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# Intellectual capital and firm performance

## Differentiating between accounting-based and market-based performance

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### Abstract

**Purpose** – This study sheds light on the relation between intellectual capital and firm performance. The study argues that traditional performance measurement based on accounting is still able to explore the relation between intellectual capital and performance.

**Design/methodology/approach** – The study was conducted at 198 firms from two Gulf Cooperation Council countries: Kingdom of Saudi Arabia and Kingdom of Bahrain for the period 2014–2016. To measure intellectual capital, the value added intellectual coefficient model was adopted along with two measures of performance: accounting-based performance which is return on assets and market-based performance which is Tobin's Q, in addition to the Random-Effects Regression.

**Findings** – Study findings came up with evidences that support the relationship between intellectual capital and accounting-based performance, but negates any relation between intellectual capital and market-based performance. The findings also revealed different results, between Saudi Arabia's and those of Bahrain.

**Originality/value** – The study contributes to the debate on the validity of relating intellectual capital to the traditional accounting-based performance.

**Keywords** Firm performance, Accounting-based performance, Market-based performance, Intellectual capital, Bahrain bourse, Saudi financial market

**Paper type** Research paper

### 1. Introduction

In the last decade, the subject of intellectual capital was of great interest for scholars, after the world has shown an apparent concern with knowledge economy. Intellectual capital was acknowledged to be one of the basic factors of firm performance (Serenko and Bontis, 2013). The intellectual capital has three dimensions depending on the perspective through which it is viewed. These are: human capital, based on human resources, structural capital relying on organizations and finally relational capital based on coordinating the relation between the organization and the surrounding environment (Jardon and Dasilva, 2017).

Many endeavors have been adapted to measure intellectual capital and many others to measure its impact on firm performance. Researchers debated the issue of suitability of performance and traditional measures based on accounting standards to explain the firm's actual performance and its relation to intellectual capital. Pulic (2000) sees that traditional performance measures are not suitable to measure performance throughout knowledge economy. He claims that measures of industrial economy are unable to be of real value which has already been created. Many creative attempts have been conducted throughout the last decades to measure firm performance based on non-traditional methods. Some of them were linked to shareholder value analysis that include many measures such as: Return



on Investment or Economic Value Added (EVA) or other market-based measures such as Tobin's Q.

The intellectual capital is one of the intangible assets which can't be accurately measured. [Frykman and Tolleryd \(2010\)](#) see that the intellectual capital includes all non-financial assets which don't appear in the balance sheet of any firm. The difficulty in measuring and reporting intellectual capital stems from the accounting standards based on traditional accounting practices. With reference to standard no. 38 (IAS 38) international accounting of standard (IASB, 2004), which deals with the intangible assets, reveals that it is not easy to specify and measure elements of intellectual capital in firms through the practices of traditional accounting that leaves a gap between the firm's book and market values ([Rahman, 2012](#)). [Pulic \(1998a, 1998b\)](#) made up a methodology which was widely used to measure the efficiency associated with the components of intellectual capital and the capital comprising the physical and financial ones, based on the concept of value added ([Iazzolino and Laise, 2013](#)).

This paper is concerned with the relation between intellectual capital and both accounting-based performance and the market-based one. Evidence is provided from GCC countries: KSA and Bahrain, where listed firms in the financial markets in these two countries were taken as a sample. Saudi Arabia, the largest country in the Gulf regarding population and economic potentials and Bahrain the smallest country in the Gulf. The comparison gives clear indications of the role of intellectual capital in the GCC and its relation to firm performance. Such evidences might contribute to financial literature on the relation between intellectual capital and performance. Empirical evidences from emerging markets are provided. Our findings argue against what both [Alcaniz et al. \(2011\)](#) went up to that accounting as a traditional concept to measure performance was unable to confront new challenges for intellectual capital and against [Gowthorpe \(2009\)](#) who said that intellectual capital didn't fit into accounting traditional models. Our study reveals that performance accounting measures are related to intellectual capital.

The rest of this paper is organized as follows: in the second part, the literature were discussed and study hypotheses developed and the third part sheds light on study methodology, study sample, study model and methods of measuring variables. The fourth part presents the descriptive study; the fifth the empirical study and tests the hypotheses; the sixth and final part provides conclusion, limitations and future studies.

## 2. Literature review and hypothesis development

Investment in knowledge and intellectual capital has become one of the most important investments to create competitive advantage for the firm and to improve its performance. [Pulic \(1998a, 1998b\)](#) created a methodology, widely used, to measure the efficiency related to the constituents of both intellectual capital and financial capital, with reference to the concept of value added. This measurement has been known as the value added intellectual coefficient (VAIC) ([Iazzolino and Laise, 2013](#)). The major goal of Pulic model was to create a measure of performance for a knowledge-based organization. He sees that knowledge investment has become one of the most important investments to create a competitive advantage for the firm. This measure was widely used by researchers looking for a relation between intellectual capital and performance. [Firer and Mitchell Williams \(2003\)](#) used VAIC measure to discover the role played by intellectual capital in returns based on accounting measure which is ROA and on assets to turn over (ATO) and the other to assess market performance in South Africa. As for [Bassi and van Buren's \(1999\)](#) study, it was one of the earliest ones which examined the relation between intellectual capital and firm performance. The study was applied to 500 American firms. Results of the study showed that there was a

