INTELECTUAL CAPITAL AND THE CREATION OF VALUE IN BRAZILAN COMPANIES

FLAVIO L. RICHIERI

ESPM - Escola Superior de Propaganda e Marketing – Pós-Graduação
Rua Joaquim Távora, 1240 – 2º andar
Paraíso – São Paulo – SP – 04015-013 - Brazil
Tel: +55 (11) 5081-8200
Fax: +55 (11) 5081-8194
Cel: +55 (11) 9657-1919
AND-mail: flrichi@yahoo.com

LEONARDO FERNANDO CRUZ BASSO

Universidade Presbiteriana Mackenzie
Rua da Consolação, 896 – 7º andar – Sala 76
Consolação – São Paulo – SP – 01302-907- Brazil
Tel: +55 (11) 3236-8597
Fax: +55 (11) 3236-8600
Cel: +55 (11) 9109-4098
AND-mail: leonardobasso@mackenzie.com.br

DIOGENES DE LEIVA MARTIN

Universidade Presbiteriana Mackenzie
Rua da Consolação, 896 – 7º andar – Sala 76
Consolação – São Paulo – SP – 01302-907- Brazil
Tel: +55 (11) 3236-8597
Fax: +55 (11) 3236-8600
AND-mail: diomartin@mackenzie.com.br

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ABSTRACT

This study makes usage of CIV (Calculated Intangible Value) and ICE (Intellectual Capital Efficiency) to measure IC stock and flows respectively. It applies static panel data models, to study the influence of IC on companies ROE (Return-on-Equity), ROA (Return-on-Assets) and ROS (Return-on-Sales) ratios. The research utilizes a sample with data for the 1,000 biggest companies in Brazil from the "Maiores and Melhores" annual survey database, covering the period between 2000 and 2005.

Results found suggest the existence of a positive relation between both CIV and ICE and the dependent variables ROE, ROA and ROS.

Key-words: Intellectual capital (IC), Intangible assets, Knowledge assets, Value creation, Financial Performance, Valuation, Knowledge management (KM), Panel data.

JEL Codes: C33, D21, D23, D46, I20, I21, I22, M20, M21

INTRODUCTION

Even though the term 'intellectual capital'[1] has existed for almost 50 years and that since the XVII Century there has been empirical evidence over its relevance in the performance of organizations, it has only been in the last 15 years that studies on the subject have become more frequent (STEWART, 1998 :XVI; STEWART, 2001: XIV).

The growing interest over the subject coincides with the deep transformations in world economy through which we have been going in recent decades. As services take a highly determining role in World's economy, the traditional view, current since the industrial revolution, which considers 'work and capital' as the main production factors to determine corporation wealth, has to be widen up (ANDRIENSEN, 2004 :5).

In fact, performance of most companies is increasingly based on the intellectual capital, since value comes from activities linked to information processing, development and knowledge transfer and application (TEECE, 1998 :75 ; FIRER and WILLIANS, 2003 :348).

Corporate value creation nowadays is grounded on proprietary standards and methods, copyright, patents, customer, supplier, and partner relationships, marks and reputation, as well as other intangible factors. The nature of competitive advantage has turned from the physical to the intangible (EDVINSON, 2003 :19).

While noting the market value of companies like Google, eBay, and YouTube, we find clear examples evidencing that information now has its 'own value', separated from regular concepts of products and services from the traditional economy.

In short words, we find today a series of evidences showing that:

a) industry is undergoing a 'dematerialization' process with the increase of the intellectual component and decrease of the physical one (STEWART, 2001: 12);

b) distance between information flow and the flow of products and services is increasing (TEECE, 1998 :59)

[1] Even though some people adopt different meanings to the terms intellectual capital, intangible assets, and knowledge assets, in the scope of this article, consistently with Stewart (1998 and 2001), Lev (2001 and 2003) and Andriensen (2004), and others, these three terms will be used as having the same meaning..

