

# The Effect of Intellectual Capital on Financial Performance of Banks Listed in Tehran Stock Exchange

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Received: 11/24/2015 Approved: 12/20/2015

## Abstract

*The aim of this paper is to empirically investigate the effect of Intellectual Capital (IC) and its components on financial performance of Iranian banks accepted in Tehran Stock Exchange (TSE). The financial performances were measured by return on equity (ROE), return on assets (ROA), assets turnover (ATO), and book to market ratio (MB). This research covers 14 banks listed in TSE over the period 2004 - 2013 and use VAIC method as a quantifiable measure to assess the intellectual capital and its components. The result of regression analysis shows that structural capital and human capital efficiency have positive and significant effects on banks' financial performance. Also, the first lag of physical capital efficiency has positive and significant effect on ROA, ROE, and ATO, but, its effect on MB is not significant. Finally, estimations show that the effect of IC on the financial performance of banks is positive and significant.*

**Keywords:** Intellectual capital, Return on equity, Return on assets, Book to market ratio, Assets turnover

**JEL Classifications:** E03, E22, E44

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## 1. Introduction

The emergence of new economy based on knowledge and information intellectual capital. Therefore, this field has been used as a means to determine the value of a given company and the changes in the dominant paradigm in industrial society (Khalkhali et al., 2012). In fact, in the present knowledge-based economy, the role and importance of intellectual capital return have been considered in the sustained and continuous profitability of companies more than financial return on equity (Anvari, Rostami and Seraji, 2005). Intellectual capital is a multidisciplinary concept and its understanding varies in business and commerce-related fields (Huang and Luther, 2007).

An appropriate combination of value of intellectual capital such as knowledge, proficiency, financial sources, performance, strategy and good relationship with stakeholders can lead to the increase of corporation performance (Dewi and Saudah, 2012). Therefore, through better use and investing in intellectual capital entrepreneurs and their workers will be able to discover opportunities for new business and enhance their competitive advantage in a market (Rexhepi et al., 2013).

The aim of this study is to make an empirical investigation of the impact of intellectual capital on financial performance of Iranian banks. This is because banks have a fundamental role on finance of Iranian companies. On the other hand, since the Basle Accord emphasizes on assets productivity, capital efficiency and revenue growth, so, assessing intellectual capital effects on financial performance of banking is very important. In another words, the present research question is: what is the effect of intellectual capital (structural, physical and human) on financial performance of Iranian banks listed in Tehran Stock Exchange?

This paper is organized as follows: Following this introduction, Section II discusses the definitions and literature review of intellectual capital and its effects on financial performance of firms and banking sector. Section III gives assessment of the intellectual capital components and its effects on financial performance of Iranian



2000). In other words, intellectual capital is an intangible asset with the potential to create value for the company and the society (Mavridis, 2005).

There are so many methods to measure the intellectual capital, but, theoreticians agree on VAIC approach (Bontis, 1998; Bontis, 2000; Dong and Gao, 2012; Edvinsson and Malone, 1997; Farsani et al., 2012; Roose et al., 1997; Stewart, 1999; Saint-Onge, 1996; Sveiby, 2012). VAIC was first introduced by Pulic (1998), and it is one of the direct measurement methods. On one side, this model creates a relationship between customer and product or service, and on the other side, it is the relationship between created value and applied resources in production or service. According to this view, the components of intellectual capital considered are physical capital efficiency, human capital efficiency, and structural capital efficiency.

## **2.2. Intellectual capital and firm performance**

Many studies in the intellectual capital field show the important role of this capital and its impact on the performance of companies in the world. So that, in the last 25 years a whole literature developed aiming to clarify the concept of intellectual capital (IC) and to decipher the role it plays in increasing the performance of firms (Sumedrea, 2013). For this reason, this article only refers to studies that have been conducted on banking financial performance. When it comes to managing intellectual capital in banks, the finance function has a key role to play in increasing the value of a firm (Irene and Hooi, 2009).

Najibullah (2005) conducted a study on the relationship between intellectual capital and the company's financial performance on banks listed on the Dhaka Stock Exchange in Bangladesh. The study showed that there was a strong relationship between intellectual capital and company performance and market value of the company.

An Indian bank evaluates the idea of VAIC and its operation with the help of annual reports. Study justified the relationship of human capital, physical capital and banks performance (Kamath, 2007).

Ulum et al. (2008) conducted a study on the Indonesian banks during the period 2004-2006. The findings showed that there is

positive relationship between the intellectual capital and the company's financial performance. The results of the study conducted by Kuryanto and Syafrudin (2008) showed that intellectual capital was not positively related to firm performance. Intellectual capital was also not related to the company's future performance.