direct relation between intellectual capital and performance of American firms. By applying VAIC methodology, [Chen et al. \(2005\)](#) concluded that there was a relation between intellectual capital constituents and performance. In Thailand, [Phusavat et al. \(2011\)](#) study found that there was a positive relationship between intellectual capital and each of the ROA and (ROE) and employee's productivity. In Indonesia, Razafindrabinina and Anggerini (2011) found a positive relation between performance and intellectual capital. A comparative study by [Nimtrakoon \(2015\)](#), conducted on five Asian countries on the relation between intellectual capital and its relation to financial performance and market value, found that there was a direct relation between intellectual capital in both financial performance and market value. In Singapore, [Tan et al. \(2007\)](#) Study found a positive relation between VAIC model and firm performance. The study of [Zeghal and Maaloul \(2010\)](#) found positive indications in the relation between intellectual capital and the performance of British firms.

In the Middle East, many attempts were done to measure the influence of intellectual capital on firm performance. [Sharabati et al. \(2010\)](#) indicated that measuring and reporting intellectual capital was an urgent need for senior managers working in medicine firms in Jordan, as such an issue was important for their decisions. In Iran, [Alipour \(2012\)](#) examined the relation between intellectual capital constituents and (ROA) using VAIC model. The findings showed that there was a direct relation with statistical significant between intellectual capital and the performance of Iranian insurance firms.

In the Arab Gulf states, many attempts were done to measure the impact of intellectual capital on the performance of firms. Recently, a study by [Hamdan et al. \(2017\)](#) examined the role of corporate governance as a moderation variable in the relation between intellectual capital and the performance of KSA firms. The study found a positive impact of governance on improving the relation between intellectual capital and the performance. This attempt was preceded by many researches such as: [Al-Musali and Ismail \(2014\)](#) who investigated the relation between intellectual capital and performance, using VAIC model. The results showed a decrease in the positive relation between KSA intellectual capital and firm performance between 2008 and 2010. The study also showed that there was a variation between intellectual capital constituents and performance. In Bahrain, [Ismail and Karem \(2011\)](#) examined the relation between intellectual capital and the performance of banks in the country. It came up to similar results regarding the positive impact of intellectual capital on the performance of Bahrain banks. In Kuwait, [AbdulSalam et al. \(2011\)](#) found a positive relation between intellectual capital and performance using VAIC model. [Sharabati et al. \(2016\)](#) study indicated that relational capital has the highest impact on Kuwait's telecommunication organizations' business performance, followed by human capital and finally structural capital.

In an extensive study, [Al-Musalli and Ismail \(2012\)](#) investigated the performance of intellectual capital and its relation to corporate governance variables in 74 GCC banks between 2008 and 2011 using VAIC input. The results showed that board size, family and institutional ownerships all have a significant statistical relation to intellectual capital. This relation between intellectual capital and performance was influenced by the consequences of the global financial crisis ([El-Bannany, 2012](#)).

Most of past studies found a positive relation between intellectual capital and firm performance in several economies of developed and developing countries, but still another group of studies didn't find any relation between them. [Iazzolino and Laise \(2013\)](#) saw that the results of such studies were based on standard economy so they failed in coming up to homogeneous results. Those studies didn't tackle the theoretical parts brought up by [Pulic \(1998a, 1998b\)](#) with regard to coping with accounting principles. For example, [Celenza and Rossi \(2014\)](#) didn't find any statistically significant relationship between constituents of

intellectual capital, financial performance and market value in Italian firms. [Morariu \(2014\)](#) study found a relation between intellectual capital on one side and productivity, profitability and market value, but didn't find any relation between them in Romanian companies. Some other studies went farther in finding even a negative relation between intellectual capital and performance, as revealed in [Britto \*et al.\* \(2014\)](#) conducted in Brazil at real estate firms.

The real contribution of our study is that it differentiates between the accounting-based performance and the market-based one and the extent of influence efficiency of intellectual capital leaves upon them. Our study is a comparative one with regard to past methodology because it is conducted on two GCC countries each of which has its own economic and social backgrounds. Therefore, it will provide those who are in charge of this vital economic sector in the Gulf with useful information. Thus, the study adds up to past literature concerned with studying the influential factors in firm performance.

Based on discussion of past literatures, the study builds its essential hypothesis on the following: there is no positive relationship with statistical significance between intellectual capital and firm performance. In compliance with this basic hypothesis, we can build many sub-hypotheses as intellectual capital comprises of several elements which are: Human Capital Efficiency HCE, Structural Capital Efficiency SCE and Capital Employed Efficiency CEE. Performance is classified into two categories; the first is the accounting-based performance ROA; the second is the market-based performance, the Tobin's Q. Thus, the study built six sub-hypotheses affiliated with six standard testing models.

### 3. Research design and methodology

#### 3.1 Study sample

Data of the study were collected from two GCC countries: Saudi Arabia and Bahrain. The study comprises 171 firms from 15 sectors of the Saudi financial market and 27 firms from 6 sectors of Bahrain Bourse through the period 2014–2016. The selected firms of the sample were subjected to different terms among which are: the firm shouldn't have merged with other companies through the period of study, it should submit all requested data to evaluate study variables and it shouldn't have been denied trading through the study period.