However, we chose to evaluate, compare, and analyze the performance of companies based on conventional information and financial statements, which, in this context, present a series of limitations (CHEN et. Al., 2005; STEWART, 1998; ROOS et. Al.; 1997; LEV, 2001), failing to offer a clear and broad view of the resource stock available to companies and their effectiveness in using such resources for value creation (ROSS et. Al. 2002; BREALEY and MYERS, 2003).

The lack of visibility and the impossibility to compare companies (especially those more intensive in terms of intellectual capital), as well as the increasing distance between market value and accounting value of companies, have also caused a systematic error in the price of company shares, resulting in excessive volatility in the stock market and jeopardizing the decision making ability of investors and managers (HAND and LEV, 2003 :2; EDIVINSON, 2003 :62-79).

Thus, there is a need today to find means to measure and appropriately qualify this important part of company capital, to enable studying the influence on their value creation, and, eventually, be able to determine on solid grounds their fair market value (ROSS et. Al., 2002; BREALEY and MYERS, 2003).

To assist clearing this highly important question for academic people, managers and investors, after two years of researches and tests with different methods and intellectual capital evaluation indexes, this paper adopts CIV (Calculated Intangible Value) and ICE (Intellectual Capital Efficiency) as measures of stock and intellectual capital flow, respectively, to offer an analysis of data related to the largest Brazilian companies in different areas, through an econometric treatment using static panel data models.

We try not only to test the validity of ICE and CIV as drivers of financial performance and value creation capacity of companies in the sample, but mainly, to contribute with an understanding on the actual influence of intellectual capital in value creation of Brazilian companies.

THEORETICAL REFERENCES

Intellectual capital, as a study area, passes through functional domains, being object of research in economics, business, psychology, and computing sciences, to mention just a few.

Under the accounting point of view, intellectual capital includes all non-monetary assets identifiable but with no physical substance, maintained for use in production or provision of goods or services, leased for third parties or for management purposes (Andriensen, 2004: 62).

Generally, due to the impossibility to set sufficient control and the uncertainty on the future return arising out of actions from people comprising the organization, unless there is a purchase and sale transaction, in accounting terms, acknowledgement is given only to the "intellectual property", a small part of the "structure" of the intellectual capital, subject to legal protection (ANDRIENSEN, 2004: 63).

However, even with the conservatism of the accounting view, other components of the intellectual capital (like human capital) have their existence (and relevance) acknowledged in circumstances when a company is acquired by prices exceeding the fair market value of all accounting assets, upon accounting acknowledgement of goodwill (YOUNG and O'BYRNE, 2003 :207).

But the intellectual capital that ended up determining goodwill at the time of sale was present before the transaction. Therefore, under the value creation view, one has to go beyond the accounting view and consider, according to the economic perspective on this issue, "all non-physical resources which are value sources (granting rights on future benefits) created by innovation (discovery), unique organizational layouts, or human resources practices" (HAND and LEV 2003 :7).

If on one side the definition is clear, on the other, since 1958, when the term intellectual capital was used for the first time, financial analysts face the challenge to evaluate companies intensives on intangible assets, those that were referred to as "science-based companies" (STEWART, 2001 :XIV).

Only in the second half of the 1980s, during a period of intensive activity where the main concepts related to this subject started to be created, led by Karl Sveiby in 1989, the first initiatives trying to measure and promote companies' intellectual capital started (ANDRIESEN, 2004).

Stewart (2001 :8) points out that, in 1999, intangible assets, not included in financial reports and analysis, became a higher value article to be exported by the USA and, in the following year, investment of North-American corporations in intangible assets was practically equal to the investment in conventional assets, summing up US$ 1 trillion (HAND and LEV, 2003 :4).

Then, as defended by Schumpeter, the companies' purpose was the creation of competitive opportunities through creation and adoption of technological innovations, causing competitive positions of competitors to be obsolete (CONNER, 1991: 124-125).

In the attempt to better understand and measure intellectual capital, several authors proposed taxonomies detailing its main components (ANDRIENSEN, 2004: 61).