Maditinos et al. (2011) researched impact of IC and its components on financial performance and market value of 96 firms from four different economic sectors which were listed on Athens Stock Exchange (ASE), and reported that only human capital component has significant impact. The empirical evidence failed to show the impact of IC on financial performance for the banks listed in Milan Stock Exchange as reported by Puntillo (2009).

Zou and Huan (2011) showed that there is not a significant relationship between IC and banking financial performance in China.

Kvalitne and Primaratny (2012) conducted an empirical investigation on the basis of the intellectual capital of the banking sector in the United States during fiscal years of 2000 and 2010. They aimed to examine the empirical relationship between intellectual capital and productivity, profitability and investor reactions using multiple regression and combination techniques. They showed that there is a positive significant relationship between intellectual capital and productivity, profitability and investor reaction.

Abdullah and Sofian (2012) studied the relationship between the characteristics of the intellectual capital performance of 147 banks in the member countries of the Gulf Cooperation Council. The results indicated that there is a meaningful relation between the characteristics of the board of directors and the intellectual capital performance.

Haji & Mubaraq (2012) elaborated Nigerian banks which illustrate the significance of effective skill management and its direct relation with progression of an organization.

Although the majority of extant studies have shown a positive relationship between intellectual capital and financial performance in a variety of sectors and geographical contexts, there have been some alternative results. For example, the work by Rehman et al. (2011,

2012) shows that there is no significant link between human capital and structural capital on the performance of banks in Pakistan.

Clearly, there is no confidence in the universality that intellectual capital has a positive influence on banking performance in all contexts. Indeed, there may be specific instances (e.g. certain countries and certain banking styles) where this is not the case. However, there is one more context that may give rise to an alternative view.

Recently, numerous researches have been carried out regarding the measuring of intellectual capital and its relations with financial performance of stock market value of Tehran Stock Exchange companies in Iran. However, only Shahai and Khalaf Elahi (2010) investigated the effect of intellectual capital on the performance of the branches of Sepah Bank in Tehran. Both descriptive and inferential data were obtained from analyzing the questionnaires in their study. Their results showed that the intellectual capital component have a positive effect on the performance of the branches of Sepah Bank in Tehran, and the highest effect belonged to the client capital, next stand structural and human capitals.

The difference between this paper and the mentioned study is that this article investigated the emphasizing role of intellectual capital in banking financial performance and it dealt with actual data of the banks under study. To provide the information on financial performance and IC of the banks, this study collected data through the financial statements issued by banks and software approved by TSE. These financial statements are published annually in websites of banks and to process the data, E-views software was used. As a result, the present research question is: what is the effect of intellectual capital on financial performance of banking?

### **3. Methodology**

The review of literature highlights contrasting findings for the relationship between IC and corporate performance. Therefore, this study attempts to find out the association between IC and financial performance of listed banks in the TSE where a similar study is in dearth.

Then, regression analysis was conducted to investigate the association between IC and financial performance of banks listed in TSE.

The equations used for testing the hypothesis are as follows:

$$ROA_{IT} = \beta_{01} + \beta_{11}VAHU_{IT} + \beta_{12}VACA_{IT} + \beta_{13}STVA_{IT} + \beta_{14}DAR_{IT} + \beta_{15}\log MKTCAP_{IT} + \varepsilon_{IT} \quad (1)$$

$$ROE_{IT} = \beta_{02} + \beta_{12}VAHU_{IT} + \beta_{22}VACA_{IT} + \beta_{32}STVA_{IT} + \beta_{42}DAR_{IT} + \beta_{52}\log MKTCAP_{IT} + \varepsilon_{IT} \quad (2)$$

$$ATO_{IT} = \beta_{03} + \beta_{13}VAHU_{IT} + \beta_{23}VACA_{IT} + \beta_{33}STVA_{IT} + \beta_{43}DAR_{IT} + \beta_{53}\log(MKTCAP)_{IT} + \varepsilon_{IT} \quad (3)$$

$$MB_{IT} = \beta_{04} + \beta_{14}VAHU_{IT} + \beta_{24}VACA_{IT} + \beta_{34}STVA_{IT} + \beta_{44}DAR_{IT} + \beta_{45}\log MKTCAP_{IT} + \beta_{55}EPS_{IT} + \varepsilon_{IT} \quad (4)$$

