



The Relationship between Profitability and Intellectual Capital by Using Public and Huang & Wang for Companies Listed in "Tehran Stock Exchange"

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ABSTRACT: The aim of this study was to examine the relationship between intellectual capital and profitability models of Huang and Wang and Paulic in listed companies in Tehran Stock Exchange for the period 2007 to 2011. So, after reviewing literature review of this field of study, needed data from financial statements of 82 companies are extracted. Then by obtained data, we evaluate the regression model to explain the variable effects of intellectual capital. The results show that both interfaces of intellectual capital are a significant positive relationship with corporate profitability.

Keyword: Intellectual Capital, Profitability, Huang and Wang Model, Paulic Model

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INTRODUCTION

Capital, in the business context, refers to any asset that will produce future cash flows. The most well-known asset types are tangible in nature. Tangible capital therefore refers to the physical and financial assets of the organization. The value of such assets is disclosed periodically (by publicly listed companies) and can be found easily on the balance sheet of the Company's financial records. Physical assets can mean land, machinery, inventory, plants, trucks, etc. whereas financial assets refer to the shareowners equity, retained earnings, working capital, prepaid expenses, accounts receivables, etc. Intangible assets on the other hand, such as the skills of the workforce and its organization, are increasingly becoming important towards determining future profits. However, they are much harder to determine, harder still to quantify into a value and therefore are never reported. Hence these types of assets remain largely invisible to the external world – and more often than not to insiders as well.

Although Intellectual Capital is similar to tangible assets in its potential for generating future cash flows, it is radically different from tangible capital in the following respects:

- Intellectual assets are non-rival assets. Unlike physical assets which can only be used for doing one thing at a time, intellectual assets can be multiplexed. For example, a customer support system can provide support to thousands of customers at the same time. It is this ability to scale with need that makes intellectual assets far more superior to physical assets.

- Human Capital and Relational Capital cannot be owned, but have to be shared with employees and

suppliers and customers. Growing this kind of capital therefore requires careful nurturing.

- Structural capital is an intangible asset that can be owned and controlled by managers.

However, it cannot be traded easily since no markets exist for this purpose. Moreover,

Customers do not care about the Structural capital of their Suppliers since everyone likes dealing directly with real human beings rather than with systems.

- Structural capital, in the form of just-in-time procurement processes and real time inventory control systems can be substituted for expensive capital expenditure such as storage warehouses. Hence the knowledge economy has opened up opportunities for every firm to explore whether inexpensive intangible assets can do the work of costly physical assets.

- Firms that leverage their intellectual capital to do knowledge work are able to generate higher margin of profits than those who provide mass-produced solutions.

- Human, Structural and Relational Capital often work together in judicious combinations to give rise to core competencies that assume strategic significance. Hence it is not enough to invest in people, systems and customers separately, but in combinations that produce end value.

Intellectual Capital should be measured to:

A review of over 700 papers that studied Intellectual Capital measurement related issues found five generic reasons as the purpose of measuring Intellectual Capital:

- To help organizations formulate their strategy
- To evaluate strategy execution
- To assist in the firm's diversification and expansion decisions
- For use as a basis for management compensation
- To communicate with external shareholders

The first three of these purposes relate to internal decision making - the purpose is maximizing operating performance for generating revenues at the lowest cost and the sustainability of supplier and customer relations and market share. The fourth point relates to the executive incentive scheme and the fifth relates to signaling motivations to external stakeholders. There are various other studies that have concluded likewise that Intellectual Capital measurement is necessary and beneficial for both efficient internal governance and succinct external communications. If the primary objective of all for-profit companies is to effectively manage their future cash flows, then they need to manage the ultimate drivers of these cash flows - the intangible assets. Since you cannot manage what you cannot measure, their measurement becomes quite important, if not absolutely necessary.

Literature review

As identified by Petty et al. (2000), the literature offers several definitions of intellectual capital. Some of them consider intellectual assets as synonymous to intellectual capital and most of them take a strategic view (Edvinsson et.al 1996; Brooking 1997; Edvinsson 1997; Edvinsson et al. 1998; Stewart 1997; Nasseri 1998; Ulrich 1998; CMA 1998; ASCPA and CMA 1999; Knight 1999).

In the previous intellectual capital literature the level of firm has been the focus, rather than at individual or stakeholder level (Quintas, et.al 1997). In the wider literature there has been considerable debate about the interaction between individuals and the organization. Hollis (1994) takes the view that the firm is more than a mere sum of individuals whose behavior can only be explained by their function in the whole. However, according to new intellectual capital (such as knowledge) always begins with the individual. In Japan, where individualism is viewed strongly, the mechanisms to promote workers' intellectual skills are evaluated individually for their compensation

Also, research indicates that personal qualities such as persistence are positively related to the learning of the firm (Argote et.al 1998). This notion is further supported by other research that demonstrates that individuals who engage in their activities and situations for its own sake, can be intrinsically rewarded by them (Csikszentmihalyi, 1975) and achieve extraordinary results by entering into the neurobiology of excellence (Goleman, 1995).

