The influence of intellectual capital on the return of equity among banks listed in Amman Stock Exchange

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Abstract: The study intends to examine the impact of intellectual capital (IC) measured by value added intellectual coefficient (VAIC) on the return of equity ratio (ROE) of commercial banks in Amman Stock Exchange (ASE). The study used the annual reports for 14 commercial banks listed in ASE during the period 2010–2015, and the data were analysed by SPSS to test the hypothesis of the study. In addition, the results show that negative impact between VAIC and ROE of commercial banks in Jordan, but there is positive impact between components of VAIC and ROE of Jordanian banks. Based on these results, researchers suggest the commercial banks in Jordan should be concerned in the IC especially human capital because its main components in the banks work.

Keywords: intellectual capital; intangible asset; value added intellectual coefficient; value added; profitability; commercial banks.

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1 Introduction

The world's attention towards to intellectual capital IC in the 1990s, which was a major part of the knowledge economy (Hamdan, 2017), IC plays important role in an organisation performance and uses widely in industrial firms, especially that depend on knowledge, skills, and experiences, including banks (Lee and Lin, 2018).

The companies, in any economy cannot have a competitive advantage without its unique IC (Maditinos et al., 2011). Despite the importance of IC to companies, it still faces problems in how to measure it; because of the novelty of the term, appeared several methods of measuring IC such as economic value added (EVA), balance score card (BSC) and VAIC (Kamath, 2015).

The IC it is an intangible asset with significant positive impact to create value for the firms (Joshi et al., 2010). According to Role et al. (2016), the IC is an intangible asset that cannot be seen with the positive impact and give a competitive advantage to the firms. Also, IC is an intangible asset and at the same time cannot be measured accurately, (Berzkalne and Zelgalve, 2014). According to Stewart (2007), he defined IC as knowledge assets, talent, and skills, which can be applied to create value and wealth for the firm.

While several researchers divided IC into three components, first human capital defined, employees' ability in changing the firm by developing new equipment or using the current firm asset effectively (Hamdan et al., 2017). The structural capital defined, things done by the employee for the advantage of the firms and it stays inside the firms when employees go home (Girma, 2017). Finally, customer capital refers to intangible assets which manage the relationship between the firms and customers, suppliers, and other stakeholders (Ozkan et al., 2017; Hamdan, 2018a, 2018b). The costumer capital considered as a bridge between IC processes to transfer it to market value (Shahveisi et al., 2015).

The aim of this study is to discuss an estimate of the impact of intellectual capital, which measure, throw VAIC on ROE for the banks which listed in Athens Stock Exchange (ASE).

The analysis is used on a sample of (14) commercial bank listed in ASE during the period 2010–2015. The researcher used qualitative and quantitative methods of research as a monographic method, correlation, and regression statistical analysis, also a descriptive statistic such as mean and standard deviation. Rest of the study is regular as Section 2, talking about the objective of the study and IC and its component's. Section 3 describes the problem of the study, its questions, and hypothesis. Section 4 describes the methodology which used in the study. Section 5 of the study displays the empirical results. Section 6 discusses the discussion and the recommendation. Section 7 describes the limitation and finally part eight contains the conclusion of the study.

2 Objective of the study and previous research

In 1997, Pulić proposed a model for evaluating the value-added efficiency of firms to measure their intellectual efficiency, which is called VAIC (Pratiwi and Kadry, 2014). VAIC indicates the amount of new value created by each monetary unit which invested in resources, the higher of VAIC is better for the firm's position, and firm IC is creating value for its stakeholders (Pulić, 2008).

The main elements of VAIC are capital employed efficiency (CEE) defined as value added divided by capital employed, and the capital employed combined physical and financial capital (Fijałkowska, 2014), human capital efficiency (HCE), which it is the amount of capital invested in knowledge employees for example salaries, training, and wages. So, the structural capital efficiency (SCE) is not an intangible characteristic, but the part of VA residually obtained by structural capital holders, or it's the status that enables human resources to make value added (Iazzolino and Laise, 2013).

According to Ismail and Karem (2011), there is a positive impact between IC and financial performance of banks in Bahrain. The component of VAIC has positively associated with CEE and HCE at the same time there is no significant with SCE. But Maditinos et al. (2011) founded that no relationship between IC measured under the VAIC and ROE for 96 companies listed in ASE, over the period 2006–2008.

Ousama and Fatima (2015) founded a higher IC efficiency which measured using VAIC of the Islamic Banks in Malaysia over the period 2008–2010. In addition, the researcher founded that HCE is higher than the SCE and CEE.