$$ROA_{IT} = \beta_{05} + \beta_{15}VAIN_{IT} + \beta_{25}DAR_{IT} + \beta_{35}\log MKTCAP_{IT} + \varepsilon_{IT} \quad (5)$$

$$ROE_{IT} = \beta_{06} + \beta_{16}VAIN_{IT} + \beta_{26}DAR_{IT} + \beta_{36}\log MKTCAP_{IT} + \varepsilon_{IT} \quad (6)$$

$$ATO_{IT} = \beta_{07} + \beta_{17}VAIN_{IT} + \beta_{27}DAR_{IT} + \beta_{37}\log(MKTCAP)_{IT} + \varepsilon_{IT} \quad (7)$$

$$MB_{IT} = \beta_{08} + \beta_{18}VAIN_{IT} + \beta_{28}DAR_{IT} + \beta_{38}\log MKTCAP_{IT} + \varepsilon_{IT} \quad (8)$$

Equation (1) and (5) estimate the relationship between IC and its components with productivity of the banks and equation (2) and (6) are used to identify the association between IC and its components with profitability to available assets of the banks. Equation (3) and (7) explain the relation between IC and components of IC with profitability from wvrr ” perspective, where, equation (4) and (8)

identifies the degree of contribution of IC components and IC on investor response respectively.

The above equations are estimated for banks listed in Tehran Stock Exchange. For this reason, this research uses panel data model over the period of 2004-2013.

In the above equations, the dependent, independent and control variables are defined as follow:

### 3.1. Dependent variables:

- 0 ROE: return on equity (net income/ shareholders' equity= return on equity)
- 0 ROA: return of assets (net income/ total assets= return of assets)
- 0 MB: market-to book value ratio (market capitalization/ book value)
- 0 ATO: asset turnover ratio: (income / total assets=asset turnover ratio)

These indicators represent bank's financial performance.

### 3.2. Independent variables

VAIN: value added of intellectual capital,

VACA: value creation efficiency of physical capital

VAHU: coefficient of performance of human capital

STVA: value creation efficiency of structural capital.

#### 3.2.1. Intellectual capital and its components as independent variable

In oeer oo aaa iiii fy and aaa eeee ttt ellecllll l attt a,, Piii css model has been used. In this study, value added of intellectual capital efficiency (VAIN) is used as the proxy measure for IC and the same represents the main independent variable in regression models.



The VAIC method was used to measure IC and this method was adopted as a quantifiable measure to assess the efficiency of a company in utilizing its IC. This indicator has been widely applied to other research studies (see Chen et al., 2005; Shiu, 2006; Ujansivu and VVVVVV, 2007; TNN TT II, 2007; Yll mra ddd Ckkk, 2007; Kmmtt h 2007; Makki and Lodhi, 1998; Chan, 2009a; Joshi et al., 2010; Zéghal and Maaloul 2010; Chu et al., 2011; Maditinos et al., 2011; Kehelwalatenna and Premaratne, 2012 and Pal and Soriya, 2012).

Key steps followed to compute VAIC are summarized that can be seen in Appendix 1.

### 3.3. Control variables:

In the above model, DAR: total debt to total assets ratio (Debt Ratio), the logarithm of market capitalization (MKTCAP), the variable for size of the firm in this study, and EPS: rate of earning per share are used as control variables.

### 3.4. Hypothesis

The following hypotheses are framed based on the objective. Based on literature review, the main hypothesis of the survey is as follows. In order to fulfill the objectives of the research i.e. analysis of the relationship between intellectual capital (human capital efficiency, structural capital efficiency and physical capital efficiency) and its effect on financial performances of banks listed in TSE, the following research hypotheses are presented:

1. Intellectual capital components have a significant positive relationship with return of assets ratio (ROA) of banks listed in TSE.
2. Intellectual capital components have a significant positive relationship with return of capital ratio (ROE) of banks listed in TSE.
3. Intellectual capital components have a significant positive relationship with asset turnover ratio (ATO) of banks listed in TSE.

4. Intellectual capital components have a significant positive relationship with market-to-book value ratio (MB) of banks listed in TSE.
5. Intellectual capital components have a significant positive relationship with return of assets ratio (ROA) of banks listed in TSE.
6. Intellectual capital has a significant positive relationship with return of capital ratio (ROE) of banks listed in TSE.
7. Intellectual capital has a significant positive relationship with asset turnover ratio (ATO) of banks listed in TSE.
8. Intellectual capital has a significant positive relationship with market-to-book value ratio (MB) of banks listed in TSE.