#### 3.2 Study models and methods of measuring variables

The study dependent variable is performance and constituents of intellectual capital an independent. A set of control variables were added to the model, as performance is divided into two parts: accounting-based and market based, so we can construct the following two models. In the first model, the accounting-based performance of the firm through ROA can be expressed as follows:

$$ROA_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Age_{it} + \beta_5 Size_{it} + \beta_6 Sector_{it} + \varepsilon_{it} \quad (1)$$

As for the second study model, the market-based performance, it was expressed through Tobin's Q, as follows:

$$TQ_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Age_{it} + \beta_5 Size_{it} + \beta_6 Sector_{it} + \varepsilon_{it} \quad (2)$$

where: ROA: is the ratio of net income divided by total assets of company (i), in the period (t). Tobin's Q is the ratio of current liabilities plus market value of share capital divided by total assets of company (i), in the period (t).  $\beta_0$ : is the constant and  $\beta_{1-6}$ : is the slope of the

controls and independent variables.  $HCE_{it}$ : the ratio of value added, divided by Human capital, of company (i), in the period (t).  $SCE_{it}$ : the ratio of structural capital divided by value added, for the company (i), in the period (t).  $CEE_{it}$ : the ratio of value added divided by capital employed, for the company (i), in the period (t).  $Age_{it}$ : the number of years since the company was established, for the company (i), in the period (t).  $Size_{it}$ : is a logarithmic variable, the total assets of the company, for the company (i), in the period (t).  $Sector_{it}$ : is a dummy variable, the area of the economy in which companies work in the same field or have related product or service, for the company (i), in the period (t).  $\varepsilon_{it}$ : random error.

Usually, study results which depend on accounting-based performance differ from those which depend on market measurement due to the shortage of data which investors receive. Consequently, the market performance is negatively or positively influenced, away from the actual performance of the company. For this reason, the study used the two measurements in an attempt to better understand the influence of intellectual capital on performance. Study variables were measured as explained in Table I.

#### 4. Descriptive statistics and comparative study

Table II presents the descriptive statistics of study variables in both Saudi financial market and Bahrain Bourse through the period of the study. The table shows a difference between the accounting-based performance and the market-based one in both KSA and Bahrain. We notice that ROA were better in Bahrain companies than in KSA, but this difference was not statistically significant. As for market-based performance, through Tobin's Q index, it was clear that it was better in KSA firms than in those of Bahrain, with statistical significance at less than 1 per cent. Such results give us preliminary indications about the difference which might occur in returns, because of the measure used.

Regarding intellectual capital, we notice that KSA was distinguished in the first two measurements: first and second HCE and SCE with a statistical significant for the first. Bahrain was distinguished in CEE index with a statistical significant.

Variables	Labels	Measurements
<i>Dependent variables</i>		
Accounting-based performance	ROA	Is the ratio of net income divided by total assets
Market-based performance	Tobin's Q	Is the (Market value of equity + Book value of short-term liabilities) ÷ Book value of total assets
<i>Independent variables</i>		
Human capital efficiency	HCE	Is the ratio of value added divided by Human capital. Where: Value added = Operating profit + employee cost + Depreciation. Where: The Human capital = Total costs invested on employees
Structural capital efficiency	SCE	Is the ratio of Structure Capital divided by value added. Where: The Structural capital = Value added - human capital
Capital employed efficiency	CEE	Is the ratio of value added divided by capital employed. Where: Capital employed = Equity + long term liabilities
<i>Moderator variable</i>		
Control variables		
Firm Size	Size	The total assets of the company
Firm Age	Age	The number of years since the company was established
Industrial dummy	Sector	Dummy variable that equals one for industrial companies, otherwise 0

**Table I.**  
Measuring of  
variables

**Table II.**  
Descriptive statistics

Variables	Descriptive statistics			Mean difference tests		
	Mean	SD	Maximum	Minimum	<i>t</i> -statistic	<i>z</i> -statistic
ROA	0.032 (0.044)	0.316 (0.049)	0.385 (0.173)	-6.746 (0.000)	-0.791 (0.429)	-0.698 (0.485)
Tobin's Q	1.914 (0.971)	1.661 (0.298)	12.720 (1.614)	0.042 (0.201)	11.665*** (0.000)	-6.220*** (0.000)
HCE	5.536 (2.915)	9.680 (6.034)	127.766 (22.413)	0.000 (-22.240)	3.258*** (0.001)	-0.261 (0.794)
SCE	0.800 (0.761)	1.281 (0.409)	24.826 (3.642)	0.000 (0.124)	0.539 (0.590)	-0.522 (0.602)
CEE	0.152 (0.318)	0.325 (1.066)	3.219 (5.122)	0.000 (-3.990)	-2.801*** (0.005)	-4.057*** (0.000)
Firm Size'000'000	20.134 (877)	59.505 (1,818)	434,878 (9,975)	42,000 (5,000)		
Firm Age	21.425 (24.630)	15.062 (13.137)	60,000 (53,000)	3,000 (2,000)		

**Notes:** In the descriptive statistics, the upper value is for KSA firms and the lower value in brackets for Bahrain firms. The *t*-statistic is based on parametric test two independent sample *t*-test, and *z*-statistic is based on non-parametric test Mann-Whitney *Z*. In the mean difference tests the upper value is for *t*/*z*-Statistic test and the lower value in brackets (*p*-value) is the probability value for this test. The difference is significant at: \*\*\* 1% level

#### 4.1 Performance comparison with regard to intellectual capital

Table III shows a performance comparison with regard to intellectual capital which was divided into three parts where we calculated the mean variable in each of them, then divided the sample according to mean value, afterward performance was compared.