While, Ozkan et al. (2017), who founded the financial performance of the Turkish banking sector is a positive affected by HCE and CEE, and Girma (2017) founded there is a positive relationship between VAIC and ROE of the Ethiopian commercial banks for five years from 2009–2013. While Sharabati et al. (2016), study the impact of IC on business performance in Kuwaiti telecommunication industries.

So the main objective of the study is to examine the influence of IC which measured using VAIC on the return equity ratio among commercial banks listed in ASE.

3 The problem and hypotheses of the study

Technological and technical developments in the communication revolution have led to the increased importance of IC and measured it has become a concern for corporate management including commercial banks to measure their real financial performance and competitive situation (Momani, 2017), according to Sharabati et al. (2016), the IC concept is not known to the company's managers in Jordan.

The problem of the study can be explained in the following main question: what is the impact of IC which measured using VAIC on the ROE of the commercial banks listed on ASE?

The following sub-questions from the main:

1 What is the relationship between CEE and ROE among the commercial banks listed on ASE?

2 What is the relationship between HCE and ROE among the commercial banks listed on ASE?

3 What is the relationship between SCE and ROE among the commercial banks listed on ASE?

According to problem statement, and to answer the questions of the study the researchers suggested the hypotheses. The first hypothesis specifically to understand the impact of IC on the ROE among commercial banks in ASE by VAIC model the researchers suggested the following hypothesis:

H0 There is no significant effect or association between IC VAIC and ROE of the commercial banks listed on ASE.

The main hypothesis can be divided into sub-hypotheses to understand the impact of IC components on the ROE among commercial banks in ASE by VAIC model the researchers suggested the following hypotheses as the following:

H0a There is no significant effect between CEE and ROE of the commercial banks listed on ASE.

H0b There is no significant effect between HCE and ROE of the commercial banks listed on ASE.

H0c There is no significant effect between SCE and ROE of the commercial banks listed on ASE.

4 Research methodology

The study employed an explanatory research design to measure the causal relationships among the study variables.

Table 1 Commercial banks in ASE

No. of bank	*Bank name*	*Symbol*
1	Arab Bank	ARBK
2	Housing BK TRD FIN	THBK
3	Capita Bank	EXFB
4	Jordan Ahli Bank	AHLI
5	Cairo Amman Bank	CABK
6	Bank of Jordan	BOJX
7	JOR Islamic Bank	JOIB
8	Arab JOR/INV/Bank	AJIB
9	Bank AL Etihad	UBSI
10	JCBANK	JCBK
11	Socgen BK – Jordanie	SGBJ
12	Jor Kuwait Bank	JOKB
13	Invest Bank	INVB
14	Safwa Islamic Bank	JDIB

Source: http://www.ase.com.jo

4.1 Sample selection and data collection

The sample of the study consists of all commercial banks listed in ASE, there are 15 banks. This study adopted timeline over six years beginning in 2010 and ending in 2015. The banks selected within the sample are shown in Table 1.

4.2 Dependent, independent variables measurement

4.2.1 Dependent variable

In this study, the dependent variable is the return on equity, which measures the profitability of firms by knowing the amount of profit the firm earns from the funds invested in it (Maditinos et al., 2011).

$$ROE = Net\ Income / Shareholders\ Equity$$

4.2.2 Independent variable

In this study, used VAIC model (Pulić, 2008). The VAIC is the aggregation of three components:

1 CEE

2 HCE

3 SCE (Sledzik, 2013).

So, VAIC = CEE + HEE + SCE.

The techniques computing VAIC model as the following:

1 Calculated the VA:

VA = P + C + D + A (Pulić, 2008)

where

- P = operating profit
- C = employee cost
- D = depreciation
- A = amortisation.

2 According to Momani (2017), the calculating of VAIC components as the following steps:

a HCE = VA / HCE

where HCE = human capital efficiency

VA = value added

CE = total expenditure on employees.

b SCE = SC / VA

where SCE = structural capital efficiency

VA = value added

SC = structural capital = VA – HC.

c CEE = VA / CE

where CEE = capital employed efficiency

VA = value added

CE = capital employed = book value of the net asset for a company (Pulić, 2008)

And finally, VAIC = CEE + HCE + SCE.