First hypothesis of the study is used to identify the relationship between IC and profitability of the bank (ROA) (Firer and Stainbank, 2003; Chan, 2009a; Zéghal and Maaloul, 2010; Chu et al., 2011; Kmmiiii c ddd kkrjj ii ,, 2;12; Kehelwalatenna and Premaratne, 2012; Pal and Soriya, 2012; and Alipour, 2012)

Second hypothesis which predicts the association between IC and ability of the firm to generate returns using common stocks of shareholders (ROE) (Tan et al.,2007; Chan, 2009a; Chu et al., 2011; Maditinos et al, 2011; ; Kehelwalatenna and Premaratne, 2012; Kmmiiii a akk kkkkjj ii ;;2;12; and Pal and Soriya, 2012).

Third hypothesis expects to examine the relationship between IC and productivity of banks. Following Firer and Williams (2003), Firer and Stainbank (2003), Kamath (2008), Chan (2009a), Chu et al., (2011); Kehelwalatenna and Premaratne (2012), Komnenc and ;; rjj ii é (2)12) ddd lll ddd iii ya (2)12) sset trrvvrr rtt io (ATO) has been selected as the proxy measure for productivity.

Finally, fourth hypothesis examines the relationship between IC and investor response. The market-to-book value ratio (MB) of companies is used in measuring the investor response as Ghosh and Wu (2007) and Kehelwalatenna and Premaratne (2012) documented it as a proxy measure for investor response.

### 3.5. Data

The analysis of intellectual capital and its effects on the financial performance of banks listed in TSE has a great importance. This is because Iranian financial system is bank-based and banks play a major role in finance of the economy of Iran. Therefore, in this study, after investigating the theoretical foundations of intellectual capital and financial ratios of banks listed in TSE, the effects of intellectual capital will be evaluated on the performance of these banks.

These banks include Eghtesad Novin, Ansar, Iran Zamin, Parsian, Pasargad, TAT, Tejarat, Hekmat Iranian, DAY, Sarmaye, Sina, Saderat, Karafarin, Mellat, Askariye Finance Credit Institution, Ghavamin Finance Credit Institution, Tose'e Finance Credit Institution.

In order to assess the financial performance of these banks, this study collected data from Financial Statements issued by companies and used software approved by TSE. These Financial statements are annually published in websites of banks, and then we selected several ratios divided into four categories: Return on equity (ROA), return of assets (ROE), asset turnover ratio (ATO) and market-to-book value ratio (MB) as previously described.

Also, to investigate the effects of the intellectual capital and, banks' financial performance, we used E-views software and econometric models.

### 4. Empirical Results

A large number of economic time series are non-stationary and regression among them is generally counterfeit. Therefore, using unit root test is necessary to determine the degree of integration of variables. If the studied time series is not stationary, there is the possibility to use regression models due to the spurious regression problem.

The unit root tests were conducted according to the Levin–Lin–Chu test. The results show the level of stationary variables (Table 1).

**Table 1: Results of Unit Root Test (Levin-Lin-Chu test)**

Variable	Level	P-value	Test Results
ROE	-90.18	0.0000	Stationary
ROA	-65.3	0.0001	Stationary
MB	-8.32	0.0000	Stationary
ATO	-24.2	0.0000	Stationary
VAHU	-84.22	0.0000	Stationary
VACA	-3.21	0.0000	Stationary
STVA	-38.6	0.0000	Stationary
MKTCAP	-40.5	0.0000	Stationary
DEBT	-12.5	0.0000	Stationary
EPS	-24.3	0.0000	Stationary

*Source:* Estimation results

After investigating the stationary of variables, this study continue to test these hypothesis through constructed regression models.

Besides, since the data was collected as cross-sectional time series,  $F_{Leamer}$  test was run to determine either to use pooled data or panel data method to analyze the data. Following the designation of panel data the method of analysis, Hausman test was run to determine either to use fixed effect or random effect technique.

The results of estimating the model using  $F_{Leamer}$  test showed that the panel data pattern could be estimated using fixed effect technique.

#### 4.1. Testing hypothesis 1

Table 2 exhibits the results of the regression model for all exogenous variables and ROA as the dependent variable for pooled sample.

The results of the regression equations in model 1 appears that the intellectual capital components have positive coefficient with ROA, under the direction of the coefficient indicates that the increase in the

structural capital efficiency, human capital efficiency and first lag of physical capital efficiency will enable an increase in the banks return of asset. Also, the size of banks (MKTCAP) and debt to total asset ratio (DAR) have a negative significance on ROA. In addition, it can be observed that increase of physical capital efficiency and return of asset of this year have stronger effect on the return of asset in the next year. These results show that the intellectual capital components have a significant positive relationship with return of assets ratio (ROA) of banks listed in TSE. On the other hand, the statistical evidence in Table 2, hypothesizes a positive relationship between IC components and ROA cannot be rejected for pooled sample.

