



## INTELLECTUAL CAPITAL INVESTMENTS INFLUENCE ON ENTREPRENEURSHIP AND ECONOMICS PERFORMANCE

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**Abstract.** Last thirty years intellectual capital role in entrepreneurship is increased. Enterprises have increased their intangible assets in total assets structure. For example, in USA between 1972 and 2011 tangible assets investments decreased from 12% till 8% and intangible assets investments increased from 8% till 15%. Also in EU countries the intangible assets investments increased. For instance, in Finland, Denmark and Netherlands the largest part of enterprise's investments is in intangible assets investments.

The goal of research is to define human capital investments influence on enterprise performance in Latvia. The research object is human capital investments as a part of intellectual capital investments. Different research methods are used in the article, such as scientific literature analysis, synthesis and comparison, survey (questionnaire). Various authors' approaches are studied and are used in current research. The analysis is made on the basis of questionnaire results and statistic data from national and European statistic agencies.

**Keywords:** intellectual capital investments, enterprise performance, human capital investments, return on investments.

**JEL classification:** J24, M59.

### 1. 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 authors suggest various interpretation of intellectual capital investments definition. For instance, Ballester *et al.* (2002), Lajili *et al.* (2005) define labor costs as a human capital investments. Bandeira *et al.* (2010) suggests that the market treats R&D expenditures as investments in intellectual capital (structural capital).

Corrado *et al.* (2005, 2006) classify spending on intangibles into three main groups: 1) computerized information (software); 2) innovative property (R&D); 3) firm competencies (training). The OECD (2013) uses the same classification for working out reports and strategy for knowledge economy development.

Within MERITUM project (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) increas-

ing the value of existing ones; 3) evaluating and monitoring the results of the former two activities. In RICARDIS project (European Commission, 2006) innovation expenditures as investments definition are used. They consist of internal and external R&D expenditures, acquisition of machinery, training and license. Awano *et al.* (2010) have measured investments in intellectual capital in six categories: employer funded training, software, R&D, reputation and branding, design, and business process development.

The goal of research is to define intellectual capital investments influence on enterprise performance. The research object is human capital investments as a part of intellectual capital investments. The authors choose this part of investments, because human capital, its transformation influence other intellectual capital components. The profit changes are calculated in different national economy sectors making investments in human capital on the basis of previous research and statistic data.

Different research methods are used in the article, such as scientific literature analysis, synthe-

sis and comparison, survey (questionnaire). Different authors' approaches are studied and are used to define the intellectual capital investment influence on enterprise performance.

## 2. Intellectual capital investments influence on enterprise performance: literature review

There are many researches about intellectual capital investments influence on enterprise performance (Table 1). Some of them disclose positive effects of investments, some research disclosure negative effect. For instance, Canibano (2000) find that marketing expenditures as part of intellectual capital investments have no significant effect on company value. Clarke *et al.* (2011) find that

physical and financial capital provides strongest significant influence on enterprise performance in Australia. At the same time they emphasise that human capital is important in the current year and also has lag effect that flows on to effects performance in the future.

Zéghal *et al.* (2010) investigate VAIC coefficient in 300 UK companies divided into three groups of industries: high-tech, traditional and services. Their main findings are: 1) there is positive association between the VAIC coefficient and company's economic performance; 2) intellectual capital plays a major role in reducing a company's production costs.