Abeysekera (2001) suggests that if knowledge is well managed, then value is added via intellectual assets and if it is badly managed, this may lead to intellectual liabilities. Unlike the previous review by Petty et.al (2000) we recognize the existence of intellectual liabilities in the constitution of intellectual capital and therefore in ICR.

Therefore, in summary, Petty et.al (2000) does not define Intellectual capital (IC) and there appears to be a silence in the literature on its meaning. However, CPA accounting handbook defines general purpose financial reporting (GPFR) as a financial report intended to meet the information needs common to users who are unable to command the preparation of reports tailored so as to satisfy, specifically, all of their information needs (ASCPA, 1999).

Using the definition of GPFR as a basis, IC can be defined as a report intended to meet the information needs common to users who are unable to command the preparation of reports about intellectual capital tailored so as to satisfy, specifically, all of their information needs.

Hypothesis:

1) There is a significant relationship between Hwang and Wang model of intellectual capital and performance.

2) There is a significant relationship between Paulic model of intellectual capital and performance.

MATERIALS AND METHODS

The purpose of this research is applied research, and its nature is experimental. Which seeks to explain the relationship between intellectual capital and corporate profitability indicator variables using a multivariate regression model? In this study to test the hypothesis of A Pooled Cross - sectional Ordinary Least Squares (OLS) Regression is used.

Population and sample

Interval of time of this study is 2007 to 2011. And the statistical society of this study is companies listed in Tehran Stock Exchange. Companies in terms of increase compared to the end of the financial period to March due to the specific nature of the activity, financial institutions are not part of the banking industry. According to the above criteria, 82 companies were selected for this stud as sample of this study.

Variables

Profitability: Net operating income is the dependent variable, which is calculated by adding depreciation to operating profit.

Intellectual Capital: To define intellectual capital as an independent variable in the model is used.

- According to the model, the intellectual capital, human capital, communication, innovation and practices is as follows):

$$IC_t = F(RPE_t, RG_t, OS_t)$$

In this equation we have:

$$RPE_t = \frac{NOR_t}{QAS_t}$$

$$RG_t = \frac{NOR_t - NOR_{t-1}}{NOR_{t-1}}$$

IC =Amount of intellectual capital at the end of year t

RPE =Net operating income (operating profit) of each employee's contribution as an indicator of human capital at the end of year t

NOR_t =Net operating income at the end of year t

QAS =Average number of employees at year-end t

RG =Net operating income growth at the end of year t as measured by customer capital (communicated)

NOR_{t-1} =Net operating income at the end of year t-1

OS = Number of years of accepted companies in Tehran Stock Exchange at the end of the year as a flagship investment scheme (organization)

- The Paulic model, the efficiency of intellectual capital, human capital, structural capital efficiency and performance of physical capital is as follows :

$$VAIC_t = F(VAHU_t, STVA_t, VACA_t) = VAHU_t + STVA_t + VACA_t$$

$$VAIC_t = F(VAHU_t, STVA_t, VACA_t) = VAHU_t + STVA_t + VACA_t$$

VAHU_t = The value added (efficiency) of intellectual capital in the end of the year t

$$VAHU_t = VA_t / EC_t$$

$$VA_t = OP_t + EC_t + D_t$$

OP = operating profit at end of year T

EC = Payroll costs of employees at end of year t

D = Depreciation expense at the end of year t

CA = Amount of tangible assets (physical) at the end of year t

$$CA_t = TA_t - IA_t$$

STVA = Coefficient value (efficiency), capital structure at the end of year t

$$STVA_t = (VA_t - EC_t) / VA_t$$

STVA = Coefficient value (efficiency) of physical capital at the end of year t

VACA_t = The value added (efficiency) of capital assets in the end of the year t

$$VACA_t = VA_t / CA_t$$

Control variables:

Based on theoretical background and proportional literature review below 3 independent variables control have been used that are:

Ratio of net income to book value of assets (ROA)

Ratio of total debt to book value of assets (financial leverage)

Firm size (log of assets)

RESULTS

Summary of descriptive statistics of the variables used in this study (Table 1) are summarized.