#### 4.2. Testing hypothesis 2

In Table 3, all coefficients in the Model 2 are reported.

**Table 2: Results of Estimating the Effect of Intellectual Capital on Return of Asset (ROA)**

Variable	Coefficient	T-statistic	P-value
Fix	0.26	13.37*	0.00
VAHU	0.01	1.62	0.01
D (VACA)	1.31E-07	4.21*	0.00
STVA	0.01	2.44**	0.02
DAR	-0.15	-9.41*	0.00
MKTCAP	-0.01	-5.63*	0.00
ROA (-1)	0.01	5.63*	0.00
R <sup>2</sup> =0.68 D-W = 2.4 F-stat=9.30 Prob.=0.00			

\* Significant at the 0.01 level

Dependent variable: ROA

Source: Estimation results

**Table 3: Results of Estimating the Effect of Intellectual Capital on Return on Equity (ROE)**

Variable	Coefficient	T-statistic	P-value
Fix	0.76	5.68*	0.00
VAHU	0.25	3.98*	0.00
D (VACA)	1.47E-06	4.88*	0.00
STVA	0.02	2.32	0.02
DAR	-0.68	-12.40*	0.00
MKTCAP	-0.11	-5.91*	0.00
ROE (-1)	0.31	3.18*	0.00
R <sup>2</sup> =0.75 D-W =2.45 F-stat= 13.4 Prob.= 0.00			
FLeamer=0.95 Prob=0.55			

\* Significant at the 0.01 level

Dependent variables: Return On Equity (ROE)

Source: Estimation results

The results reflected in Table 3 show that the intellectual capital components and first lag of VACA have positive and significant effect on ROE. On the other hand, increase in the size of banks and debt to total asset ratio have a negative effect on ROE. Therefore, results in Table 3 support hypothesizes a positive association between IC components and ROE of the study.

These findings corroborate Riahi-Belkaoui (2003), Firer and Stainbank (2003), Chen et al., (2005), Tan et al., (2007), Zéghal and Maaloul (2010), Chu et al., (2011), Pal and Soriya (2012) and Alipour (2012) who all found significant positive associations between IC and financial performance.

### 4.3. Testing hypothesis 3

Table 4 exhibits the results of the regression model 3 for all exogenous variables using productivity (ATO) as the dependent variable for

pooled sample. All the coefficients in the Model 3 reported are highly statistically significant and positive (except DAR coefficient).

**Table 4: Results of Estimating the Effect of Intellectual Capital on Asset Turnover (ATO)**

Variable	Coefficient	T-statistic	P-value
Fix	0.44	5.40*	0.00
VAHU	0.39	9.81*	0.00
D(VACA)	1.12E-06	2.33*	0.02
STVA	0.29	8.32*	0.00
DAR	-0.20	-4.12*	0.00
MKTCAP	0.03	5.45*	0.00
ATO(-1)	0.44	5.40*	0.00
R <sup>2</sup> =0.41 D-W =1.87 F-stat= 6.07 Prob.= 0.00 F <sub>Leamer</sub> =0.73 Prob.=0.69			

\* Significant at 0.01 level. Dependent variables: Asset Turnover ratio (ATO)  
Source: Estimation results

#### 4.4. Testing hypothesis 4

Table 5 shows the effect of the intellectual capital and its components on asset turnover (ATO) during the period of 2004-2013. Estimates of Model 4 which was constructed mainly to test the association between IC components and investor response (MB) are reported in Table 5. Evidence derived indicates that IC components are significantly and positively related, as expected in this study. Of course, the coefficient of MKTCAP is negative and coefficient of DAR and D(VACA) are not significant.

**Table 5: Results of Estimating the Effect of Intellectual Capital on Market-to-book Value Ratio (MB)**

Variable	Coefficient	T-statistic	P-value
Fix	0.0010	5.79*	0.00
VAHU	0.00016	2.84*	0.01
D (VACA)	4.02E-10	0.80	0.43
STVA	7.46E-05	2.50	0.04
DAR	-0.0002	-1.54	0.13
MKTCAP	-0.0001	-4.22*	0.00
EPS	1.E-7	3.60*	0.00
R <sup>2</sup> = 0.99 D-W =1.86 F-stat= 18239 Prob.= 0.00			

\* Significance at the 0.01 level

Source: Estimation results

Dependent variables: Market-to-Book value ratio (MB).