In general, we may consider that there are two basic comprising groups to be considered: those directly linked to people who are part of the organization (Human Capital) and those that are somehow incorporated within the organization (Structural Capital) thus supporting human capital's productivity (EDVINSON and MALONE, 1997: 11).

The organizations' human capital arises out of the competence acquired by professionals, their knowledge and skills, behavioral characteristics ('attitude'), and the capacity showed to innovate and apply their knowledge to new and different situations ('intellectual agility'). While structural capital includes all computing systems and data bases, flow charts and process descriptions, as well as all the intellectual property and any other items whose value for the company exceeds its material value (ROOS et. Al., 1997: 34-42).

It is interesting to note that if on one hand human capital presents great complexity in terms of management, on the other, its tacit nature makes it difficult to imitate, making the competitive advantage arising out of it more sustainable (TEECE, 1998: 66).

In general, the intellectual capital potential's to create value for the companies is directly related to its specific economic characteristics of increasing returns (since these are characterized for high "sunk costs" and unlimited scalability) and its "network effects" which cause existing clients to attract new clients, even when the supplying company employs no effort in this sense (LEV, 2001: 22-23; HAND and LEV, 2003 :327).

Therefore, through constant development and effective use of its intellectual capital, companies create several opportunities to increase their productivity, whether improving efficiency of existing tangible assets, or reducing their need. Besides, through innovation and close relationship with customers and suppliers, the companies may introduce different high margin products and services, some times creating fully new markets (LEV, 2001: 51-77).

Similarly to the discussion on the relative importance of each of the components of the intellectual capital, questions arise related to the effect of intellectual capital stock in company value creation, compared to the efficiency level of usage.

Even when most efforts and methods developed in order to measure the intellectual capital (e.g. market value/accounting value ratio (M/B), Tobin's *Q* ratio, Real Options, CWP - Citation Weighted Patents, IAM - Intangibles Asset Monitor, KCV - Knowledge Capital Value, etc.), have been concentrated on measuring the stock of intellectual capital of a company, there are also others (e.g. EVA™, IC-Index™, HRCA - Human resource costing and accounting, and Skandia Navigator™, among others) that try to capture the intellectual capital value as a flow (ANDRIENSEN, 2004 and MALHOTRA, 2003).

Studying the effects of a company's intellectual capital in its value creating capacity, using only stock measures, would be like despising the P&L statement and trying to apply the accounting balance as the only financial management instrument (ROSS et Al., 1997 :52-53).

Then, in order to create the broader vision possible, in this study, upon careful and extensive review of alternatives available in the literature, as Kujansivu and Lönnqvist (2005), we have chosen CIV – Calculated Intangible Value and ICE – Intellectual Capital Efficiency, respectively, as metrics for intellectual capital stock and flow of researched companies (Luthy (1998), Chen and Cheng (2005), and Van Der Zahn et al., 2004.).

RESEARCH MODEL

The general purpose of the research was to measure and evaluate the impact of intellectual capital stock of Brazilian companies, as well as the efficiency using it (intellectual capital flow), on the value creating capacity (financial performance).

To address such a theme, due to the investigative nature of this study, we chose to adopt the unilateral cause-effect model represented in Figure 1, where we assume simultaneous influence of tangible and intangible aspects in value creation, without further investigation on possible direct relationships between them.

Insert Figure 1 about here

Then, considering the intellectual capital indicators chosen, the following research hypotheses were built:

Hypothesis $_{0,1}$: *Companies' intellectual capital stock* ***does not*** *affect their value creation capacity.*

Hypothesis $_{0,2}$: There is no *difference in the value creation capacity between companies more or less efficient in the use of intellectual capital.*

METHOD PROCEDURES

Data and sample

This study has considered secondary data about the 1,000 largest Brazilian companies according to criteria adopted by the 33rd edition of the annual book "Maiores and Melhores" published by Exame magazine, prepared by Editora Abril with Fundação Instituto de Pesquisas Contábeis, Atuariais and Financeiras (Fipecafi).

From a universe including 935 companies, summing up a total of 2981 observations, a non-probabilistic sample was selected containing 628 observations related to 237 companies in the period between 2000 and 2005.