Suitable tests were used to check the differences in performance in relation to the level of intellectual capital. It is noticed that in Human Capital Efficiency (HCE), KSA firms achieved a level of HCE in ROA higher than those with lower HCE. The difference was statistically significant.

It is also noted that ROA differed from those of Tobin's Q; firms with high level of HCE, achieved a lower market performance, according to Tobin's Q. The difference was statistically significant. The results support what we hypothesized in our study that there is a difference between the influence on intellectual capital based on accounting and the one based on market. Information differences between investors and decision makers in firms about their activities and future plans may create a gap in performance standards and that forces corporate governances and accounting disclosure to take measures to bridge this gap. The same applies to Bahrain firms. There was a difference in ROA which was in favor of firms with high level of HCE and the opposite was for Tobin's Q, but was with no statistical significant. As for the variable SCE, it was clear that KSA firms with high level of this variable have low levels of ROA and a high level of Tobin's Q. In Bahrain, the high levels of SCE secured a high level of ROA and a lower level of Tobin's Q. As for the variable CEE, accounting-based results matched with the market-based ones. We noticed that KSA firms that got a high level of CEE, achieved high levels of ROA and of Tobin's Q. Contrary to that, the firms that got low level of CEE got low levels of the two variables. In the two measures, the difference was of statistical significance. In Bahrain, the measure of ROA was the only one with statistical significance.

### 5. Empirical results

The null hypothesis of Hausman test assumes that capabilities of fixed-effect approach and random-effects approach are same, but if a null hypothesis is rejected, then this indicates

Performance and difference tests	Intellectual capital level											
	Human capital efficiency HCE				Structural capital efficiency SCE				Capital employed efficiency CEE			
	KSA		Bahrain		KSA		Bahrain		KSA		Bahrain	
	High HCE	Low HCE	High HCE	Low HCE	High SCE	Low SCE	High SCE	Low SCE	High CEE	Low CEE	High CEE	Low CEE
ROA	0.077	-0.014	0.047	0.041	0.048	0.015	0.049	0.038	0.066	-0.003	0.044	0.043
<i>t</i> -statistic	3.137		0.590		1.131		1.054		2.466		0.159	
<i>p</i> -value	0.002		0.557		0.258		0.295		0.014		0.874	
<i>z</i> -statistic	-7.289		-1.049		-0.640		-1.401		-13.464		-0.052	
<i>p</i> -value	0.000		0.294		0.522		-0.231		0.000		0.958	
Tobin's Q	1.714	2.117	1.020	0.920	1.777	2.054	0.954	0.989	2.143	1.685	1.043	0.901
<i>t</i> -statistic	-2.667		1.515		-1.830		-0.516		3.132		2.193	
<i>p</i> -value	0.008		0.134		0.068		0.607		0.002		0.032	
<i>z</i> -statistic	-2.000		-1.347		-2.363		0.161		-6.608		-2.352	
<i>p</i> -value	0.046		0.178		0.018		0.817		0.000		0.019	

**Notes:** The *t*-statistic is based on parametric test two independent sample *t* test, and *z*-statistic is based on non-parametric test Mann-Whitney Z

**Table III.**  
Intellectual capital  
level and firm  
performance



that random-effect approach is inappropriate, and it is therefore preferable to use fixed-effect approach. The Hausman  $\chi^2$  of the four models shown in Table IV and V are not statistically significant. This means that capabilities of random-effects approach is best representing the relationship. Regression analysis results in Tables IV and V reveal that the two study models are suitable and provide credible results. The constant value for each of them was statistically significant and the value of F-test for both was significant as well. From such results, we can tell that the second study model was the best in representing the relation between intellectual capital and performance, because of the adjusted R square which was bigger in the second model than the first.

### 5.1 Intellectual capital and accounting-based performance

HCE represents value added created by one financial unit invested in employees to develop their job skills and potentials (Gan and Saleh, 2008). In Table IV, we notice that HCE has a positive impact with statistical significance on ROA of KSA firms. The investment used in developing employees' skills was positively reflected on the profitability of Saudi firms. Such a result was not seen in Bahrain firms. Results showed that HCE had a positive influence, but with no statistical significance on ROA. Investment in human capital in Bahrain firms had a positive impact on performance, but never reached the level of significant factors which might influence such a performance. Huang and Hsueh (2007), saw that the poorest relation between performance and intellectual capital was the human capital relationship.