Table 1. Results of descriptive statistics used in this study

Variables	Variable	Standard Deviation	MID	Mean
dependence	Profitability	0.512	4.935	5.064
independence	Huang and Wang intellectual capital	6887.04	12.945	29.794
	Paulic Intellectual capital	853.50	4.761	9.872
controlling	Firm size	0.521	5.679	5.859
	Financial leverage	0.044	0.682	0.676
	Return on assets	0.013	0.140	0.165

Testing hypotheses

All statistics show that scale variables in the model are ordinal. Distribution of the dependent variable as normal and a linear relationship between variables using analysis of variance and calculated F statistic has been confirmed. These results in Tables 2 and 3 are

provided. Well as the results of the test, Durbin - Watson show that the observations are independent of each other. Finally, it is concluded that linear regression is appropriate. Correlation coefficient (R) and coefficient of determination also confirmed the existence of relationships is extracted.

Table 2. Results for the first model

$NOP = \beta_0 + \beta_1 IC + \beta_2 ROA + \beta_3 Lev + \beta_4 Size + \epsilon$			
Variables	Panel analysis		
	P - value		Coefficient
C	0.0000	C	-0.822153
IC	0.0000	IC	0.001250
ROA	0.0000	ROA	1.687863
LEV	0.0000	LEV	-0.090615
SIZE	0.0000	SIZE	0.961395
Statistic F	2.032	Durbin	64.67
		Watson	
P-value	0.787	Statistic	000.0
		R2 Adjusted	
Panel analysis			
	Results	Test significant	Test stat
Test F	Proof VS. POOL OLS FE	0000.0	74.13
Hasman test	Proof VS. RE FE	0000.0	99.167

Table 3. Results for the second model

$NOP = \beta_0 + \beta_1 VAIC + \beta_2 ROA + \beta_3 Lev + \beta_4 Size + \epsilon$			
variables	Panel analysis		
	P - value		v
C	0.0000	C	-0.912225
VAIC	0.0208	VAIC	0.000947
ROA	0.0000	ROA	1.765028
LEV	0.0000	LEV	-0.094841
SIZE	0.0000	SIZE	0.983043
Statistic F	2.06	Statistic F	50.16
		P-value	
0.778		Panel analysis	0.000
		results	
	results	Test significant	Test stat
Test F	Proof VS. POOL OLS FE	0000.0	12.00
Hasman test	Proof VS. RE FE	0000.0	15.51

The first hypothesis test

In this hypothesis, we test Huang and Wang model of intellectual capital and based on results the whole regression model significance is proven by the significant level of 0.000 and 99% confidence level indicates that the model is significant. Adjusted coefficient of R is 0.787, indicating that approximately 79% of the variability of dependent variable could be explained by model variables. Well as statistics Durbin - Watson value is 1.671, indicating the absence of autocorrelation.

As seen in Table 3 t-statistics and significance levels (Prob) is to represent the intellectual capital of the independent variables of intellectual capital (IC) is statistically valid. The value obtained is smaller than the 0.05 level. So there is a significant positive relationship between intellectual capital calculated

according to Huang and Wang model and profitability of listed companies in Tehran Stock Exchange.

Test the second hypothesis

In this hypothesis, we test Paulic model of intellectual capital and based on results the whole regression model significance is proven by the significant level of 0.0001 and 99% confidence level indicates that the model is significant. Adjusted coefficient of R is 0.778, indicating that approximately 78% of the variability of dependent variable could be explained by model variables. Well as statistics Durbin - Watson value is 1.693, indicating the absence of autocorrelation.

As can be seen in the significant coefficients and t (Prob) implies the validity of the statistical model. Because the significance of this observation is smaller than the 0.05 level. So there is a significant positive relationship between intellectual capital calculated in

accordance with the model of Paulic and profitability of the listed companies in Tehran Stock Exchange.

DISCUSSION

In this study, we examine the relationship between intellectual capital and profitability for the companies listed in Tehran Stock Exchange for the period of 2007 to 2011. The results show that there are significant positive relationship between corporate profitability and intellectual capital of models Huang and Wang Paulic intellectual capital.

It can be generally stated that independent variable has the total effect on the dependent variable has significant explanatory acceptable and therefore, the results of this study are consistent with results described in the literature thoroughly. Most researchers focus on these results that intellectual capital has a significant relationship by corporate profitability.

It can be stated that for the calculation of the company's intellectual capital, each of the two models Paulic and Huang & Wang can be used.

Recommendations based on research results

Based on study and its' results the following recommendations can be provided.

1 - Create a separate business units for the measurement and management of intellectual capital for the benefit of the company's intangible assets, to earn higher financial performance.

2 - Requirements of the Stock Exchange member firms, to prepare an annual report on intellectual capital, transparent decision-making information for shareholders and investors.

Suggestions for Future Research

Based on the results of this study, the following issues are suggested for future research is:

- Use of any other models of intellectual capital measurement and test their empirical performance.
- Review the Company separately in different industries.
- A comparative study of the proposed models to separate the components of intellectual capital for companies in various industries.

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