Table 1 presents the number of companies, in each sector, for each of the studied years.

Insert

Table 1 about here

Analysis method

Care related to an eventual bias problem arising out of omitted variables determined the application of the combined use of cross section and time series data in order to obtain consistent estimators (WOOLDRIDGE, 2002: 247-251; ARELLANO, 2003: 7-8; STOCK and WATSON, 2004: 188).

Based on the literature, considering that regressors are strictly exogenous, static panel data models were used. Since information for some of the evaluated companies was not available for all periods, three 'unbalanced' panels were built, one for each regression model, defined below.

$$ROE = \beta + \beta_1 CIV_{it} + \beta_2 ICE_{it} + \beta_3 CE_{it} + \beta_4 END\_GERAL_{it} + \beta_5 CRESC\_VENDAS_{it} + \varepsilon_{it} \quad (1)$$

$$ROA = \beta + \beta_1 CIV_{it} + \beta_2 ICE_{it} + \beta_3 CE_{it} + \beta_4 END\_GERAL_{it} + \beta_5 CRESC\_VENDAS_{it} + \varepsilon_{it} \quad (2)$$

$$ROS = \beta + \beta_1 CIV_{it} + \beta_2 ICE_{it} + \beta_3 CE_{it} + \beta_4 END\_GERAL_{it} + \beta_5 CRESC\_VENDAS_{it} + \varepsilon_{it} \quad (3)$$

Research variables

Value creation (Financial performance). The study tried to capture value creation under the perspective of shareholders and owners, however; as the sample considered private open capital companies, private closed capital companies, and public companies, acting in different segments of the economy, we were forced to abandon metrics subject to companies' market value.

We then chose objective measures, non-subject to controversial accounting adjustments, using three main profitability indexes, built through simple accounting measures, with special emphasis to ROE, which is the one that best represents the value perspective of shareholders and owners.

- **ROE (*Return on equity)*** = Net profit in the exercise/ Total net equity
- **ROA (*Return on assets)*** = Net profit in the exercise/ Total assets
- **ROS (*Return on sales)*** = Net profit in the exercise / Total sales

Intellectual capital stock. To measure monetary value of the 'intellectual capital stock' of companies, the CIV (Calculated Intangible Value) method was used. Even though a few number of studies in the literature have adopted this calculation method based on 'Excess Earnings', CIV was developed for purposes of helping obtain bank credit for intensive companies in terms of intellectual capital, being based on a procedure accepted by the North-American revenue service, described in rule IRS 68-609 (STEWART, 1997; ANDRIENSEN, 2004; LUTHY, 1998).

Although laborious, its calculation may be applied to large samples, which makes this method specially desirable in a study as such, since it is grounded on traditional rules and accounting metrics, enabling benchmarking between companies of a different nature (MALHOTRA, 2003: 12).

CIV_e (intellectual capital stock) = REL_e / Average discount rate where:

- Company Net Exceeding Return (REL_e) = REB_e – Income Tax
- Company Gross Exceeding Return[2] (REB_e) = Company average AT $_{(\text{last 3 years})}$ * (company average ROA $_{(\text{last 3 years})}$ – Average ROA of the sector $_{(\text{last 3 years})}$)

Efficiency in the use of intellectual capital. To measure the "Efficiency in the use of intellectual capital", trying to analyze the company's ability to convert its intellectual capital stock employed in business in value, we used the ICE (Intellectual Capital Efficiency).

Derivative of two indexes comprising the VAIC^{TM} – Value Added Intellectual Coefficient, developed by Ante Pulic and other collaborators at the Austrian Research Center of Intellectual Capital, and adopted in recent studies in Europe and Asia.

This method considers that expenditures with employees shall not be treated merely as expenses, but as investments, being, then, a valid proxy of companies' human capital.

It also assumes that it is possible to build an index able to measure the efficiency level in the use of structural capital, by complementing the ratio between the human capital value and the total value created by the company (KUJANSIVU and LÖNNQVIST, 2005; FIRER and WILLIANS, 2003; CHEN et Al., 2005; PULIC, 2000b; PULIC, 2000a).