#### 4.5. Testing hypothesis 5, 6, 7 and 8

An investigation into the effects of intellectual capital on financial indicators are shown in Table 6. The results show that IC has a positive significant effect on ROA, ROE, MB and ATO.

Also, for testing the main hypothesis, this study separately examined the relationship between intellectual capital and the financial performance indicators of the selected banks. The results are shown in Table 6.

The results indicate that the effect of intellectual capital on financial performance indicators is positive and significant in some selected banks, for example, Parsian, Eghtesad Novin, Pasargad and Iran Zamin Bank.



Table 6: Effects of intellectual capital on financial indicators of selected bank in TSE

Variable	Dependent variable											
	ROA			ROE			MB			ATO		
	Coefficient	t-statistic	t-statistic	Coefficient	t-statistic	t-statistic	Coefficient	t-statistic	t-statistic	Coefficient	t-statistic	
Fix	0.11	5.93**		0.43	2.63**		0.001	12.03**		0.14	2.66*	
VAIC	3.6E-9	2.38**		3.02E-6	2.07*		1.17E-9	2.36**		9.3E-7	1.57*	
DAR	-0.05	-3.88**		0.67	4.69**		0.001	1.44**		-0.21	-5.86**	
MKTCAP	-0.005	-2.31*		-0.09	-2.91**		-0.0001	-7.05**		0.01	2.41*	
R <sup>2</sup>	0.48			0.27			0.12			0.27		
D.W	1.99			2.10			2.4			1.84		
F <sub>tests</sub>	2.84			2.02			0.51			1.12		
	(0.005)			(0.04)			(0.86)			(0.37)		
Hausman	6.18			1.88			-			-		
	(0.10)			(0.59)								
result	Random effects			Random effects			Data pooling			Data pooling		

\* Significance at the 0.01 level of confidence of 99%.

\*\* Significance at the 0.05 level of confidence of 95%.

\*\*\* Significance at the 0.1 level of confidence of 90%.

Source: Results Estimation

Table 7: Results of estimating the effect of intellectual capital on financial indices represented separately for the selected banks

Independent variable: Intellectual capital	Dependent variable											
	ROA		ROE		MB		ATO					
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic				
Fix	0.01	3.80*	0.272661	4.6*	-6.59E-05	-0.66	0.049073	4.65				
Parsian	2.62E-06	1.60	4.80E-05	2.5*	5.63E-08	1.73***	1.90E-05	5.48*				
Karafarin	2.66E-06	3.20*	2.88E-05	2.9*	1.07E-06	64.44*	7.46E-06	4.21*				
Fahtesad Novin	1.26E-07	0.67	1.72E-06	0.8	8.36E-09	2.21**	4.54E-07	1.13				
Tejarat	-6.65E-14	-2.05**	-8.56E-13	-2.2**	9.51E-16	1.47	-7.87E-14	-1.14				
Mellat	-5.76E-07	-2.21**	-4.50E-06	-1.4	6.66E-09	1.28	7.98E-07	1.44				
Sina	-2.40E-07	-0.48	-1.07E-05	-1.8***	2.74E-08	-2.72*	2.71E-07	0.25				
Tose'e	-2.44E-07	-2.40*	-4.36E-06	-3.6*	7.00E-09	1.29	1.53E-06	7.07*				
Pasargad	5.70E-06	5.12*	-7.62E-06	-0.6	2.11E-08	2.61	6.25E-06	2.54*				
Saderat	-3.47E-07	-1.28	-4.26E-06	-1.3	2.79E-08	4.93*	-8.95E-07	-1.55				
Ghavamin	-2.25E-06	-3.19*	-2.04E-05	-2.4*	5.05E-08	3.36*	-4.97E-06	-3.32				
Ansar	1.13E-07	0.32	1.55E-06	0.4	6.45E-08	3.79*	5.73E-06	7.67*				
Hekmat Iranian	8.55E-07	3.49*	-1.06E-05	-3.6*	3.42E-08	2.72*	2.41E-06	*4.63				
DAY	6.83E-06	8.82*	-1.67E-05	-1.8***	-6.59E-05	-0.66	1.29E-05	*7.86				
Iran Zamin	2.74E-06	3.77*	-2.82E-05	-3.2*	5.63E-08	1.73***	1.16E-05	*7.48				
R <sup>2</sup>	0.75		0.56		0.78		0.29					
D-W	1.53		1.98		2.15		2.9					