Variables	Accounting based performance model: ROA			
	KSA Model		Bahrain model	
	$\beta$	<i>t</i> -statistic	$\beta$	<i>t</i> -statistic
Constant	0.053	2.516** (0.001)	0.110	2.452** (0.015)
<i>Intellectual capital components</i>				
Human capital efficiency (HCE)	0.128	2.072** (0.039)	0.039	0.733 (0.465)
Structural capital efficiency (SCE)	0.067	2.527** (0.012)	0.023	3.607*** (0.000)
Capital employed efficiency (CEE)	0.676	3.656*** (0.000)	0.032	1.322 (0.188)
<i>Control variables</i>				
Firm size	-0.891	-1.033 (0.302)	-0.069	-2.175** (0.031)
Firm age	0.140	3.960*** (0.000)	-0.060	-1.705* (0.090)
Sector	-0.003	-1.986** (0.048)	0.067	1.894* (0.060)
$R^2$		0.131		0.187
Adjusted $R^2$		0.117		0.163
<i>F</i> -Statistic		9.538***		7.775***
<i>p</i> -value ( <i>F</i> -Statistic)		0.000		0.000
<i>Hausman Test</i>				
$\chi^2$ -Statistic		2.676		4.139
<i>p</i> -value ( $\chi^2$ )		0.750		0.530

**Notes:** This table reports the regression results using the ordinary-least-squares with firm and year fixed-effects. All regressions are estimated with robust standard errors clustered at the firm level. *t*-Critical: at  $df=513$ , and confidence level of 99% is 2.326 and level of 95% is 1.645 and level of 90% is 1.282. *F*-Critical (df for denominator  $n-\beta-1 = 513-8-1 = 504$ ) and (df for numerator =  $\beta = 8$  and confidence level of 99% is 2.79 and confidence level of 95% is 2.09 and confidence level of 10% is 1.77. The upper value is for *t*-statistic test and the lower value in brackets (*p*-value) is the probability value for this test. Symbols mean significance at: \* 10%, \*\* 5% and \*\*\*1% levels

**Table IV.**  
Random-effect  
results for ROA  
model

These results conform to those of [Meditinos et al. \(2011\)](#) study which discovered a positive relationship between HCE and return on equity, and that of [Shiu \(2006\)](#) which found a positive relationship between VAIC constituents and ROA. [Sydler et al. \(2013\)](#) saw that the increase in intellectual capital is related to the increase in ROA through time.

Investors give a higher value for the companies of high SCE level as they are privileged for higher gains and incessant growth in revenues ([Chen et al., 2005](#)). ([Gan and Saleh, 2008](#)) considered SCE an index of value added efficiency of the structural capital. The results presented in [Table IV](#) show that SCE variable has a positive impact with statistical significant on the performance of KSA and Bahrain firms and that conforms to our hypothesis which confirms the positive impact of VAIC constituents-SCE-on firm performance. This result conforms to results of past studies like that of [Clarke et al. \(2010\)](#) which found a positive relationship between intellectual capital and performance. In general, [Chang \(2013\)](#), saw that constituents of intellectual capital had a direct or indirect positive impact on firm performance. [Lu et al. \(2014\)](#) support the idea that intellectual capital has a positive impact on firm operative efficiency of which ROA. [Sumedrea \(2013\)](#) saw that in times of crises, firms for their development, depend on human and structural capitals.

CEE measures the new value made by one investment unit in the capital used in the firm ([Boujelbene and Affes, 2013](#)). This measurement reflects the success to which the firm reached in best investing its capital to create the value added for the firm. With reference to our results, we notice that this variable had a positive impact on returns of Saudi and Bahrain firms. Such a thing reflects the success these firms achieved through the best investment of their capitals to create value added and that was positively reflected in the ROA. It is noticeable that this relation was statistically significant, solely in KSA firms.

### 5.2 Intellectual Capital and market-based performance

The results of [Daryae et al. \(2011\)](#) indicate that firm-market value (known as Tobin's Q) is positively related to intellectual capital, while accounting-based firm performance (here ROA) doesn't relate to intellectual capital. But we got counter results: the ones in [Table V](#) show that all VAIC constituents have no statistically significant relation, whatsoever to Tobin's Q except for HCE variable in Bahrain. Some of its variables even had a negative impact with no statistical significance on the firm market value such as SCE and CE in the Bahrain model. Our results cope with the results of [Ferraro and Veltri \(2011\)](#) which didn't find any meaningful relation between intellectual capital and market value. The results of [Mehralian et al. \(2012\)](#); [Tanideh \(2013\)](#) failed to find any relation between intellectual capital and market value.

Our study argues that there is a difference between the accounting and market-based measures with regard to relation with intellectual capital. The results of other studies such as: [Chu et al. \(2011\)](#); [Gan and Saleh \(2008\)](#); [Clarke et al. \(2011\)](#), confirm our findings. [Stankeviciene and Liucvaitiene \(2012\)](#) see that the impact of intellectual capital is conditioned by firm size and activity and managers' attitude toward intellectual capital. Thus, [Jazzolino and Laise \(2013\)](#) assert that performance measures proposed prior to Pulic's VAIC can never be real competitive measures for traditional performance.