ICE_e (Efficiency in the use of intellectual capital) = VAHU + STVA where:

- VAHU = VA/HU
- HU = Total expenditure with employees' salaries and benefits
- VA = Sales – Products and services acquired from third parties - Depreciation
  = Salaries + Interest + Taxes + Dividends + Retained Profits
- STVA = ST / VA
- ST = VA – HU

Controlling variables. Considering the non-existence of a broad theoretical reference allowing to ensure the appropriateness of the research model, special care was taken with inserting controlling variables.

[2] In cases when the company's average ROA is lower than the sector's average ROA, CIV may not be calculated. For further detail, see LUTHY (1998 :9-10).

Thus, based on the meta-analysis by Capon et Al. (1990) on the drivers of financial performance in 320 empiric studies, with the work by LEV et Al. (2003 :171), the following controlling variables were defined for purposes of trying to isolate the intellectual capital effect from other factors linked to tangible and financial assets of companies.

- **CE (Physical and financial stock of assets) =** Total assets – current liabilities
- **END_GERAL =** Total liabilities/ Total assets
- **CRESC_VENDAS =** ((Total sales in the current year / Total sales in the previous year) – 1) * 100

RESULTS

Our study followed the investigation sequence proposed by Wooldridge (2003 :426-483), and thus, the Pooled Cross-sections models were evaluated, as well as the models with fixed effect estimators (within) and the random effect estimators (GLS – w/b).

Prior to that, however, as showed in Table 2, an important relation level between variables CE and CIV was found, and therefore the VIF – Variance Inflation Factor study was carried out, to highlight any eventual issue with multicolinearity. The result of this analysis has not showed any sign suggesting the existance of any bias specification in terms of model, or the need to eliminate any variable (GUJARATI, 2000 :317-344).

Insert Table 2 about here

As expected, values obtained in tests F (F(236, 386); ROE= 4.11934; ROA= 6.63419; ROS= 13.9059; p-value < 1%), for the null hypothesis that every sectional unit have the same intercept, and Breush-Pagan (ROE=106.692; ROA= 393.69; ROS= 683.352; p-value < 1%) for the null that the intercept variation is equal to 0, determined the rejection of the Pooled Cross-Sections model (GREENE, 2000 :562 and :567-568; WOOLDRIDGE, 2003 :431-432 and :469).

Then, we proceeded analyzing results obtained through **fixed effects**[3] estimators (considering the non observed heterogeneity α to comprises a specific effect of each sectional unit, which remains fixed throughout time) and **random effects** (that treat intercept as a random variable error term, considering α independent from any explanatory variables, on all the evaluation periods) (STOCK and WATSON, 2004 :190; WOOLDRIDGE, 2003: 466-469; GREENE, 2000 :567-568).

The autoregression correction procedure proposed by Baltagi and Wu (1999 :814-818) was also used, appropriate to 'unbalanced' data panels, to calculate fixed effects estimators (using OLS and transformation by within) and random effects (through GLS) presented in Table 3.

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[3] For fixed effects models we consider the error term to be compound ($\varepsilon_{it} = \alpha_i + \upsilon_{it}$) in order to be able to study their two components: non observed heterogeneity (α_i) and the idiosyncratic error (υ_{it}).

Insert Table 3 about here

As suggested by Wooldridge (2003 :473), we used Hausman test to select the most adjusted models for each of the depending variables. Thus, we considered results of the fixed effect model in equation 1 (ROE) and random effect model in equations 2 (ROA) and 3 (ROS).

In any event, the variables coefficient analysis allowed us to reject null hypotheses, showing the positive influence of intellectual capital in value creation among researched companies.

We also noted, regarding equation 1 (ROE), that variables coefficient of CE and CRESC_VENDAS are not statistically significant. Thus, the variable coefficient of CRESC_VENDAS has not proved to be significant in equation 3 (ROS).

Another fact that caught our attention was the negative and statistically non-significant coefficient of the variable CE on the regression model 2 (ROA).

