

Studying Effect of Intellectual Capital Components on Financial Performance of Iranian Family Firms

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ABSTRACT

The goal of this research was to study effect of intellectual capital components on financial performance of Iranian family firms. Statistical population included the family firms available in Tehran Stock Exchange between 2006 and 2010, from which the statistical sample was selected. The research hypotheses were tested using Panel Data Model and Spearman Correlation Coefficient. The research results indicated the presence of a significant effect of intellectual capital components on the operating cash flow and average return on assets in Iranian family firms.

KEY WORDS: Family firms, Intellectual capital, Financial performance, Tehran Stock Exchange.

1. INTRODUCTION

In today's economic world, intellectual capital has turned into one of the main sources of competitive preference in firms.

Also, intellectual capital plays an extraordinary role in infrastructural factors of production and commerce, according to new economic knowledge. As a result, it is important to recognise intellectual capital components as the source which leads to the creation of value for firms.

Firms should consider competitive advantage for strategic survival and, since markets, products, competitors and regulations are rapidly changing in the society, continual improvement of knowledge and innovation will enable them to maintain sustainable competitive advantage. For this reason, managers regard knowledge and ability of creating and applying knowledge as the most important source of sustainable competitive advantage because knowledge is considered an asset and efforts for managing knowledge and applying intellectual assets have been considerably successful in terms of directing the organizations. In the present era with the growth of knowledge-based or knowledge-centered economy, intangible assets of the firms and their intellectual capital are a key for achieving sustainable competitive advantage. Thus, attention to intangible items has been widely grown in different fields such as accounting and strategic management.

The present research studied the relationship between components of intellectual asset and some financial performance assessment indices of the firms while considering the importance of intellectual capital in today's business world. The aim was to clarify the importance of intellectual capital and effect share of each and every intellectual capital component as human and structural capital on financial performance of the firms. Because no research has been conducted on family firms in Iran, attempts were made to study this issue in this kind of firms.

2. REVIEW OF LITERATURE

2.1. Definition of Intellectual Capital

The literature on intellectual capital indicates value and nature of intangible of these resources. It is almost difficult to present a comprehensive and accurate definition for the term "intellectual capital" and, sometimes, some other terms such as "knowledge assets" or "intangible assets" are used instead.

To evolve the concept of intellectual capital, theorists have given different definitions for intellectual capital considering different points of view, some of which are shown in the following table.

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Table 1- Definitions of intellectual capital

Writer	Defintion
Edvinson & Sullivan (1996)	Intellectual capital is the knowledge which can turn into value.
Brooking (1996)	Intellectual capital is a combination of four major parts: market assets, human-centered assets, intellectual assets and infrastructural assets.
Sveiby (1985)	Intellectual capital has three classes of intangible assets: internal structure, external structure and personnel competence
Roose et al. (1997)	Intellectual capital has an intellectual part (e.g. human capital) and a non-intellectual part (e.g. structural capital).
Stewart (1997)	Intellectual capital is the obtained and formalized intellectual items, which has been applied to produce an asset with more value added.
Bontis et al. (1999)	Intellectual capital is the concept which classifies all intangible resources and their internal communications.

A brief look at the definitions indicates that writers have not agreed on a single definition but there are some similarities among these different definitions. All the definitions are based on the principle that intellectual capital is the sum of intangible assets of an organization including human capital, structural capital and communicational capital (customer).

2.2. Components of Intellectual Capital

A- Human Capital:

Human capital indicates knowledge existence of the people in an organization. Bontis (2002) and Roose et al. (1997) also argued that personnel create intellectual capital through their competence, attitude and intellectual agility. Brooking (1996) also believes that human asset of an organization could include skills, specialty, problem solving ability and leadership styles. Stewart (1997) declared that, although the personnel are regarded as the most important asset in a learning organization, they do not belong to the organization because there is still hot argument on whether the new knowledge created by the personnel belongs to the organization or not.