### 5.3 Additional results

The study provides additional results on firm size and age. It was found that firm size negative relates to performance in ROA and Tobin's Q models in KSA and Bahrain, with a difference of statistical significance. Large firms might not use their assets to the best to create returns when compared to small ones characterized by assets limitation, but with high efficiency using them to create returns. As for firm age, results varied between the two models Tobin's Q and ROA and also between KSA and Bahrain. Firm age in KSA was positively related to ROA with

Variables	Market-based performance model: Tobin's Q			
	$\beta$	KSA Model <i>t</i> -Statistic	Bahrain model $\beta$	<i>t</i> -Statistic
Constant	9.892	9.584*** (0.000)	0.790	2.487** (0.014)
<i>Intellectual capital components</i>				
Human capital efficiency (HCE)	0.005	0.414 (0.679)	0.012	2.765*** (0.006)
Structural capital efficiency (SCE)	0.029	0.570 (0.569)	-0.018	-0.434 (0.665)
Capital employed efficiency (CEE)	0.588	1.576 (0.116)	-0.005	-0.003 (0.998)
<i>Control variables</i>				
Firm size	-0.496	-7.927*** (0.000)	-0.007	-0.322 (0.748)
Firm age	-0.002	-0.303 (0.762)	-0.011	-0.431 (0.667)
Sector	-0.100	-3.247*** (0.001)	0.024	0.973 (0.332)
$R^2$		0.182		0.068
Adjusted $R^2$		0.166		0.031
<i>F</i> -Statistic		11.661***		1.818*
<i>p</i> -value ( <i>F</i> -Statistic)		0.000		0.099
<i>Hausman test</i>				
Chi <sup>2</sup> -Statistic		2.143		8.820
<i>p</i> -value (Chi <sup>2</sup> )		0.816		8.820

**Notes:** This table reports the regression results using the ordinary-least-squares with firm and year fixed-effects (FE). All regressions are estimated with robust standard errors clustered at the firm level. *t*-Critical: at  $df=513$ , and confidence level of 99% is 2.326 and level of 95% is 1.645 and level of 90% is 1.282. *F*-Critical (df for denominator  $n-\beta-1 = 513-8-1 = 504$ ) and (df for numerator  $=\beta = 8$  and confidence level of 99% is 2.79 and confidence level of 95% is 2.09 and confidence level of 10% is 1.77. The upper value is for *t*-Statistic test and the lower value in brackets (*p*-value) is the probability value for this test. Symbols mean significance at: \* 10%; \*\* 5% and \*\*\* 1% levels

**Table V.**  
Random-effect  
results for Tobin's Q

statistical significance, while it was negatively related to market value without statistical significance. As for Bahrain, firm age was negatively related, with no statistical significance, to the return in each of the two models: Tobin's Q and ROA.

## 6. Conclusion

No one can deny that intellectual capital has today become one of the most important assets of the firm and that the investment increase in intellectual capital leads to a rise in firm value (Berzkalne and Zelgalve, 2013). Results in past studies differed on the relation between intellectual capital and performance regarding the measurement used in calculating that performance. Many studies argued that traditional accounting measures of performance were unable to catch the relation between intellectual capital and performance. This kind of argument created a gap good for this research study to work with through providing additional evidence from the Gulf states investigating this relation. The study adopted random-effect regression model to examine the impact of three components of intellectual capital through two measures of performance ROA as an accounting measure and Tobin's Q as a market-based measurement. The sample of study comprised 171 firms from KSA and 27 from Bahrain.

Results showed that there was a difference in some constituents of intellectual capital between KSA and Bahrain. As a result, the difference between the two countries was clear with regard to the impact of intellectual capital on firm performance. In general, the results showed that the accounting-based traditional measure ROA could catch the relation between intellectual capital and performance. Contrary to that of the market-based measurement

Tobin's Q. Though these results, differed from those of past studies, yet they provide an evidence on the relation between intellectual capital and performance in emerging markets. This evidence adds up to past studies, but still it is controlled by economic conditions in which such countries live. Therefore, conducting more of such studies to confirm the results is important before generalizing them. Adding more new variables to the relation, such as the role of corporate governance, remains a reasonable factor to comprehend the general picture of the role of intellectual capital in firm performance in emerging markets.