DISCUSSION

Although previous works have followed towards financial evidence of the intellectual capital relevance in Brazilian companies (KAYO, 2002; KAYO, THE and BASSO, 2006; OMAKI, 2005; PEREZ and FAMÁ, 2006), this study tried to widen up the analysis of this issue while measuring in quantity the impact level.

An initial interesting finding comes from the comparison between the influence of intellectual capital and tangible assets in value creation. Based on results found, there seem to be a negative influence of physical asset and financial stock of companies on their ROA. Also, it is interesting to note the fact that the coefficient of the variable CE, in ROE equation, cannot be deemed statistically different from zero.

Upon confirmation by future studies, these two findings would be signs that, in view of intellectual capital, the level of employed physical and financial capital is not relevant for value creation for shareholders and owners.

In the point of view of capital stock, results found for ROA and ROS equations in the studied sample, show that not only the impact of variable CIV is more relevant than the one from variable CE, but also that the increase of physical and financial assets level *ceteris paribus* seem to reduce companies' performance, contrary to the business logic in force in most organizations.

These findings seem to confirm the appropriateness of the increasing importance that literature has been giving to companies' intangible aspects and intellectual capital.

We came to the same conclusion when we concentrated our focus on the efficient use of intellectual capital, since, again, we found positive and statistically significant coefficients, proving their relevance related to the three value creation measures used.

In general, as the result of the regressions, we concluded that intellectual capital stock and flow are equally relevant while determining companies' value creation capacity.

Regarding the effects of efficient use of intellectual capital, considering premises used while calculating variable ICE, we noted the importance of the relationship between company's added value and its total of expenses and salaries.

While rewriting the equation to calculate ICE in terms of salaries and added value (VAHU)[4], we find a new analysis perspective focused on the efficiency of human capital, which, when considered with coefficients found, seems to confirm the importance attributed by some authors (STEWART, 1998 :97-114; LEV, 2001 :35; EDVINSON and MALONE, 1997 :35) for companies continuously looking for converting human capital into structural capital to increase productivity (VAHU) and reduce dependence of this important component of intellectual capital.

Also considering that another way to increase VA is through innovation, we found support to a second approach (complementary to the initial approach) to increase ICE.

While focusing the development and application of human capital on activities that provide "over regular" profits, as proposed by Teece (2000 :12-13), we also increase the VAHU ratio, and, consequently, ICE.

We may check systematically this influence of the efficiency of human capital in companies' value creation in Figure 2.

Insert Figure 2 about here

Finally, it is also curious to note that the independent variable CRESC_VENDAS, an index highly valued by managers and market analysts, seemed to be non-significant regarding variables ROE and ROS; and, in case of variable ROA, despite of being significant, its influence is much smaller than from other evaluated variables.

[4] ICE = 1 + (VAHU – 1/VAHU)

FINAL CONSIDERATIONS

It is important to note that this study bears some limitations, starting with the size and nature of the sample, resulted from the lack of financial and broad information on companies in Brazil. While considering only the largest companies, the evaluated sample represents a reality that does not allow extrapooling with reality of the majority of companies in Brazil

We also should point out the fact that, although every care and attention have been applied in the search for instruments most appropriate to the reality and need of the study, there are no evaluation methods of intellectual capital extensively tested and able to be applied onto large samples

Although after a laborious reviewing process we have considered that CIV and ICE are indicators able to capture and measure intellectual capital stock and flow of each company, neither one is exempted from criticism, especially being aware that both of them use only basic financial information in their composition.

Lastly, although in the last ten years many things have been written and researched about intellectual capital and its impact on the organizations' performance, researches aiming to quantify, broadly, this impact, are not significant.

Thus, results obtained hereunder should be considered within a context of an exploratory work, which aimed to build upon results of the main available studies on this issue, but simultaneously, take a risky option embracing an innovative methodological approach. Then, we suggest this study to be continued using a more representative base and a longer horizon, including detail analysis of intellectual capital effects on several sectors, upon using a controlling group with intellectual capital intensive companies (and sectors), and analyzing "lags" of the two independent variables associated with intellectual capital.