4.2.3 Linear multiple regression

Statistical analysis of the study using the SPSS program by the simple and multiple linear regression models to determine the effect of IC and its components on financial performance in the banking sector. *The simple and multiple regression models* of the main hypothesis as in the following (Pouraghajan et al., 2013):

$$H0 : ROE = \alpha_0 + \alpha_1 VAIC + \varepsilon$$

$$H0_{a,b,c} : ROE = \alpha_0 + \alpha_1 CEE + \alpha_2 HCE + \alpha_3 SCE + \varepsilon$$

The researcher developed the following models to find the impact of human and structural capital on the return on equity ratio of banks:

ROE return on equity ratio

VAIC value added intellectual coefficient

CEE capital employed efficiency

HCE human capital efficiency

SCE structural capital efficiency.

5 Empirical results

5.1 Descriptive statistics

Table 2 present descriptive statistics of all variables of present study. The banks ranked it according to the value of VAIC and found that the highest rates of VAIC are respectively: Socgen BK Jordanie (15.37620) and Arab JOR/INV/Bank (8.73027), Capita Bank (8.64573). Banks with the lowest rate of VACA were Safwa Islamic Bank (2.07264), Arab Bank (4.469680) and Jordan Ahli Bank (5.12673).

Table 2 shows the most important component of VAIC which is HCE represents up to 84.04% of VAIC then SCE represents about 10.8% of VAIC finally CEE. The finding is consistent with the prior studies by Ozkan et al. (2017 and Lipunga (2014).

Table 3 refers to the annual values of the study variables, where founded the rate of VAIC during the period 2010–2015 equals 7.1903, this is higher than, Al-shubiri's (2011) study on the banking sector in Jordan during the period 2002–2007 were the rate of VAIC equal 1.469 that refers to the Jordanian banks take more importance of IC and development it, especially human capital, which was equal in the Al-shubiri's (2011) study about 0.9963 (67.82%). While in this study, it has risen up to 6.0428 (84.04%).

These results are consistent with the prior studies (Abdulsalam et al., 2011; Chatzoudes et al., 2011; Lipunga, 2014; Alhassan and Asare, 2016; Ozkan et al., 2017).

Table 2 Dependent and independent in the Jordanian banking sector

Bank name	*IV*				*DV*
	CEE	*HCE*	*SCE*	*VAIC*	*ROE*
Socgen BK Jordanie	0.35191	14.13063	0.89366	15.37620	6.59936
Arab JOR/INV/Bank	0.41180	7.45418	0.86429	8.73027	10.25268
Capita Bank	0.36829	7.42391	0.85352	8.64573	6.45907
Bank AL Etihad	0.36214	6.91620	0.85313	8.13147	8.07178
Jor Kuwait Bank	0.34986	6.79875	0.85228	8.00089	11.83855
Invest Bank	0.36907	6.11321	0.83398	7.31626	8.67928
Housing BK TRD FIN	0.33324	6.06683	0.83500	7.23507	10.43361
JCBANK	0.44650	5.54430	0.81433	6.80514	4.85903
JOR Islamic Bank	0.51259	5.25756	0.80498	6.57512	15.66251
Bank of Jordan	0.42039	5.00830	0.80002	6.22871	13.32885
Cairo Amman Bank	0.56208	4.58025	0.78120	5.92353	15.32649
Jordan Ahli Bank	0.44746	3.93531	0.74396	5.12673	8.56785
Arab Bank	0.27642	3.51055	0.70983	4.49680	6.12090
Safwa Islamic Bank	0.09645	1.85957	0.11663	2.07264	1.29912
Mean	0.37916	6.04282	0.76834	7.19033	9.10708

Table 3 Mean for VAIC and its components

Year	*HCE*	*SCE*	*CEE*	*VAIC*
2010	5.6391	0.6288	0.3803	6.6482
2011	7.5097	0.7996	0.3485	8.6578
2012	5.4535	0.7979	0.3666	6.6180
2013	6.1323	0.7999	0.4060	7.3382
2014	6.0760	0.7993	0.4124	7.2877
2015	5.4464	0.7845	0.3611	6.5920
Mean	6.0428	0.7683	0.3792	7.1903
Percentage	84.0410	10.6858	5.2731	100.0000

Table 4 Descriptive statistics

Variables	*Mean*	*Std. deviation*	*Minimum*	*Maximum*
VAIC	7.1903	2.9589	2.0726	15.3762
CEE	0.3792	0.1102	0.0965	0.5621
HCE	6.0428	2.8159	1.8596	14.1306
SCE	0.7683	0.1939	0.1166	0.8937
ROE	9.1071	4.0457	1.2991	15.6625

Table 4 presents descriptive statistics of study, include mean, and standard deviation, of the study variables, as observing results indicate that: the average of VAIC is equal to 7.1903 which divided to three components that are: CEE has average 0.3792, the average of HCE 6.0428 that is maximum amount of VAIC, and SCE average 0.7683. Also, the ROE average is 9.1071 that show a good performance of the management in gaining income from equity in Jordanian banks and these results opposite (Pouraghajan et al., 2013).

