



Critical Analysis of the Concept of Intellectual Capital Investment

Oksana Lentjushenkova¹ and Inga Lapina²

¹ Alberta College, 22 Skolas Street, Riga, LV-1010, Latvia

² Riga Technical University, Faculty of Engineering Economics and Management, 6 Kalnciema Street, Riga, LV-1048, Latvia

Abstract

The aim of the research is to analyse the concept of the intellectual capital investments in order to clarify the definition and understanding of the concept for business society at enterprise level. There is no unique approach how to define intellectual capital investments. The definition of intellectual capital investments depends on the aim of study or practical implementation. Some researchers define the investments as a different kind of expenditures according to the intellectual capital components. Other researchers use other definitions of the intellectual capital investments such as intangible investments, knowledge based investments, intangible activities etc. Different points of view interfere the understanding of the concept of the investments at enterprise. As a result entrepreneurs do not invest in intellectual capital. The authors critically analyzed different concepts and clarified the definition of the intellectual capital investments.

Keywords: intellectual capital investments, expenditures, financial performance, non-financial performance.

Introduction

The definition of intellectual capital investments is not clear. There is no unique approach for intellectual capital definition and measurement of the investments. Different researchers suggest various interpretations of intellectual capital investments definition. For instance, Ballester *et al.* (2002) define labor costs as human capital investments. Bandeira *et.al* (2010) found that the market treats R&D expenditures as investments in intellectual capital.

An investment in the intellectual capital is focused on intellectual capital creation. The process is oriented on future benefits creation for achievement of enterprise's goal (Gaponenko & Orlova, 2008). Many researchers analyse the intellectual capital investments as key-drivers for financial performance at the enterprise. The definition of "investment" is focused on financial performance, but intellectual capital investments could be also drivers for non-financial performance such as productivity, quality improvement etc. The non-financial performance could be incentive for financial performance, because the interaction between intellectual capital components influences effectiveness of the investments.

The authors found that the development of the concept of intellectual capital investments could be divided into four stages:

- 1) Changes in resource view approach from "resource-based" to "knowledge-based".
- 2) Development of the definition of the intellectual capital and the determination of the components of the intellectual capital.
- 3) The intellectual capital measurement methods creation.
- 4) The definition of intellectual capital investments development.

In the Last years the resource view approach has changed. The role of intellectual capital has increased. One of the first economists, who used the term „intellectual capital“, was Galbraith J.K. in 1969. Stewart T.A. (1991) was one of the first economists to make deeper research in the field of intellectual capital. He described intellectual capital as patents, processes, management skills, technologies, information about customers and suppliers, and old-fashioned experience. Stewart divided intellectual capital into three parts: human capital, organizational capital and relational capital. Later researches extended the number of components.

According to an increasing role of intellectual capital in entrepreneurship, researchers developed different intellectual capital measurement methods. There are more than 40 methods for intellectual capital measurement, for example, Value Added Intellectual Coefficient (Pulic, 2000), MERITUM (Canibano *et.al.*, 2002). Sveiby (2001) summarized and classified all methods in four groups:

- 1) Direct Intellectual Capital methods (DIC). Estimate the financial value of intangible assets by identifying its various components.

- 2) Market Capitalization Methods (MCM). Calculate the difference between an enterprise's market capitalization and its stockholders' equity as the value of its intellectual capital.
- 3) Return on Assets methods (ROA). Average pre-tax earnings of an enterprise for a period of time are divided by the average tangible assets of the enterprise. The result is an enterprise ROA that is then compared with its industry average.
- 4) Scorecard Methods (SC). The various components of intangible assets or intellectual capital are identified and indicators and indices are generated and reported in scorecards or as graphs.

The aim of current research is to analyse the concept of the intellectual capital investments in order to clarify the definition and understanding of the concept for business society at an enterprise level.

Methodology of Research

The main questions of current research are as follows:

- 1) How do researchers define the intellectual capital investments at the enterprise level?
- 2) Which concepts are related to the intellectual capital investments at the enterprise?
- 3) Is the main purpose of the intellectual capital investments financial or non-financial investments?

The following research hypotheses are developed by the authors:

H1: Different kinds of expenditures such as advertising expenditures, R&D expenditures, training expenditures are used as synonyms for intellectual capital investments.

H2: The intellectual capital investments are related not only to financial performance, but to enterprise's non-financial performance too.