**Table 1.** Previous research results (some examples, 2000-2012) (source: compiled by authors)

Author (-s)	Data	Results
Pulic 2000	30 FTSE companies (random sample)	Positive correlation between intellectual capital amount and company market value.
Bontis, Keow, Richardson 2000	107 Malaysian companies	Positive relationship between intellectual capital and company performance in all researched sectors. Influence of each intellectual capital component is different in different sectors.
Swartz, Firer 2005	75 public companies with high level of intellectual capital in South Africa	The intellectual capital influence on company performance is not significant in developing countries.
Subramaniam, Youndt 2005	93 American companies	Positive complementary impact on innovation activities.
Wang, Chang 2005	IT companies from Taiwan Stock exchange in period 1997-2001	Human capital positive influence, but only in connection with other intellectual capital components. Other intellectual capital positive influence on company performance.
Chen, Cheng, Hwang 2005	4254 public companies in Taiwan in period 1992-2002	Intellectual capital amount, R&D and advertising expenditures positive influence on return on assets.
Tsang, Goo 2005	81 companies in Taiwan	Positive influence on company performance is proved by empirical studies. In high technologies companies positive effect is more significant.
Garanina 2008	43 Russian companies in period 2001-2006	Physical capital investments influence is more significant.
Chan 2009	All companies from Honkong Stock exchange in period 2001-2005	Investors and companies evaluate amount of physical capital as a driver for company performance.
Puntilo 2009	Banking sector in Italia in period 2005-2007	Influence on company performance is not observed.
Zéghal, Maaloul 2010	300 UK companies	Positive association between the VAIC coefficient and company's economic performance.
Gohberg 2010	1000 companies in manufacturing industry	Positive influence of separate intellectual capital components on productivity is observed.
Kamukama, Ahiauzu, Ntayi 2010	Microfinance industry in Uganda	Positive and strong relationship exists between human capital, structural capital, relational capital and financial performance.
Clarke, Seng, Whiting 2011	Australian companies	Physical and financial capital provides strongest significant influence on enterprise performance.
Komnencic, Pokrajcic 2012	37 Serbian companies in period 2006-2008	Human capital has significant positive effect on the profitability and productivity, but structural capital has positive impacts on return on equity.

Komnenic *et al.* (2012) investigate intellectual capital influence on enterprise performance, using data from 37 multinational companies which established their business in Serbia from 2006 to 2008 and applying the VAIC (value added intellectual capital) methodology. They found out that human capital has significant positive effect on the profitability and productivity, but structural capital positive impacts on return on equity only. Maditinos *et al.* (2011) observed great human capital and structural capital efficiency related to better enterprise financial performance.

There are contradictory results presented in some studies also. Structural capital investments have a positive effect on enterprise financial indicators till certain level. If the amount of investment is too high, the negative effect is observed (Huang *et al.* 2005).

Some researchers (Tseng *et al.* 2005; Huang *et al.* 2005; Huang *et al.* 2008) distinguish synergy and multiplier effects between intellectual capital components. These effects change intellectual capital investments influence on enterprise results. For instance, if enterprise separately invests in technologies, there is no significant positive influence on enterprise performance. Enterprises do not have an optimal assets combination very often. There is no balanced structure of intellectual capital either. Because of these reasons the investments influence on enterprise results is not positive. Kamukama *et al.* (2010) tested relationship between intellectual capital components in microfinance industry in Uganda. They conclude that a positive and strong relationship exists between human capital, structural capital, relational capital and financial performance.

The enterprise financial performance depends not only on intellectual capital amount and investments, but also on capital management. Poor management of intellectual capital decreases the efficiency of intellectual capital investments (Joshi *et al.* 2013).

In OECD report (2013) intellectual capital investments influence on enterprise performance along with country benefits is analyzed. Innovation-based growth, underpinned by investments in a broad range of knowledge-based capital (KBC), is central to raising long-term living standards. This is especially the case in advanced economies that are relatively close to the technological frontier, where future growth will increasingly need to come from improvements in multifactor productivity (MFP) (OECD 2013). While investment in innovation has traditionally been peroxide by indicators such as spending on research and development (R&D) and the purchase of capital embodying new

technologies, innovation-based growth relies on a much broader range of intellectual capital. Corrado *et al.* (2005) classify possible growth output for investors according to their classification on intellectual capital. For instance, investments in software improved process efficiency, optimized vertical and horizontal integration.

Comparing previous research results the authors observed cross - country differences in the intellectual capital role and influence on enterprise performance. For instance, in developing countries the role of intellectual capital is lower than in developed countries.

### 3. Return on investment

One of important indicators for measuring intellectual capital investments influence is return on investment. The return on intellectual capital investment is calculated in different researches. Almeida *et al.* (2006) on the basis of previous research estimate the effects of training on productivity. They find out that an increase in the amount of training per employee of 10 hours per year, leads to an increase in current productivity of 0.6%. Increases in future productivity are dampened by the rate of depreciation of human capital but are still substantial. They conclude that investments in human capital have on average negative returns for those firms which do not provide training. They estimate that the returns for firms providing training are quite high: lower bound being of 17% and preferred estimate being 24%.