5.2 Correlation matrix

The Pierson correlation coefficient between study variables provides an initial preview of the results, which indicates the correlation matrix in Table 5.

Pearson correlation is used to find the relationship between the variables of the study and its direction.

Table 5 Correlation matrix

Variables	*CEE*	*HCE*	*SCE*	*VAIC*	*ROE*
CEE	1				
HCE	0.154	1			
SCE	0.689**	0.596*	1		
VAIC	0.229	0.996**	0.659*	1	
ROE	0.758**	0.025	0.521	0.086	1

Note: **Correlation is significant at the 0.01 level.
*Correlation is significant at the 0.05 level.

Table 5 shows that there is a positive and significant correlation at a level less than 1% error between CEE and SCE, and there is a weak link at a significant level 5% error between HCE and SCE. The correlation between HCE and the rest of the study variables is not related. This result is similar to the results of some previous studies which showed that the invested capital is positively related to SCE as a study (Pouraghajan et al., 2013; Alhassan and Asare, 2016; Ozkan et al., 2017).

5.3 Regression analysis and hypothesis testing

The mean hypothesis of the study as the following:

H0 There is no significant effect between VAIC and ROE of the commercial banks listed on ASE.

The regression model for this hypothesis can be written as follows:

$$H0_a : ROE = \alpha_0 + \alpha_1 VAIC + \varepsilon$$

$$H0_{1a} : ROE = 8.2601 + 0.1178 * VAIC + \varepsilon$$

To test the validity of the study hypotheses and the effect of VAIC on ROE of commercial banks in Jordan, the researcher used the simple and multiple regression model. The regression analysis results are presented in Table 6.

First main hypothesis indicates that there is insignificant relationship between VAIC with ROE ratio of the commercial banks listed on ASE at a level of 0.05. The amount of R^2 is 0.0074 for the model which shows that the VAIC is explained just about 0.74% changes of ROE. Thus, the results are same with the results of past studies (Chatzoudes et al., 2011; Mondal and Ghosh, 2012; Pouraghajan et al., 2013) but contradict with the study by Al-shubiri (2011). Coefficient (β) is equal to 0.1178 means that the increase of one JD in the VAIC will increase the shareholder's equity in Jordan commercial banks at about 0.1178.

Table 6 Regression analysis between VAIC and ROE

Variable	*ROE*		
	Coefficient	*t*	*t sig*
Constant	8.2601	2.7156	0.0188
VAIC	0.1178	0.2995	0.7696
R		0.0862	
R^2		0.0074	
F		0.0897	
F Sig		0.7696	

To apply regression analysis, the data must follow the normal distribution for data that show in Figure 1.

Figure 1 Normal distribution ROE (see online version for colours)

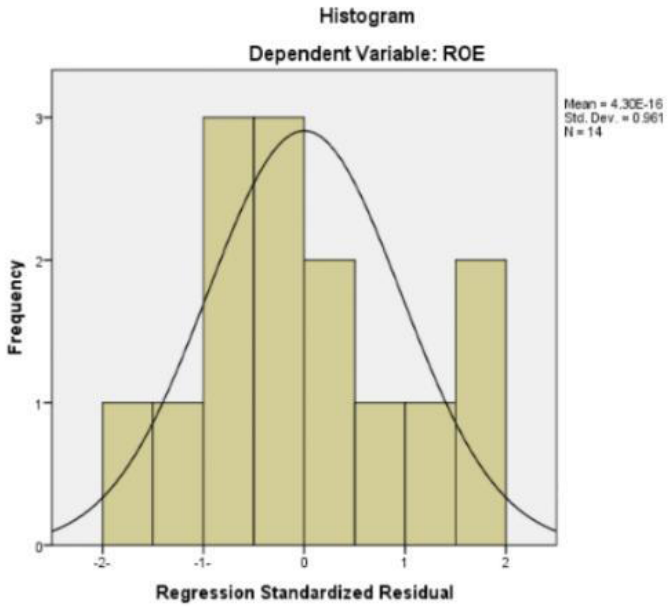

Figure 2 indicates the form and a regression equation between VAIC and ROE.

To test the validity of the study sub-hypotheses and the effect of VAIC components CEE, HCE and SCE on ROE of commercial banks in Jordan, the researcher used the

simple and multiple regression model. The regression analysis results are presented in Table 7.