The authors used scientific literature content analysis, which is made using software NVivo 10 and consists of these stages:

- 1) Scientific articles selection from scientific data bases Scopus and Science Direct. The authors selected 80 scientific articles using keywords "intellectual capital investments", "intangible assets investments", "intangible investments" and according to them the number of citations.
- 2) Selected articles' review and critical analysis. After critical analysis only 51 articles are used for the next stage.
- 3) Selected 51 articles' content analysis using NVivo 10. The authors used a query for word frequency counting as a tool for coding. After that the authors created six nodes with 20 synonyms.
- 4) Results analysis and clarification of the intellectual capital investments definition.

Literature Review

The authors critically analysed research aimed at intellectual capital and intellectual capital investments (see Table 1).

Table 1 The interpretations of the definition of the intellectual capital investments (some examples) [created by authors]

Authors	The interpretations of the definition of the intellectual capital investments
Hall, Griliches&Hausman (1986)	Specific strategic expenditures should be viewed as investments in strategic assets.
Klock&Megna (2000)	Advertising expenditures are used as a measurement for the intellectual capital investments.
Canibano et al. (2001)	Investments are described as intangible activities (dynamic notion). They imply an allocation of resources aimed at: 1) developing internally or acquiring new intangible resources; 2) increasing the value of existing ones; 3) evaluating and monitoring the results of the former two activities.
Corrado et.al. (2002)	Intellectual capital investments are defined as intangible activities for strategic aim achieving at the enterprise.
Ballester et al. (2002)	Labour costs as a measure for human capital investments are used.
Bontis&Fitz-enz (2002)	Training and development expenditures are used as proxies of human capital investments
Andriessen&Stam (2005)	They use values of intellectual capital as the intellectual capital future perspectives, which give insight into the future power of an organization.
Corrado, Hulten & Sichel (2006)	Expenditures related to software, innovative property, economic competencies are used as the intellectual capital investments.
RICARDIS project (2006)	As a definition of investments, innovation expenditures are used, which consist of internal and external R&D expenditures, acquisition of machinery, training and license.
Bandeira&Afonso (2010)	R&D expenditures are used as a synonym for intangible capital investments.
Awano, Franklin, Haskel&Kastrinaki (2010)	Intellectual capital investments are defined as expenditures in training, software, R&D, reputations, brand, and design and business process improvement.
Zeghal&Maaloul (2011)	Intangible investments are the main values creator.
Pekkola (2011)	An enterprise' capital formation expenditures
Molodchik et.al. (2012)	Intellectual capital investments are an intellectual capital part, which a company invests in order to gain competitive advantage and to improve performance which then causes an increase in company value.

The intellectual capital investments are analyzed in different contexts: financial and non-financial performances. The main outputs can be determined at microeconomic (enterprise) level (white colour) and macroeconomic (national economy) level (light grey colour) (see Fig.1.).

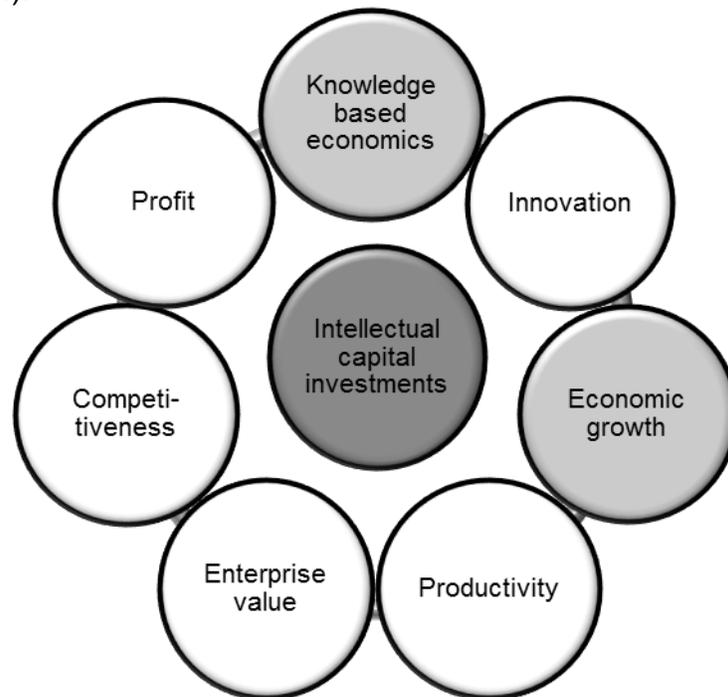


Figure 1 Concepts related to the intellectual capital investments outputs [created by authors]

The main outputs are: at microeconomic level - profit, competitiveness, firm value, productivity, innovation and at macroeconomic level – knowledge based economics and economic growth.