Human capital is the force which is activated in person and increases his/her ability and possibility to produce goods and services which cause his/her welfare in personal and social life. Broad differences between capacity levels are due to the difference in the acquisition of abilities, which is known as human capital (Sanobari, 2009).

Human capital of an organization includes skills, specialties, problem solving ability, experience and leadership styles (Brooking, 1996). Human capital as fundamentals intellectual capital results in improvement of performance and creation of profit for the firm (Chen, Zhu and Xie, 2004).

B- Structural Capital

Structural capital includes all non-human reservoirs of knowledge in an organization which encompasses databases, organizational diagrams, executive instructions of processes, strategies, executive plans and generally all the things with the value higher than material value for the organization (Roose, 1997). In other words, Roose et al. believed that structural capital refers to "what is remained in the firm after the personnel return to home at night." Brooking (1996) declared that structural capital includes intellectual assets such as technical knowledge, trademarks, patents and utilization rights. In addition, according to Stewart (1997), structural capital means the knowledge available in information technology, patents and utilization right, projects and trademarks. Bontis, et al. (1999) believed that, if an organization has weak systems and procedures, total intellectual capital will not reach its maximum potential while the organizations with strong structural capital will have protective culture, which allows people to do new work, fail and learn. Chen et al. (2004) believed that structural capital can help support staff fulfill optimal intellectual performance and business performance of the organization. Structural capital is also a function of human capital. Thus, the interaction of structural capital and human capital helps organizations consistently form, develop and apply customer capital.

C- Customer Capital (Communications)

Stewart (1997) declared that the main issue in customer capital is knowledge of marketing channels and relations with customers. Customer capital indicates the potential capability of an organization due to its intangible external factors. Chen et al. (2004) classified customer capital into marketing capability, market intensity and customer loyalty. In other studies, it was specified that customer satisfaction can maintain business relations, reduce price flexibility of products and increase firm credits. These studies have presented more pieces of evidence for the importance of customer capital as a key component of overall intellectual capital of an organization. Growth of customer capital depends on the support from

human capital and structural capital. In general, customer capital which acts as a bridge and interface in intellectual capital process is the main determinant in the conversion of intellectual capital to market value and, as a result, business performance of the organization. New definitions have extended concept of customer capital to relational capital, which includes the knowledge available in all the established relations of the organization with customers, competitors, suppliers, trade associations or the government (Bontis, 1999).

2.3. Family firms

In order to conduct this research, it was obligatory to select family firms and collect their data. First, definitions of family firms are given and then family firms are defined in Iran:

Family firms can be defined from different viewpoints. Membership of family members in board of directors, percentage of stock ownership of family members and significant influence or control in the firm are among the factors through which family firms are defined. Membership in board of directors and percentage of stock ownership have been mentioned in most definitions for the family firms. Also, different views have been presented on the percentage of stock ownership.

Anderson and Reeb (2003) considered 18% as the condition of family firms. They also believed that "one of the criteria of family firms is the presence of family members in the management rank of the firm."

Villalonga and Amit (2006) defined family firms as follows: "a firm in which the founder or a member of his/her family by either blood or marriage is a member of the board, chief executive manager or owner of at least 5% of the firm's stock, either individually or collectively."

Yang and Tsai (2008) mentioned the family members' ownership of at least 10% of the stock as one of the conditions for family firms. According to them, the following firms are considered family firms: the firms in which the family controlling owners commonly own at least 10% of the equity of shareholders or family members or legal representatives of other family firms commonly own more than 50% of the board of directors.

Chakraborty (2009) defined family ownership title as a firm in which a real person controls the firm as a shareholder. In other words, a person collects so much stock in order to have at least 20% of the firm stock.

Namazi and Mohammadi (2010) in a paper defined family firms as the firms in which at least 20% of the stock is held by family members, individually or collectively, or at least one of family members (either by marriage or blood) is member of board of directors or chief executive manager and actively participates in the firm's board of directors and at least two generations of the family play a role in the firm control.