In spite of these limitations, the study has given evidence on how much the intellectual capital stock and the efficiency companies demonstrates on using it, influence the companies' capacity to create value.

In general, results found contribute to clarify the proposed research question. They also offer additional empiric evidences on how much intellectual capital (stock and flows), influence the value creation of Brazilian's companies.

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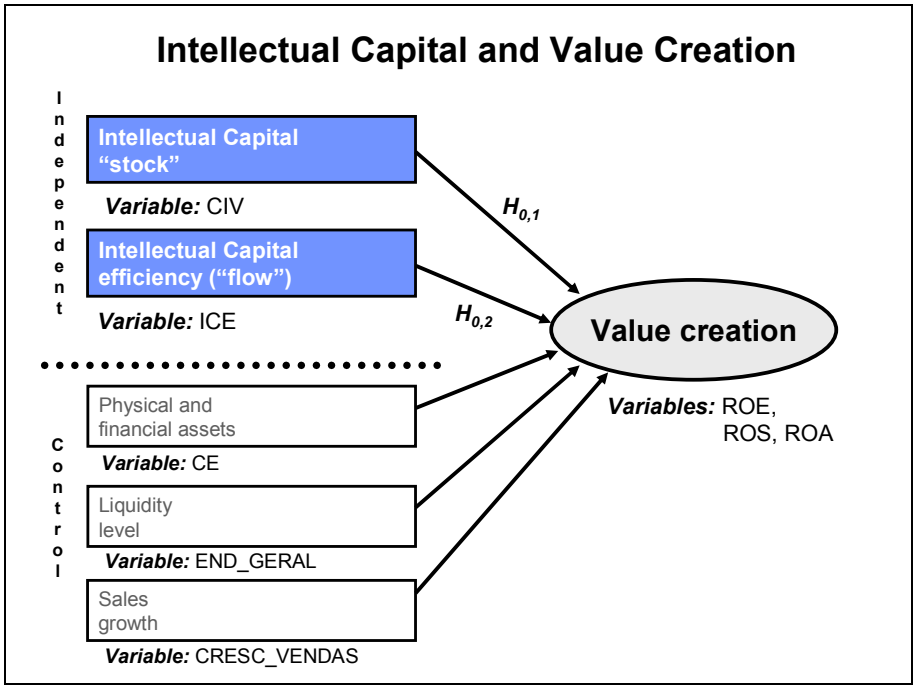

Figure 1 – Intellectual Capital and Value Creation – Conceptual Model

Source: prepared by the authors.

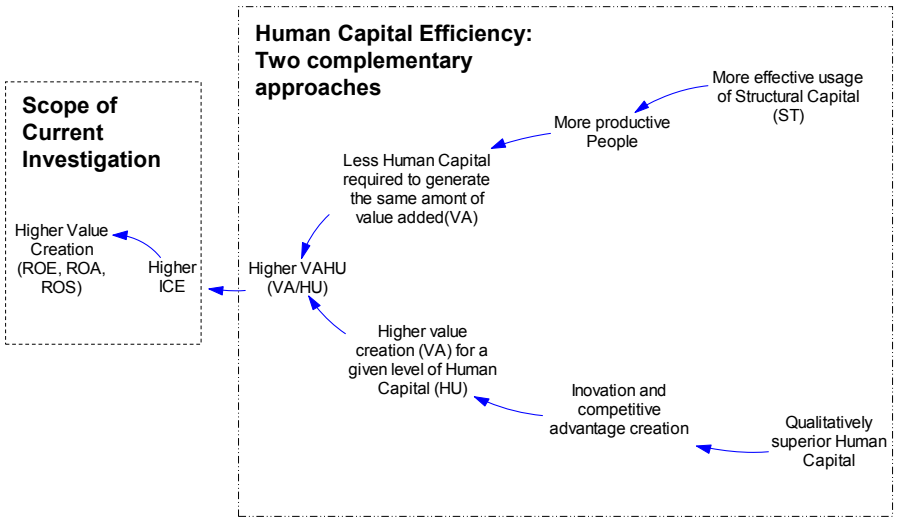

Figure 2 – Relationships and Impacts of Human Capital on Companies' Value Creation

Source: prepared by the authors.