Researchers define intellectual capital investments as different kinds of expenditures or costs, for example, advertising expenditures, R&D expenditures, labour costs etc. This approach is used because these expenditures are easy to identify and they can be measured using enterprise accountancy information and statistical data. This approach is related to the intellectual capital investments objects too. At present there are four main interpretations of the intellectual capital definition: knowledge based capital, intangible assets, intangible resources and intellectual property. Sometimes these definitions are used as synonyms. But that is incorrect. Each definition is used by a different group of people according to their professional field, for example, accountants use “intangible assets”, and lawyers use “intellectual property”. The definitions mentioned are not synonyms, because sometimes intangible resources are not an intellectual capital. Intellectual capital involves intangible assets and intellectual property. Therefore the authors can conclude that main intellectual capital investments objects are intangible assets and intellectual property, which can provide benefits for an enterprise.

Results

In order to answer to the main questions of the current research the authors used scientific literature content analysis. Content analysis is made using software NVivo 10 and described in the section Methodology of Research.

The first step was a query used as a tool for coding (see Fig.2). Due to the query running 50 most frequent words are found from 51 selected articles after review. According to current research questions and query results the main words are selected: performance, investments, and value.

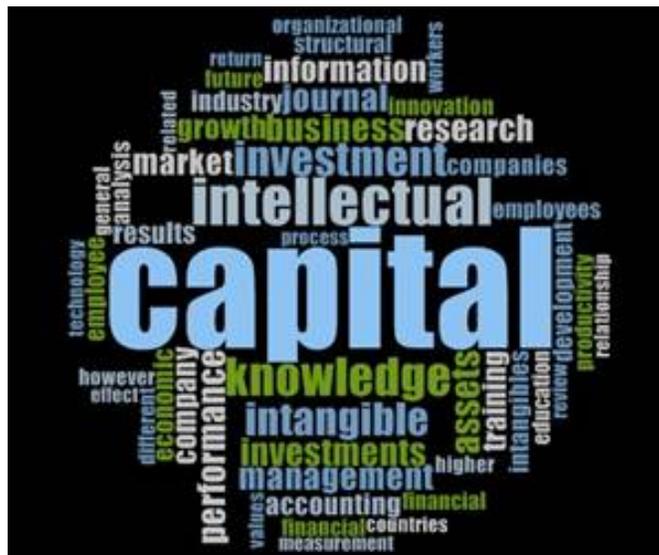


Figure 2 Query results (50 frequently used words in the articles) [created by authors]

The second step was text coding. Six nodes with 20 synonyms were created on the basis of query and critical literature review. The main nodes are: Intellectual capital investments; Financial Performance, Non-Financial Performance, Investments, Expenditures, Firm Value, Risk.

The third step was content analysis and indicators calculations. In order to assume are expenditures and intellectual capital investments definitions synonyms the authors calculated Jaccard's coefficient. It was calculated as follows:

$$S_J = a/(a + b + c) \quad (1)$$

where S_J = Jaccard's similarity coefficient, a = number of species common to (shared by) quadrates, b = number of species unique to the first quadrate, and c = number of species unique to the second quadrate (Pang-Ning, 2005).

The calculations show that a correlation between "intellectual capital investments" and "expenditures" is at the average level (Jaccard's coefficient is 0,232996). It means that researchers treat expenditures as the intellectual capital investments, but expenditures

and intellectual capital investments are not synonyms. The first hypothesis of current research is not approved.

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{(n - 1)s_x s_y} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}}$$

(2) Where x and y are the sample means of X and Y, while s_x and s_y are the sample standard deviations of X (Székely & Rizzo, 2009).

The authors found out a relationship among “Intellectual capital investments”, “Financial performance”, and “Non-financial performance”, which is proved by the results. (see Table 2).

Table 2 The relationship among intellectual capital investments, financial performance and non-financial performance [created by authors]

Node A	Node B	Pearson correlation coefficient
Nodes\\Intellectual Capital Investments	Nodes\\Financial Performance	0,85
Nodes\\Non-Financial Performance	Nodes\\Intellectual Capital Investments	0,82
Nodes\\Intellectual capital investments	Nodes\\Firm Value	0,54
Nodes\\Risk	Nodes\\Intellectual Capital Investments	0,47

The cluster analysis shows that intellectual capital investments are connected to financial and non-financial performance, but expenditures are connected to firm value (see Fig. 3.).