## References

- Abdulsalam, F., Al-Qaheri, H. and Al-Khayyat, R. (2011), "The intellectual capital performance of Kuwaiti banks: an application of vaicTM1 model", *iBusiness*, Vol. 3 No. 1, pp. 88-110.
- Alcaniz, L., Gomez-Bezares, F. and Roslender, R. (2011), "Theoretical perspectives on intellectual capital: a backward look and a proposal for going forward", *Accounting Forum*, Vol. 35 No. 2, pp. 104-117.
- Alipour, M. (2012), "The effect of intellectual capital on firm performance: an investigation of Iran insurance companies", *Measuring Business Excellence*, Vol. 16 No. 1, pp. 53-66.
- Al-Musali, M.A.K. and Ismail, K.N.I.K. (2014), "Intellectual Capital and its effect on financial performance of banks: evidence from Saudi Arabia", *Procedia-Social and Behavioral Sciences*, Vol. 164, pp. 201-207.
- Al-Musalli, M.A.K. and Ismail, K.N.I.K. (2012), "Corporate governance, bank specific characteristics, banking industry characteristics, and intellectual capital (IC) performance of banks in Arab Gulf cooperation council (GCC) countries", *Asian Academy of Management Journal of Accounting and Finance*, Vol. 8 No. 1, pp. 115-135.
- Bassi, L.J. and Van Buren, M.E. (1999), "Valuing investments in intellectual Capital", *International Journal of Technology Management*, Vol. 18 Nos 5/6/7/8, pp. 414-432.
- Berzkalne, I. and Zelgalve, E. (2013), "Intellectual Capital and company value", *Procedia - Social and Behavioral Sciences*, Vol. 110, pp. 887-896.
- Boujelbene, M.A. and Affes, H. (2013), "The impact of intellectual capital disclosure on cost of equity capital: a case of French firms", *Journal of Economics, Finance and Administrative Science*, Vol. 18 No. 34, pp. 45-53.
- Britto, D., Monetti, E. and Lima, J. (2014), "Intellectual Capital in tangible intensive firms: the case of Brazilian real estate companies", *Journal of Intellectual Capital*, Vol. 15 No. 2, pp. 333-348.
- Celenza, D. and Rossi, F. (2014), "Intellectual capital and performance of listed companies: empirical evidence from Italy", *Measuring Business Excellence*, Vol. 18 No. 1, pp. 22-35.
- Chang, W.S. (2013), "Are R&D and intellectual property rights related to the firm's financial performance? The perspectives on intellectual capital", *International Journal of Technology, Policy and Management*, Vol. 13 No. 3, pp. 245-260.
- Chen, M.C., Cheng, S.J. and Hwang, Y. (2005), "An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance", *Journal of Intellectual Capital*, Vol. 6 No. 2, pp. 159-176.
- Chu, S.K.W., Chan, K.H., Yu, K.Y., Ng, H.T. and Wong, W.K. (2011), "An empirical study of the impact of intellectual Capital on business performance", *Journal of Information & Knowledge Management*, Vol. 10 No. 1, pp. 11-21.
- Clarke, M., Seng, D. and Whiting, R.H. (2010), "Intellectual capital and firm performance in Australia", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 505-530.
- Clarke, M., Seng, D. and Whiting, R.H. (2011), "Intellectual capital and firm performance in Australia", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 505-530.
- Daryae, A., Pakdel, A., Easapour, K. and Khalafu, M.M. (2011), "Intellectual Capital, corporate value and corporate governance (evidence from Tehran stock exchange (TSE))", *Australian Journal of Basic & Applied Sciences*, Vol. 5 No. 2, pp. 821-826.

- El-Bannany, M. (2012), "Global financial crisis and the intellectual Capital performance of UAE banks", *Journal of Human Resource Costing & Accounting*, Vol. 16 No. 1, pp. 20-36.
- Ferraro, O. and Veltri, S. (2011), "The value relevance of intellectual Capital on the firm's market value: an empirical survey on the Italian listed firms", *International Journal of Knowledge-Based Development*, Vol. 2 No. 1, pp. 66-84.
- Firer, S. and Mitchell Williams, S. (2003), "Intellectual capital and traditional measures of corporate performance", *Journal of Intellectual Capital*, Vol. 4 No. 3, pp. 348-360.
- Frykman, D. and Tolleryd, J. (2010), *Corporate Valuation*, 2nd ed., Prentice Hall, London.
- Gan, K. and Saleh, Z. (2008), "Intellectual capital and corporate performance of technology-intensive companies: Malaysia evidence", *Asian Journal of Business and Accounting*, Vol. 1 No. 1, pp. 113-130.
- Gowthorpe, C. (2009), "Wider still and wider? A critical discussion of intellectual capital recognition, measurement and control in a boundary theoretical context", *Critical Perspectives on Accounting*, Vol. 20 No. 7, pp. 823-834.
- Hamdan, A., Buallay, A. and Alareeni, B. (2017), "The moderating role of corporate governance on the relationship between intellectual capital efficiency and firm's performance: Evidence from Saudi Arabia", *International Journal of Learning and Intellectual Capital*, Vol. 15 No. 3, pp. 1-24.
- Huang, C. and Hsueh, S. (2007), "A study on the relationship between intellectual Capital and business performance in the engineering consulting industry: a path analysis", *Journal of Civil Engineering and Management*, Vol. 8, pp. 265-271.
- Iazzolino, G. and Laise, D. (2013), "Value added intellectual coefficient (VAIC): a methodological and critical review", *Journal of Intellectual Capital*, Vol. 14 No. 4, pp. 547-563.
- Ismail, K.N.I.K. and Kareem, M.A. (2011), "Intellectual capital and financial performance of banks in Bahrain", *Journal of Business Management and Accounting*, Vol. 1 No. 1, pp. 63-77.
- Jardon, C.M. and Dasilva, A. (2017), "Intellectual capital and environmental concern in subsistence small businesses", *Management of Environmental Quality: An International Journal*, Vol. 28 No. 2, pp. 214-230.
- Lu, W.-M., Wang, W.-K. and Kweh, Q.L. (2014), "Intellectual capital and performance in the Chinese life insurance industry", *Omega (United Kingdom)*, Vol. 42 No. 1, pp. 65-74.
- Maditinos, D., Chatzoudes, D., Tsairidis, C. and Theriou, G. (2011), "The impact of intellectual capital on firms' market value and financial performance", *Journal of Intellectual Capital*, Vol. 12 No. 1, pp. 132-151.
- Mehralian, G., Rasekh, H.R., Akhavan, P. and Sadeh, M.R. (2012), "The impact of intellectual Capital efficiency on market value: an empirical study from Iranian pharmaceutical companies", *Iranian Journal of Pharmaceutical Research*, Vol. 11, pp. 195-207.
- Morariu, C. (2014), "Intellectual capital performance in the case of Romanian public companies", *Journal of Intellectual Capital*, Vol. 15 No. 3, pp. 392-410.
- Nimtrakoon, S. (2015), "The relationship between intellectual Capital, firms' market value and financial performance: Empirical evidence from the ASEAN", *Journal of Intellectual Capital*, Vol. 16 No. 3, pp. 587-618.
- Phusavat, K., Comepa, N., Sitko-Lutek, A. and Ooi, K.B. (2011), "Interrelationships between intellectual Capital and performance: empirical examination", *Industrial Management & Data Systems*, Vol. 111 No. 6, pp. 810-829.
- Pulic, A. (1998a), "Measuring the performance of intellectual potential in the knowledge economy", *The 2nd World Congress on the Management of Intellectual Capital*, Hamilton, ON, 21-23 January.
- Pulic, A. (1998b). "Measuring the performance of intellectual potential in knowledge economy". *2nd McMaster Word Congress on Measuring and Managing Intellectual Capital by the Austrian Team for Intellectual Potential*.
- Pulic, A. (2000), "VAICT - an accounting tool for IC management", *International Journal of Technology Management*, Vol. 20 Nos 5/6/7/8, pp. 702-714.