\* Significance at the 0.01 level

\*\* Significance at the 0.05 level

\*\*\* Significance at the 0.1 level

Source: Results Estimation

## 5. Conclusion and Recommendations

The role of intellectual capital as an intangible asset in the modern business organizations is clear. But, there is no confidence in the universality of intellectual capital to have a positive influence on banking performance in all contexts. Furthermore, the present research question is that: what is the effect of intellectual capital on financial performance of banking section. Then, this research covered 14 banks listed in TSE over the period 2004 to 2013 and used VAIC method and panel data models for assessing the effect of intellectual capital and its components on financial performance of selected banks. Four hypotheses were examined. The results show that coefficients for relationships between IC and productivity, profitability and investor response are statistically significant and positive in pooled sample. But the IC has the most effect on ATO and ROA respectively. Also, assessing component of intellectual capital indicates that the impact of the first lag of physical capital efficiency on financial performance of banks is positive for pooled data with the exception of MB index. On the other hand, structural capital and human capital efficiency are the most effective on ATO

Also, this study examined the relationship between intellectual capital and the financial performance indicators of the selected banks separately. The results indicate that the effect of intellectual capital on financial performance indicators is positive and significant in Parsian, Eghtesad Novin, Pasargad and Iran Zamin Bank.

The results of the present research supports the claim that the intellectual capital is the competitive advantage of today's world and ggggsst tttt tee kkkk's ficcccill rrr fir mccc increases when the efficiency of intellectual capital increases.

Today, despite the increase in the importance of intangible properties and specially non-material and intellectual capitals in the banks, most accounting systems are not capable of clear and proper calculation of company performance in accordance with intellectual capital.

In can be observed that the results obtained in the present study are consistent with the results of studies expressed in the empirical

literature and the mentioned researchers have also emphasized that intellectual capital and its components (physical capital efficiency, human capital efficiency and structural capital efficiency) have positive and significant relationship with the financial performance of banks. Therefore, banks can persist on the enhancement of intellectual capital in order to improve their financial performance to achieve the standards expressed in Basel Committee's Principles on Banking Supervision.

## References

Anvari Roostami, A. and H., Saraj, (2005). "Measuring Intellectual Capital and Studying Relation between Intellectual Capital and Stock Value of Companies Listed in Tehran Stock Exchange". *Quarterly Journal of Accounting and Auditing Review*. (13) 19, 59-13. (In Persian).

Berzkalne, I., & E. Zelgalve, (2014). "Intellectual Capital and Company Value". *Procedia-Social and Behavioral Sciences*, 110, 887-896.

Bontis, N. (1999). "Managing Organizational Knowledge by Diagnosing Intellectual Capital: Framing and Advancing the State of the field". *International Journal of Technology Management*, 18(5), 462-433.

Cabrita, M. D. R., & N. Bontis, (2008). "Intellectual Capital and Business Performance in the Portuguese Banking Industry". *International Journal of Technology Management*, 43(1-3), 212-237.

Chan, H., K. (2009). "Impact of Intellectual Capital on Organizational Performance: An Empirical Study of Companies in the Hang Seng Index (Part 1)". *The Learning Organization*, 16(1), 21-4.

Chang, S. L. (2007). *Valuing Intellectual Capital and Firms' Performance: Modifying Value Added Intellectual Coefficient (VAIC (TM)) in Taiwan IT industry (China)*. 68(7).

Chen, M. C., Cheng, S. J., & Hwang, Y. (2005). "An Empirical Investigation of the Relationship between Intellectual Capital and

Firms' Market Value and Financial Performance". *Journal of Intellectual Capital*, 6(2), 176-159.

Choo Huang, C., R. Luther, & M. Tayles, (2007). "An Evidence-based Taxonomy of Intellectual Capital." *Journal of Intellectual Capital*, 8(3), 386-408.

Edvinsson, L., & M. S. Malone, (1997). *Intellectual Capital: Realizing your Company's True Value by Finding its Hidden Brainpower*. (Vol. 225). New York, NY: Harper Business.

Firer, S., & S. Mitchell Williams, (2003). "Intellectual Capital and Traditional Measures of Corporate Performance." *Journal of Intellectual Capital*, 4(3), 360-348.

Fotros, M.H., and T. Beigi, (2010). "Comparative Study of the Effect Intellectual Capital on Organizational Performance of Banking Industry in Private and Government Section, Case of Banks Located in Tehran". *Quarterly journal of Executive Management*. 38(2) 136-101 (In Persian).