Figure 3 Cluster analysis results of the nodes [created by authors]

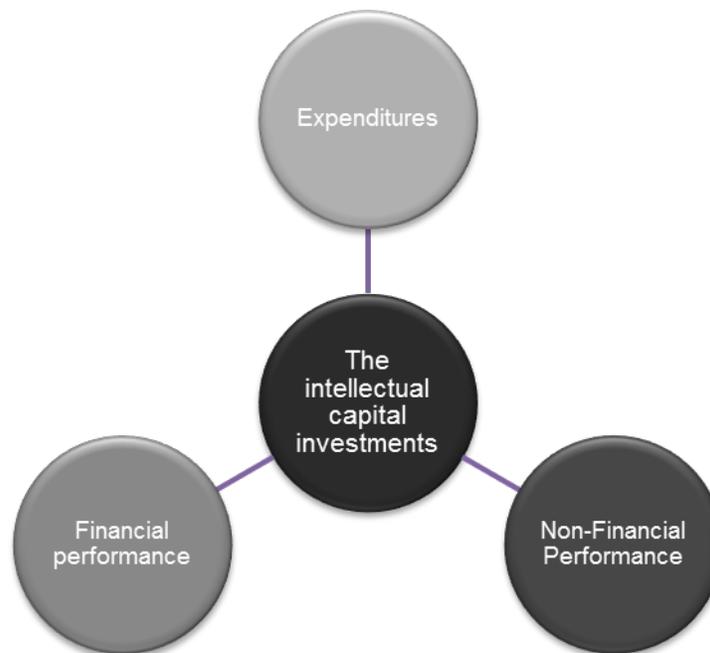


Figure 4 The concepts related to the intellectual capital investments [created by authors]

According to the analysis and calculations, the authors conclude:

- 1) Human capital investments, R&D expenditures, IT expenditures, labour costs, training costs as intellectual capital investments are used more frequently.
- 2) Intellectual capital investments influence the enterprise's financial and non-financial performance. The second hypothesis of current research is approved. Making investments the enterprise could increase not only its profit, firm value, asset value, but productivity, quality, competitiveness, loyalty of clients and employees etc. Some researches show, that non-financial performance could be incentive for financial performance at the enterprise.
- 3) Intellectual capital investments positively influence firm value (market value). There are many researches about market value increasing by making intellectual capital investments. Many researches are made on the basis of American, UK or Asian companies.
- 4) The intellectual capital investments are risky. Different researches provide contradictory results. They depend on the region in which the research took place and the region's economic development.
- 5) A critical analysis of articles shows, that expenditures are often used as investments in studies about investments influence on financial performance and market value.
- 6) The authors found an important problem to be solved: the expenditures can be recognized as intellectual capital investments, if they can be reflected in accountancy. Many researchers emphasise, that it is one of the most important factors, which impedes intellectual capital investments at the enterprise level.

Content analysis shows, that the most related concepts to intellectual capital investments are expenditures, financial performance and non-financial performance (see Fig.4.). Therefore, the authors clarified the definition of intellectual capital investments as follows: *the intellectual capital investments are expenditures in different intangible assets (software, brand, loyalty programs, routines and processes etc.) and human resources of the enterprise for its financial and non-financial performance.*

Conclusion

The authors have analyzed different researches about intellectual capital investments and conclude that there is no unique understanding of intellectual capital investments. Some of researchers use expenditures as investments definition; some use intangible investments or intellectual capital investments. This approach does not improve understanding of investments and their role in entrepreneurship. One of the reasons of it is accounting standards: many of them do not disclose investments in balance sheets.

The authors found answers on current research questions:

- 1) The calculations show that a correlation between “intellectual capital investments” and “expenditures” is at an average level. Some researchers use expenditures as the intellectual capital investments, but expenditures and intellectual capital investments are not synonyms. The first hypothesis is not approved.
- 2) The main concepts related to the intellectual capital investments concept are financial and non-financial performance, expenditures, risk, firm value. The main outputs of investments are divided into two groups: microeconomic level and macroeconomic level.
- 3) The main purpose of intellectual capital investments is enterprise performance: financial and non-financial performance. Some entrepreneurs make investments for profit only; some make investments for business processes improvement. The second hypothesis is approved.

The clarified definition by the authors of article combines a relationship between different definitions and indicators and helps understand the concept of intellectual capital investments at the enterprise level.

Due to critical literature review the authors have found that intellectual capital investments influence on enterprise performance is not unambiguous. Some research results show positive influence on entrepreneurship results, some researches show negative influence, and some researchers found no influence on entrepreneurship (for example, in Russia, South Africa etc.). The authors emphasise that intellectual capital investments should stimulate non-financial performance and they can provide more relevant benefits for the enterprise, because of interaction between non-financial and financial performance.

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