The regression model for this hypothesis can be written as follows:

$$H0_{a,b,c} : \text{ROE} = \alpha_0 + \alpha_1\text{CEE} + \alpha_2\text{HCE} + \alpha_3\text{SCE} + \varepsilon$$

$$\text{ROE} = -1.3288 + 24.7770\text{CEE} + (-0.2500\text{HCE}) + 3.3216\text{SCE} + \varepsilon$$

Figure 2 Regression equation between VAIC and ROE (see online version for colours)

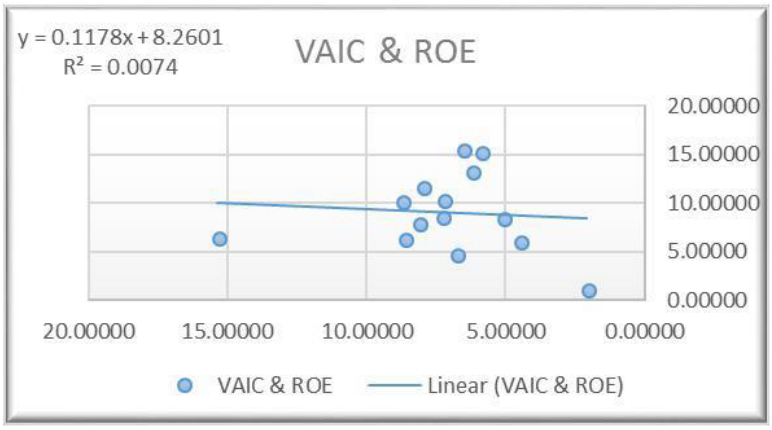

Table 7 Regression analysis between CEE, HCE, SCE and ROE

Variable	*ROE*		
	Coefficient	*t*	*t. sig*
Constant	–1.3288	–0.3864	0.7073
(CEE)	24.7770	2.1676	0.0554
(HCE)	–0.2500	–0.6188	0.5499
(SCE)	3.3216	0.4152	0.6868
R	0.7681		
R^2	0.5900		
F	4.7974		
F sig	0.0254		

Sub-hypothesis indicates that there is a significant relationship between VAIC elements with the ROE ratio of the commercial banks listed on ASE at a level of 0.05. The coefficient of correlation between the variables of the model R is about 0.7681. Likewise, the amount of R^2 is equal to 0.5900 for the model. These results show that the elements of VAIC will explains about 59% changes of ROE. The value of F is 4.7974 and F sig is 0.0254. Both values are lower than 0.05. It means that the results of sub-hypothesis were rejected. In other words, there is a statistically significant effect between the elements of IC and the rate of return on equity in commercial banks operating in Jordan at a level of significance (0.05).

6 Discussion and recommendations

This study investigated the impact of IC which measured through VAIC on the ROE for 14 commercial banks in ASE during the period 2010–2015.

The study revealed the effectiveness of ICE, which consists of the sum of both the HCE and SCE, constitutes 94.74% of the VAIC. This show the realisation of the management of commercial banks in Jordan of the importance of IC in banking especially HCE. Also, there is no relationship between VAIC and ROE, T sig = 0.7696 and the H0 insignificant F sig = 0.7696 at level 0.05 error. And no relationship between CEE, HCE, SCE, and ROE T sig respectively, 0.0554, 0.5499, 0.6868 and the $H0_{a,b,c}$ significant relationship between VAIC elements with the ROE ratio of the commercial banks listed on ASE at a level of 0.05 error.

7 Limitations of the study

The study has some of the limitations, these are:

1 Time limitations, this study only used six years study period. This will affect the data used in the study. The longer the period of the study, the data will be analysed represent the VAIC valuation of the bank's M/B ratio.

2 Objects used in this study are listed bank in ASE which amounted to only 14 banks.

8 Recommendations for banks organisation and future research

The researcher results may help managers establish distinctive strategic positions. Building competitive strategies for managing IC is important, therefore, banking organisations should adopt an IC strategy. Furthermore, the current management system at banking organisations ought to be seriously re-evaluated. They must be managed by policies, systems and programs not by individuals. The management banks in Jordan must be gives more attention to the development of IC, especially for employees or HC through training, increased rewards, wages, and salary.

Finally, authors are recommended that the authors in the future studies first increase the size of the sample to include other sectors in the ASE and secondly, increase the study period. Further empirical researches involving data collection over diverse countries are needed, although most variables may have room for further instrument refinement. More coordination and cooperation between academic institutions and organisations especially between the basic and the secondary research are recommended.

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