**Table 2.** Marginal Return of a Training Hour for All Employees (source: Almeida *et al.* 2006)

		Human capital depreciation rate,%				
		5	10	17	25	100
Rate on return,%	All enterprises	14	10	9	1	-28
	Enterprises not providing training	0	-4	-7	-14	-64
	Enterprises providing training	27	22	24	17	4

One of the returns on investment measurement methodology is ROI methodology (Philips, 1970), which is implemented to human capital also. ROI presents the earnings (net benefits) as compared to the cost (Philips *et al.* 2005). ROI could be implemented in different areas: higher education, coaching, learning, training and development, public sector, consulting etc. This coefficient shows financial effectiveness of intellectual capital investments.

Researches use VAIC coefficient method for intellectual capital influence on enterprise performance (Pulic 2000). This coefficient is based on two components of intellectual capital (human and structural capital) and is used as intellectual capital effectiveness indicator and financial effectiveness indicator at enterprises. For VAIC calculation simple information from statistic and balance sheet is necessary. Some authors criticize this method:

- in different researches it is used as intellectual capital measurement;
- this coefficient shows effectiveness of both capitals: intellectual and physical. For instance, employees need a certain set of resources for work. So their effectiveness depends on these resources effectiveness also. This flaw is observed using other methods as well.

Besides financial effectiveness other indicators are used too, for instance profit per employee as one of the employee’s productivity measurement (Clarke *et al.* 2011).

#### 4. Intellectual capital investments influence on company performance estimation in Latvia

##### 4.1. Methodology

There are two stages in current research:

- the authors use employer’s survey for human capital investment main object determination at enterprises in 2010;
- on the basis of survey results statistical data are collected for possible effect estimation on enterprise performance.

There are several limitations in current research:

- the authors estimate the human capital investments influence on enterprise performance. The human capital was selected because of several problems at labor market, such as: number of employees, qualification of employees (there is a gap between qualification and labor market requirements), low productivity etc.;
- due to statistic data availability and survey results authors assume training costs as human capital investments. The research period is 2010, because of the same reason;
- estimation is made in two sectors of national economy: industry (B-E according NACE 2 red.) and wholesale and retail trade (G according NACE 2 red.).

#### 4.2. The human capital investments’ main object: employers survey results

Questionnaire was selected as a tool for the survey in the first stage. The authors prepared questionnaire for enterprises and made random selection from enterprises in industry and wholesale and retail trade sectors. The number of respondents was 104 small and medium enterprises (the size was classified according to the number of employees at the enterprise):

- 19.4% from industry sector;
- 80.6% wholesale and retail trade.

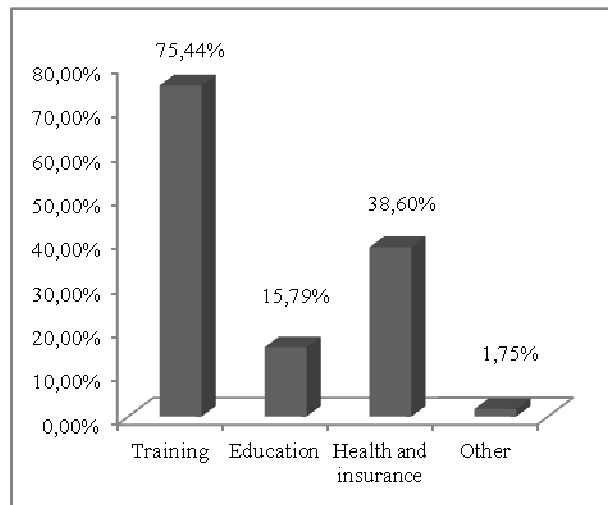


Fig. 1. The human capital investments main object at enterprises (source: compiled by authors)

The biggest part of respondents in both sectors (72.2%) invests in human capital. The human capital investments main object is training (Fig. 1).

