17,955,304
10	ANTIBIOTICE.	1	Manufacturing	Iasi	158,722,154
11	ARMATURA	2	Manufacturing	Cluj	18,780,419
12	AURORA	Unlisted	Manufacturing	Iasi	1,813,884
13	AZOMURES	1	Manufacturing	Mures	223,274,138
14	BERMAS	2	Manufacturing	Suceava	17,690,195
15	BIOFARM	1	Manufacturing	Bucharest	72,793,864
16	BOROMIR PROD BUZAU	2	Manufacturing	Buzau	93,389,688
17	C.N.T.E.E.	1	Electricity, gas and water	Bucharest	3,409,380,793
18	CARBOCHIM	2	Manufacturing	Cluj	56,416,216
19	CASA DE BUCOVINA	2	Hotels and restaurants	Suceava	33,960,900
20	CEMACON ZALAU	2	Manufacturing	Salaj	176,372,183
21	CHIMOPAR	Unlisted	Manufacturing	Bucharest	19,158,100

Appendix 3. Contd.

22	COMCM CONSTANTA	2	Manufacturing	Constanta	274,255,417
23	COMELF	2	Manufacturing	Bistrita	30,455,128
24	COMPACT	2	Manufacturing	Sibiu	354,928,584
25	COMPANIA PETROL	2	Constructions	Prahova	6,387,766
26	CONDMAG	2	Constructions	Brasov	86,529,354
27	CONTOR GROUP	2	Manufacturing	Arad	58,190,217
28	DAFORA	2	Mining	Sibiu	325,506,352
29	DOROBANTUL	Unlisted	Manufacturing	Prahova	43,874,993
30	ELECTROAPARATAJ	2	Manufacturing	Bucharest	61,437,358
31	ELECTROPUTERE	2	Manufacturing	Dolj	493,761,747
32	EMA PIATRA NEAMT	Unlisted	Manufacturing	Neamt	4,672,328
33	FAUR	Unlisted	Electricity, gas and water	Bucharest	82,478,719
34	FELINVEST	Unlisted	Constructions	Cluj	1,003,440
35	FORAJ SONDE	Unlisted	Manufacturing	Prahova	1,024,426
36	GHCL UPSOM	Unlisted	Manufacturing	Alba	68,413,799
37	GRUPUL INDUSTRIAL	2	Manufacturing	Botosani	7,789,812
38	IMPACT DEVELOPER	1	Constructii	Bucharest	87,624,247
39	MECANICA CEHLAU	2	Manufacturing	Neamt	25,831,836
40	MECHEL TAGOVISTE	2	Manufacturing	Dambovit	234,344,663
41	MEFIN	2	Manufacturing	Prahova	15,464,273
42	MJ MAILLIS ROMANIA	2	Manufacturing	Ilfov	24,025,289
43	MOBILA ALFA	Unlisted	Water distribution. Sanitation.	Bihor	6,530,475
44	MOLDOMOBILA	Unlisted	Water distribution. Sanitation.	Iasi	10,537,522
45	NICOLINA	Unlisted	Electricity, gas and water	Iasi	4,217,018
46	OIL TERMINAL	1	Transport and storage	Constanta	170,698,565
47	OLTCHIM RM VALCEA	1	Manufacturing	Valcea	1,098,810,419
48	OMV PETROM	1	Industria extractiva	Bucharest	22,243,002,582
49	PREFAB BUCURESTI	1	Manufacturing	Bucharest	194,087,126
50	PRODPLAST	2	Manufacturing	Bucharest	10,056,997
51	PRODVINALCO	Unlisted	Manufacturing	Cluj	8,521,209
52	RAFINARIA ASTRA	Unlisted	Manufacturing	Prahova	105,852,692
53	RAFO	Unlisted	Manufacturing	Bacau	495,080,859
54	ROMCARBON BUZAU	2	Manufacturing	Buzau	181,598,027
55	ROMPETROL RAFINARE	2	Manufacturing	Constanta	3,569,077,207
56	ROMPETROL WELL	2	Mininig	Prahova	63,859,679
57	RULMENTI	Unlisted	Manufacturing	Vaslui	124,324,034
58	RULMENTUL	Unlisted	Manufacturing	Brasov	53,946,408

Appendix 3. Contd.

59	S.N.T.G.N. TRANSGAZ	1	Transport and storage	Sibiu	2,956,719,655
60	SANTIERUL CONSTANTA	Unlisted	Electricity, gas and water	Constanta	111,155,843
61	SANTIERUL ORSOVA	2	Manufacturing	Mehedinti	56,532,975
62	TRANSIL. CONSTRUCTII	2	Constructions	Cluj	133,994,373
63	SINTEZA	2	Manufacturing	Bihor	160,722,051
64	SIRETUL PASCANI.	2	Manufacturing	Iasi	20,945,475
65	SOCEP	1	Transport and storage	Constanta	62,601,736
66	SOMES	Unlisted	Manufacturing	Cluj	59,724,249
67	STRATUSMOB	Unlisted	Manufacturing	Alba	16,997,029
68	T.M.K. - ARTROM	2	Manufacturing	Olt	423,412,346
69	TERAPLAST	2	Manufacturing	Bistrita	150,532,814
70	TITAN	2	Manufacturing	Ilfov	223,150,102
71	TURBOMECANICA	1	Manufacturing	Bucharest	126,486,034
72	TURISM FELIX	2	Hotels and restaurants	Bihor	202,347,567
73	TURISM MAREA NEAGRA	2	Hotels and restaurants	Constanta	310,589,688
74	UAMT	2	Manufacturing	Bihor	35,417,650
75	UTON	Unlisted	Manufacturing	Bacau	12,136,720
76	UZTEL	2	Manufacturing	Prahova	89,089,211
77	UZUC	Unlisted	Manufacturing	Prahova	37,449,754
78	VAE APCAROM	2	Manufacturing	Buzau	26,959,976
79	VES	2	Manufacturing	Mures	19,935,099
80	VRANCART	2	Manufacturing	Vrancea	93,116,815
81	ZENTIVA	2	Manufacturing	Bucharest	79,731,933
82	ZIMTUB	2	Manufacturing	Teleorman	15,236,994