Considering the presented definitions, here, a definition was given for family firms considering Iranian rules and regulations and conditions. In the above definitions, different percents were mentioned for ownership in family firms. In order to mention a definite percentage for Iran, first, it should be considered that when shareholders in Iran significantly influence firms. Then, family firms can be defined considering this significant influence:

Iran Accounting Standards Board stated in Article 8 of Standards no. 20:

"Significant influence is unlikely without having enough votes; thus, having a special rate of voting right in the investee unit is regarded as the assumption of the existence of significant influence. To achieve a reasonable amount of action homogeneity, it is assumed that, in the absence of violating evidence, in cases where the investor (directly or indirectly through subsidiary commercial unit) holds at least 20% of voting power in the investee unit, it will have significant influence in investee unit. In contrast, when the investor unit (directly or indirectly through subsidiary commercial unit) holds less than 20% of voting power in investee unit, it is assumed that the investor has no significant influence unless such influence can be clearly proved" (Iran Accounting Standards Committee, 2007).

Considering the above facts, having 20% of the firm's stock by family members is mentioned as one of the conditions for family firms. In addition, membership of family members in board of directors of the firm is also another criterion which is considered for family firms.

3. Research History

Ghorbani et al. (2010) studied effect of intellectual capital on financial performance in Iranian pharmaceutical industry between 2004 and 2008. The results showed no reason for the attribution of changes in market values of firms to performance of intellectual capital and it seemed that pharmaceutical market of Iran still showed more sensitivity to material capitals than intellectual capitals.

Abbasi and Sedghi (2010) studied effect of intellectual capital efficiency on financial performance of the firms in Tehran Stock Exchange between 2000 and 2003. The results indicated that structural and human capital efficiency coefficient on dividend per share was positive but effect of structural capital

efficiency coefficient was significantly negative. Effect of structural and human capital efficiency coefficient and on annual return rate was positive but effect of human capital efficiency coefficient was significantly negative. The results also showed that the firms with higher intellectual capital had better financial performance. In addition, mean of intellectual capital efficiency coefficient was significantly different between 7 industries.

Tan et al. (2007) focused on Asia and acquired information of 150 general firms in Singapore Stock Exchange between 2000 and 2002 and studied the relationship between three sections (human capital, structural capital and communicational capital) and financial return (performance) of the firms. Their results indicated that first, there was a significantly positive relationship between intellectual capital of the firms and their current and future financial return; second, effect of intellectual capital of the firms was different in different industries.

4. Expressing the Model and Research Variables

independent variables:

Palic mentioned the Value Added Intellectual Coefficient (VAIC) in 1997, expanded it in 1998 and completed it in 2000. Palic used VAIC for measuring intellectual capital of Australian stock exchange companies. In his model, value added was obtained by subtracting outputs from inputs:

$$\text{Value added (VA)} = \text{Outputs} - \text{inputs}$$

Inputs refers to the income obtained from the selling goods and services and outputs means all costs applied for the production of goods and services, except personnel salary and wage expenses and depreciation costs because cost payment is a kind of investment in manpower and, as a result, helps to create intellectual and structural value added due to correction of processes and regulations. Depreciation cost is a part of non-cash costs of the companies:

$$\text{Depreciation costs} + \text{personnel salary and wage expenses} + \text{operating profit} = \text{value added}$$

Value Added Intellectual Coefficient has the following components:

- A) Value Added Capital Coefficient (VACA): this coefficient shows the generated value added as a result of applying tangible physical assets; i.e., for 1 Rial tangible physical asset, several Rial value added Rials will be obtained. This coefficient is obtained by the following relation:

Intangible assets – total assets = CA – tangible assets

$$\text{VACA} = \text{VA} / \text{CA} = \text{value added} / \text{physical tangible asset}$$