Halim, S. (2010). "Statistical Analysis on the Intellectual Capital Statement". *Journal of Intellectual Capital*, 11(1), 73-61.

Kai Wah Chu, S., K. Hang Chan, & Wu, W. W. (2011). "Charting Intellectual Capital Performance of the Gateway to China". *Journal of Intellectual Capital*, 12(2), 276-249.

Khelwalatenna, S., & G. Premaratne, (2012). "An Empirical Investigation on Intellectual Capital Performance: Evidence from Banking Sector". Available at SSRN 2157813.

Khan, F. A., R. A. G., Khan, & M. A. Khan, (2012). "Impact of Intellectual Capital on Financial Performance of Banks in Pakistan: Corporate Restructuring and Its Effect on Employee Morale and Performance". *International Journal of Business and Behavioral Sciences*, 2(6), 22-30.

Maditinos, D., D. Chatzoudes, C. Tsairidis, & G. Theriou, (2011). "The Impact of Intellectual Capital on Firms' Market Value and Financial Performance". *Journal of Intellectual Capital*, 12(1), 151-132.

- Mojtahedzadeh, V., S. H. Alavitabar, & M. Mahdizadeh, (2010). "Relationship between Intellectual Capital and Insurance Companies' Performance". *Journal of Accounting and Auditing Review*. (2) 17, 119-101 (in Persian).
- Petty, R., & J. Guthrie, (2000). "Intellectual Capital Literature Review: Measurement, Reporting and Management". *Journal of Intellectual Capital*, 1(2), 176-155.
- Pew T. H., D. Plowman, & P. Hancock, (2007). "Intellectual Capital and Financial Returns of Companies". *Journal of Intellectual Capital*, 8(1), 95-76.
- Piri, P., M. Alghyani, & S. Sadaghiani, (2014). "A Study on the Effects of Intellectual Capital Efficiency on Economic Performance". *Management Science Letters*, 4(5), 985-992.
- Poordawood, H., H. Yazdani, (2012). "Intellectual Capital and Intellectual Capital value Added and Financial and Economic Performance and Stock Market Value". *Journal of Accounting and Auditing Review*. (19) 70. 32 -15. (In Persian).
- Poorzamani, Z. A. Jahanshad, and A. Mahmoodabadi, (2012). "The Effect of Intellectual Capital on Market Value and Financial Performance". *Journal of Accounting and Auditing Review*. (19) 68. 30-17. (In Persian).
- Riahi-Belkaoui, A., (2003). "Intellectual Capital and Firm Performance of US Multinational Firms: a Study of the Resource-based and Stakeholder Views." *Journal of Intellectual Capital*, 4(2), 226-215.
- Roos, G., & J. Roos, (1997). "Measuring Your Company's Intellectual Performance". *Long Range Planning*, 30(3), 426-413.
- Shahaie, Behnam and Khaef Elahi, Ahmadali, (2010). "Studying the Effect of Intellectual capital on the Performance of Sepah Bank in Tehran". Fifth Edition. *State Management Journal*.
- Zéghal, D., & A. Maaloul, (2010). "Analyzing Value Added as an Indicator of Intellectual Capital and its Consequences on Company Performance". *Journal of Intellectual Capital*, 11(1), 60-39.

## Appendix

The calculation of VAIC involves five steps (Pulic, 2000; Chan, 2009a), which have already been illustrated in detail by other researchers. For simplicity, first of all, the value added (VA) of the company had to be extracted .

$VA = \text{Wages and salaries} + \text{Interest paid} + \text{Depreciation} + \text{Tax paid} + \text{Dividend paid} + \text{Retained earnings}.$

In second step, the human capital efficiency (HCE) and structural capital efficiency (SCE) were calculated .

$CA = \text{Total staff cost} - \text{Deferred expenses}.$

$HU = \text{Human capital} = \text{Total staff cost}.$

$SC = \text{Structural capital} = VA - HU$  (VAIC model assumes that there is a reversal association between HU and SC).

$VACA$  (Value creation efficiency of physical capital) =  $VA / CA$ .

$VAHU$  (Value creation efficiency of human capital) =  $VA / HU$ .

$STVA$  (Value creation efficiency of structural capital) =  $SC / VA$ .

Finally, VAIC, which acts as an independent variable affecting the traditional financial performance of companies, was obtained by summing up VACA, VAHU and STVA

$VAIC$  (Value added intellectual capital coefficient) =  $VACA + VAHU + STVA$