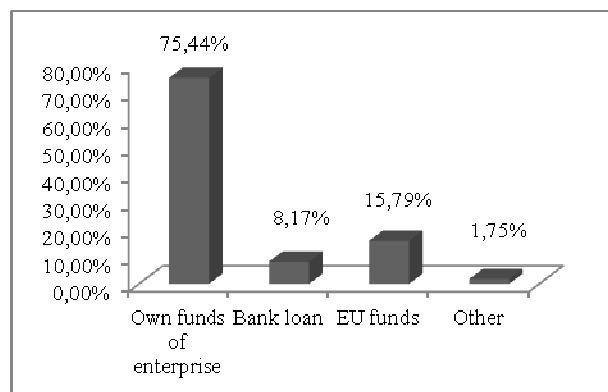
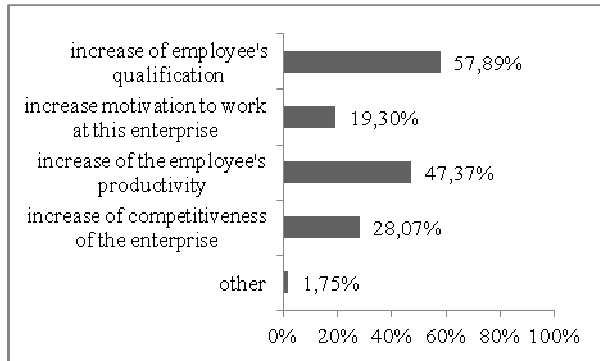


Fig. 2. The financing sources of human capital investments at enterprises (source: compiled by authors)

Enterprises more frequently used their own funds for financing investments (Fig.2). The reason for this is lack of information about EU funds opportunities and limitation for their use, for instance, in wholesale and retail sector.

Two incentives are mentioned more frequently: the increase of employee's qualification and increase of employee's productivity (Fig.3). The reasons for this are: workforce migration and lack of qualified employees in different fields despite unemployment in the country, differences between wage and productivity.



**Fig. 3.** The main incentives for investment in human capital at enterprises (source: compiled by authors)

The employers mentioned the main obstacles for human capital investments in addition:

- lack of funds;
- tax policy in the country;
- employee turnover;
- low motivation of staff;
- management unwillingness to make such investments.

According to survey results the statistic data were collected and calculation is made in the second stage of current research.

#### 4.3. Data and calculation

The authors use statistic data about enterprise profit, production value, labor costs, direct costs of CVT course (without labor costs), number of employees, and commercial profitability in 2010 for investments influence and possible benefit estimation. Data are collected from national and European statistic data bases about two sectors of national economy: industry and wholesale and retail trade. The following assumptions are made:

- according to the Central Statistical Bureau of Latvia production value is the volume of actually produced output or services provided, including changes in supply and fixed assets produced for own needs, and excluding purchased goods and services for resale. Changes in production values are calculated if productivity increase between 0,6% and 1,3% after 10 additional training hours;
- according to the Central Statistical Bureau of Latvia personnel costs is total remunera-

- tion in cash or in a kind which employer pays to an employee as a reward for the work done. Personnel costs also include the employer's social security contributions;
- direct costs of CVT courses are without labor costs;
- changes in total direct costs of CVT courses are calculated only for employees participating in the courses;
- Number of employees did not change during the estimation period.

**Table 3.** Input data in 2010 (source: compiled by authors from Eurostat and the Central Statistic Bureau)

Data	Industry	Wholesale and retail trade
Production value, thsd Eur	7801706.00	3900632.00
Personnel costs, thsd Eur	992749.00	902509.00
Number of employees	129156	151546
Profit before taxes, thsd Eur	232600.00	36800.00
Percentage of employees (all enterprises) participating in CVT courses	18.00%	22.00%
Number of employees participating in CVT courses	23248	33340
Direct cost of CVT courses per employee (all enterprises)	30.00	39.00
Total direct CVT courses costs, thsd Eur	697.44	1300.26
Direct cost of CVT courses per training hour, Eur	9.00	13.00

Using data from Almeida *et al.* (2006) research, the authors calculated change in costs of CVT courses depending on additional number of training hours (Table 4).

**Table 4.** Changes in costs of courses and production value (Source: compiled by authors)

	Industry	Wholesale and retail trade
Change in direct costs of CVT courses (additional 10 hours), thsd Eur	2092,33	4334,22
Change in production value (productivity increase by 0,6%), thsd Eur	46810,24	23403,79
Change in production value (productivity increase by 1,3%), in thsd Eur	101422,18	50708,22

The authors estimate possible changes in profit before taxes also too (Table 5).