- B) Value Added Human Capital Coefficient (VAHU): this coefficient indicates value added caused by the personnel which is obtained by dividing value added by the personnel salary and wage expenses and means that several Rial value added is obtained for one Rial of the personnel salary and wage expenses. This is obtained from the following relation:

$$\text{VAHU} = \text{VA} / \text{HU} = \text{value added} / \text{personnel salary and wage expenses}$$

- C) Structural Capital Value Added Coefficient (STVA): This coefficient indicates value added caused by the processes and structures in the company. It means that some percentage of the company's value added result from structural capital. Structural capital and Value Added Structural Capital Coefficient are calculated by the following relations:

(SC) structural capital = value added – personnel salary and wage expenses

$$\text{STVA} = \text{SC} / \text{VA} = \text{structural capital} / \text{value added}$$

Therefore, the Value Added Intellectual Coefficient is obtained by summing the above coefficients:

Intellectual capital = structural capital efficiency + human capital efficiency + physical capital efficiency

$$\text{VAIC} = \text{VACA} + \text{VAHU} + \text{STVA}$$

Dependent Variables:

Financial performance was dependent variable of this study. It was measured with the use of two indicators:

- (1) Average return on assets (ROA):

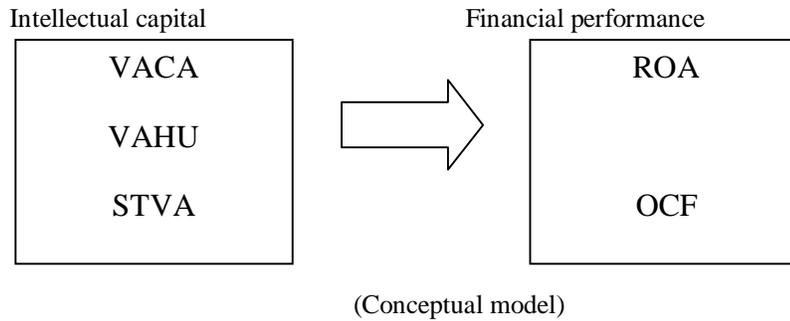
$$\frac{\text{Profit before tax deduction}}{\text{Total assets}}$$

Total assets

- (2) OCF: Operating cash flow (operating profit + depreciation):

Net sales - cost of the sold goods – operating costs + Depreciation cost

Conceptual model can be seen as follows:



5. Research Hypotheses

Hypotheses of this research can be expressed as follows:

Main hypothesis: There is a significant relationship between intellectual capital components and financial performance of family firms.

H1: There is a significant relationship between intellectual capital components and financial performance of family firms.

H0: There is no significant relationship between intellectual capital components and financial performance of family firms.

Secondary hypotheses include:

Hypothesis 1: There is a significant relationship between intellectual capital components and return on assets of family firms.

Hypothesis 2: There is a significant relationship between intellectual capital components and operating cash flow of family firms.

Hypothesis 3: There is a significant relationship between intellectual capital and financial performance of family firms.

6. RESEARCH METHOD, POPULATION AND STATISTICAL SAMPLE

Because the goal of this research was to study the relationship between intellectual capital and financial performance of family firms, the data were studied and extracted from financial statements of the sample companies considering the necessary conditions. Statistical population was the family firms accepted in Tehran Stock Exchange and 43 firms were selected as the statistical population. Among them, 32 firms were considered the statistical sample which had the following conditions:

- Financial statements of the firms were available from 2006 to 2010.
- Their financial year ended to March 20.
- There was no financial change in time domain of the research.

7. DATA ANALYSIS

7.1. Descriptive Statistics

First, characteristics of each one of the variables were investigated using Table 2.