Table 1 - Sample : Number of observations per year and per sector

Industry	2000	2001	2002	2003	2004	2005	Total
Food, Beverages and Tobacco	8	7	6	8	6	4	39
Wholesale	9	11	13	11	10	8	62
Automotive	5	4	4	2	3	3	21
Retail	10	7	9	10	13	12	61
Communications	1	2	1	1	1	1	7
Textile and Apparel	3	1	1			1	6
Construction	3	2	3	1	2	2	13
Electronic	9	9	7	6	8	3	42
Consumer Products, Pharmaceutical and Cosmetics	1	1	1	1	1	1	6
Building Materials	3	3	2	3	1	1	13
General Mechanics	1	2	2	1	1	1	8
Mining	2	1	2	4	5	6	20
Pulp and Paper	5	2	3	4	5	3	22
Plastics and Rubber	1	1	1	1	2	2	8
Chemical and Petrochemical	12	12	8	7	9	4	52
Transportation Services	4	4	1	2	3	5	19
General Services		2	2		2	3	9
Public Services	14	18	14	22	28	27	123
Steel	6	9	10	13	11	7	56
Computres and Information Technology	3	1	1	1	2	2	10
Telecommunications	2	4	5	7	7	6	31
Total number of companies in the sample	102	103	96	105	120	102	628

Source: prepared by the authors.

Table 2: Descriptive Statistics and Correlation Analysis

				Correlations							
Variable	*N*	*Mean*	*σ*	ROE	ROA	ROS	CIV	ICE	CE	END_ GERAL	CRESC_ VENDAS
ROE	628	0.2014351	0.190335	**1.000**							
ROA	628	0.0891115	0.070654	0.762	**1.000**						
ROS	628	0.0922929	0.095839	0.359	0.543	**1.000**					
CIV	628	1.314858	4.373081	0.089	0.127	0.238	**1.000**				
ICE	628	10.48996	22.69514	0.237	0.187	0.131	0.060	**1.000**			
CE	628	1.346371	3.946137	(0.033)	(0.004)	0.256	0.813	0.056	**1.000**		
END_GERAL	628	0.5144989	0.185165	0.247	(0.193)	(0.263)	(0.024)	0.010	(0.067)	**1.000**	
CRESC_VENDAS	628	6.436502	16.86214	0.149	0.152	0.049	0.054	0.138	0.011	0.047	**1.000**

Source: prepared by the authors.

Table 3: Results and Fixed Effects / Random Effects Estimators

	Fixed Effects			*Random Effects*		
	ROE	ROA	ROS	ROE	ROA	ROS
CIV	0.0058599 *	0.0026993 *	0.0035167 *	0.0084889 *	0.0034491 *	0.0041653 *
ICE	0.0044583 *	0.0010188 **	0.0008757 ***	0.0013067 *	0.0003346 *	0.0002572 **
CE	-0.0040687	-0.0015919	0.0049732 **	-0.0089737	-0.0032958 *	0.004209 *
END_GERAL	0.3283249 *	-0.0780824 **	-0.0848954 **	0.2805713 *	-0.0643359 *	-0.0858131 *
CRESC_VENDAS	0.000434	0.0002915 **	-0.0001256	0.000895	0.000422 *	0.0000416
Constant	-0.0107349	0.1222539 *	0.119421 *	0.042255	0.1159608 *	0.1218816 *
R2	0.1235	0.1177	0.1095	0.1492	0.1376	0.1258
W(j)	*	*	*	*	*	*
F(158, 227)	4.19 *	4.61 *	7.92 *			
Hausman test	H = 13.78 **	H = 7.21	H = 3.85			

** p-value < 1%, ** p-value < 5%, *** p-value < 10%*

Source: prepared by the authors.