**Table 5.** Changes in profit before taxes making investments (Source: compiled by authors)

Human capital depreciation rate,%	5.00	10.00	17.00	25.00
Rate on return,%	14.00	10.00	9.00	1.00
Change in profit (Wholesale and retail trade), mln Eur	41.95	40.48	40.11	37.17
Change in profit (Industry), mln Eur	265.16	255.86	253.53	234.93

Changes in profit are calculated on the basis of input data in table 3.

### 4.3. Results

Summarizing the calculations the authors have found:

- Only few employees participate in courses;
- Direct costs of CVT courses are 0.07% of personnel costs in industry and 0.14% of personnel costs;
- If a number of training hours is increased the direct costs of courses increase more than 3 times in both analyzed sectors;
- Comparing changes in production value and changes in costs of courses, the authors observed, that changes in production are biggest and excess costs (Table 6).

**Table 6.** Changes in production value and costs of courses (Source: compiled by authors)

	Industry		Wholesale and retail trade	
	Productivity is increased by		Productivity is increased by	
	0.6%	1.3%	0.6%	1.3%
Changes in production value, mln Eur	46.81	101.42	23.40	50.71
Changes in costs of courses, mln Eur	2.09		4.33	
Multiplier	22.37	48.47	5.40	11.70

- It means that by increasing a number of training hours it is possible to get larger production value. But an additional research is needed about main influencing factors on production value.

- Changes in profit are significant and positive. For calculation the authors used profit before taxes. So, if profit increases, possible tax revenue in state budget will increase too.

**Table 7.** Profit per employee (Source: compiled by authors)

	Industry	Wholesale and retail trade
	Before investments	
Profit per employee	1.80	0.24
	After investments	
Profit per employee (depreciation rate 5%)	2.05	0.28
Profit per employee (depreciation rate 10%)	1.98	0.27
Profit per employee (depreciation rate 17%)	1.96	0.26
Profit per employee (depreciation rate 25%)	1.82	0.25

- Changes in profit are more significant in industry, profit per employee while making investments is bigger too (Table 7). If human resource depreciation rate is more than 25%, the positive effects not observed.

### 5. Conclusions

The authors have analyzed different researches about intellectual capital investments influence on enterprise performance (the researches are random selected on the basis of the number of citation) and conclude:

- most researches are made in Asia;
- enterprises in different economic sectors are analyzed, some researches are concentrated only in one sector of national economy;
- the research results are different. Some of them show positive effect from intellectual capital investments (mostly in Asia and in high technology sectors of economy). Some research shows negative or neutral effect, for instance in Russia the role of intellectual capital is not significant. There are cross-country differences of intellectual capital role atin enterprises;
- some researches show, that effectiveness of investments depends on intellectual capital management too;
- the VAIC coefficient method often is used for determining of intellectual capital influence on enterprise performance. Other methods such as ROI, ROA, and MVA are used also.

- One of the problems for influence calculation is related to problems in accounting. Accounting standards do not provide sufficient information for estimation. Due to European Union project some suggestions are made for intangible assets accounting methodology. There are some guidelines for intellectual capital (intangible assets) reports (for example, in Germany, Denmark, Austria, Japan and Australia). Some of them are related to higher education and research sectors.

There are two stages in current research. The authors determine the human capital investments main object at enterprises using survey on the first stage. Survey results show, that the investments main object is training (at 75.44% of enterprise). Using survey results and available statistical data from Eurostat and Central Statistical Bureau changes in profit and production values making human capital investments in two sectors of national economy are calculated on the second stage. The training costs as human capital investments were assumed.

Calculations disclose a positive effect on enterprise financial performance:

- positive changes in profit and productivity are observed;
- better results are observed in industry, because financial indicators are better and the number of employees is smaller;
- direct costs of CVT courses are 0.07% of personnel costs in industry and 0.14% of personnel costs;
- if a number of training hours is increased the direct costs of courses will increase. Comparing changes in production value and changes in costs of courses, the authors observed, that changes in production excess costs;
- if human resource depreciation rate is till 25%, enterprise can increase profit making investments. But an additional research about factors influencing productivity and tangible and intangible resources synergy effect is needed.

Furthermore the authors will calculate benefits from intellectual capital investments at a certain number of enterprises in Latvia and factors influencing intellectual capital investments.

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