Table 2. Descriptive statistics for all study variables

	VACA	VAHU	STVA	VAIC	ROA	OCF
Mean	0.426188	2.292459	0.692721	3.411368	0.096628	37142.02
Median	0.258209	2.068704	0.523085	2.915003	0.093639	18012.50
Maximum	9.199732	7.431760	51.98795	51.96560	1.322639	254346.0
Minimum	-0.178668	-1.721393	-8.222621	-8.100142	-0.442024	-335711.0
Std. Dev.	1.089170	1.430500	4.174675	4.425559	0.195325	58860.96
Observations	160	160	160	160	160	160

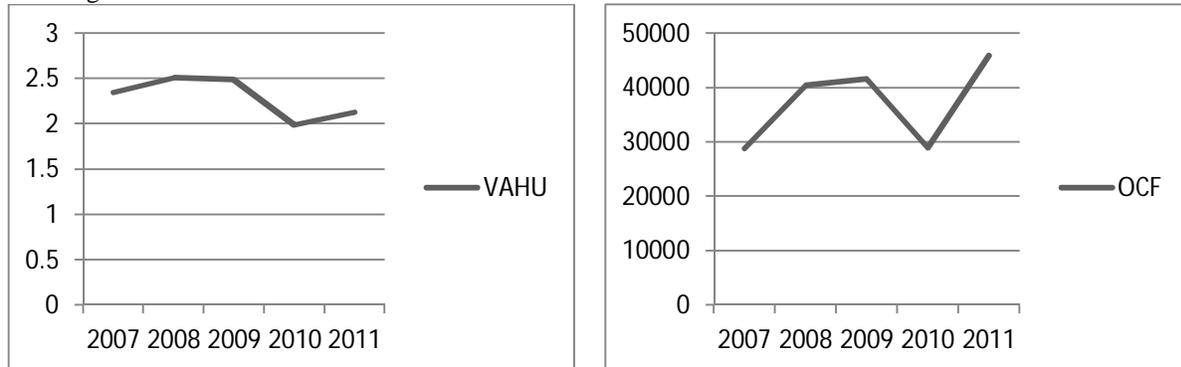
After Table 2 which summarized characteristics of the variables such as mean, median and other cases between 2006 and 2010, mean of each one of the components of intellectual capital and financial performance of the family firms are summarized, as shown in Table 3:

Table3: Average intellectual capital and financial performance indicators from 2007 until 2011

Year	Financial performance indicators		Components of Intellectual Capital			VAIC
	ROA	OCF	VACA	VAHU	STVA	
2007	0.118895	28831.84	0.292542	2.345486	0.446319	3.084346
2008	0.14357	40420.28	0.527351	2.506911	0.492821	3.527083
2009	0.104804	41577.97	0.503517	2.489564	0.194417	3.187497
2010	0.068039	28920.88	0.519534	1.991272	2.026909	4.537715
2011	0.047831	45959.13	0.287996	2.129064	0.30314	2.720199

Considering the provided data in Table 3, Diagrams 1, 2 and 3 were provided below, which presented VAHU and OCF of the family firms between 2007 and 2011. Also, the relationship between OCF and VAHU can be clearly recognized in them by observing OCF diagram and comparing it with VAHU diagram. From 2010 to 2011, OCF had an ascending trend while VAHU had a descending one.

Diagrams 1 and 2: OCF and VAHU trends between 2007 and 2011



7.2. Inferential Statistics

7.2.1. Spearman Correlation Test

In order to study the relationship between intellectual capital components and financial performance indices, Spearman Correlation Test was used, which results are given in Table 4:

Table 4: Spearman Correlation Test

Dependent \ Independent	ROA		OCF	
	Sig.	Correlation	Sig.	Correlation
VAIC	0.000	.685**	0.000	.761**
STVA	0.000	.422**	0.000	.751**
VACA	0.000	.720**	0.000	.314**
VAHU	0.000	.608**	0.000	.858**

** . Correlation is significant at the 0.01 level (2-tailed).

N : 160

As shown above, there was a significant relationship between components of intellectual capital and financial performance of the family firms.