- Rahman, S. (2012), "The role of intellectual capital in determining differences between stock market and financial performance", *International Research Journal of Finance and Economics*, Vol. 89 No. 1, pp. 46-77.
- Serenko, A. and Bontis, N. (2013), "Investigating the current state and impact of the intellectual Capital academic discipline", *Journal of Intellectual Capital*, Vol. 14 No. 4, pp. 476-500.
- Sharabati, A.A.A., Naji Jawad, S. and Bontis, N. (2010), "Intellectual capital and business performance in the pharmaceutical sector of Jordan", *Management Decision*, Vol. 48 No. 1, pp. 105-131.
- Sharabati, A., Shamari, N., Nour, A., Durra, A. and Moghrabi, K. (2016), "The impact of intellectual capital on business performance in Kuwaiti telecommunication industry", *International Journal of Business Performance Management*, Vol. 17 No. 4, pp. 428-446.
- Shiu, H. (2006), "The application of the value added intellectual coefficient to measure corporate performance: evidence from technological firms", *International Journal of Management*, Vol. 23, pp. 356-365.
- Stankeviciene, A. and Liucvaitiene, A. (2012), "Aspects of intellectual capital evaluation", *Business: Theory and Practice*, Vol. 13, pp. 79-93.
- Sumedrea, S. (2013), "Intellectual capital and firm performance: a dynamic relationship in crisis time", *Procedia Economics and Finance*, Vol. 6, pp. 137-144.
- Sydler, R., Haeffiger, S. and Prukša, R. (2013), "Measuring intellectual capital with financial figures: can we predict firm profitability?", *European Management Journal*, Vol. 32 No. 2.
- Tan, H.P., Plowman, D. and Hancock, P. (2007), "Intellectual capital and financial returns of companies", *Journal of Intellectual Capital*, Vol. 8 No. 1, pp. 76-95.
- Tanideh, S. (2013), "Relationship between innovation capital and intellectual capital with value and financial performance", *Life Science Journal*, Vol. 10, pp. 251-254.
- Zeghal, D. and Maaloul, A. (2010), "Analysing value added as an indicator of intellectual capital and its consequences on company performance", *Journal of Intellectual Capital*, Vol. 11 No. 1, pp. 39-60.

### Further reading

- Gan, K., Saleh, Z., Abessi, M. and Huang, C.C. (2013), "Intellectual capital disclosure in the context of corporate governance", *International Journal of Learning and Intellectual Capital*, Vol. 10 No. 1, pp. 52-70.
- Iazzolino, G., Laise, D. and Marraro, L. (2012), "Business multicriteria performance analysis: a tutorial", *Benchmarking: An International Journal*, Vol. 19 No. 3, pp. 395-411.
- Pulic, A. (2008), *The Principles of Intellectual Capital Efficiency. A Brief Description*, Croatian Intellectual Capital Center, Zagreb.
- Sarea, A. and Alansari, S. (2016), "The relationship between intellectual capital and earnings quality: evidence from listed firms in Bahrain bourse", *International Journal of Learning and Intellectual Capital*, Vol. 13 No. 4, pp. 302-315.
- Singh, S., Sidhu, J., Joshi, M. and Kansal, M. (2016), "Measuring intellectual capital performance of Indian banks: a public and private sector comparison", *Managerial Finance*, Vol. 42 No. 7,
- Stewart, G.B. (1991), *The Quest for Value: A Guide for Senior Managers*, Harper Business, New York, NY.

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