7.2.2 . Regression Model

Using Panel Data Test, the research hypotheses were studied to specify effect of each one of the intellectual capital components on financial performance indices:

7.2.2.1. First Model

In the first model, the relationship between intellectual capital components and return on assets of the firms was studied and its results are given in Table 5 as follows:

Table 5: Regression model of intellectual capital components and return on assets (ROA)

F-statistic	Adjusted Rsquared	dependent variable - ROA				Independent variable
		R-squared	t	Sig	β	
161.4798	0.751733	0.756417	-6.75817	0.000	-0.102681	C
			19.45389	0.000	0.138217	VACA
			11.37891	0.000	0.061602	VAHU
			-0/636946	0.5251	-0.001180	STVA

Considering Table 5, intellectual capital efficiency was not significant only at significance level of 5%; as a result, the following model can be presented:

7.2.2.2. Second Model

In the second model, the relationship between intellectual capital components and operating cash flow of the firms was investigated and the results are given in Table 6 below:

Table 6: Regression model of intellectual capital components and operating cash flow (OCF)

Dependent variable - OCF						Independent variable
F-statistic	Adjusted Rsquared	R-squared	t	Sig	β	
44.19202	0.449019	0.459415	-3.990487	0.0001	-27218.82	C
			0.269970	0.7875	861.0901	VACA
			11.48827	0.0000	27920.65	VAHU
			-0.022740	0.9819	-18.90905	STVA

In Table 6, while investigating effect of intellectual capital components on operating cash flow (OCF), only intellectual capital efficiency coefficient was effective on the dependent variable and, as a result, the following model could be presented:

7.2.2.3. Third Model

In this model, the relationship between intellectual capital and return on assets of the firms was studied and the results are given in Table 7 as follows:

Table 7: Regression model of intellectual capital components and return on assets (ROA)

Dependent variable - ROA						Independent variable
F-statistic	Adjusted Rsquared	R-squared	t	Sig	β	
10.15122	0.054423	0.060370	3.141731	0.0020	0.059634	C
			3.186098	0.0017	0.010844	VAIC

The model obtained from effect of intellectual capital on return on assets (ROA) is presented below:

7.2.2.4. Fourth Model

In this model, the relationship between intellectual capital and operating cash flow of the firms was studied, the results of which are given in Table 8 as follows:

Table 8: Regression model of intellectual capital and operating cash flow (OCF)

Dependent variable - OCF						Independent variable
F-statistic	Adjusted Rsquared	R-squared	t	Sig	β	
5.215277	0.025826	0.031953	5.0004261	0.0000	29031.55	C
			2.283698	0.0237	2377.484	VAIC

As shown in Table 8, the following model can be proposed:

7.3. Studying the Summary of Research Results

Considering the performed analyses, the results obtained from studying the research hypotheses are summarized in Table 9:

Table 9: Summary of the research results

Hypothesis	Description	acceptance H ₀ or H ₁	results
First hypothesis	Relationship between intellectual capital components and financial performance	H ₁	Hypothesis acceptance
Second hypothesis	Relationship between intellectual capital components and ROA	H ₁	Hypothesis acceptance
Third hypothesis	Relationship between intellectual capital components and OCF	H ₁	Hypothesis acceptance
Fourth hypothesis	Relationship between intellectual capital and financial performance	H ₁	Hypothesis acceptance

1. RESULTS AND RECOMMENDATIONS

Considering that family firms have been less considered in Iran, in this research, attempt was made to study financial performance of these firms and the effect induced by their intellectual capital on that. The obtained research results indicated that intellectual capital components were effective on financial performance of the family firms, which were two indices of operating cash flow and return on assets in this research. With increase of human capital efficiency coefficient, operating cash flow followed an ascending trend as well.

As a result, managers of family firms can reinforce their human capital if they tend to increase operating cash flow and this important case can be achieved by employing new and efficient human resources or actualizing potential capability of the family members through training.

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