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The impact of intellectual capital on firms' market value and financial performance: case study of Tunis Stock Exchange

تأثير رأس المال الفكري على القيمة السوقية والأداء المالي للشركات: دراسة حالة بورصة تونس للأوراق المالية

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Abstract:

The purpose of this study is to examine the impact of intellectual capital (IC) on firms' market value and financial performance. The empirical data were drawn from a sample of 16 Tunisian firms listed in the Tunis Stock Exchange (TSE), from six different economic sectors, observed over the ten years of 2008 to 2017. Various regression models were examined to test the hypotheses included in the proposed conceptual framework. Using the Value Added Intellectual Coefficient (VAIC) methodology and Market to Book value ratio, results failed to support the hypotheses about the relation between IC and firms' market value, only concluding that there is a statistically significant relationship between IC and its components and financial performance except for working capital efficiency that is not related to financial performance. Several arguments have been advanced to explain these results are related to the general context of the study community, the global financial crisis and the Tunisian revolution.

Keywords: Intellectual capital; value added intellectual coefficient; Market to Book value ratio; Financial performance; Tunis Stock Exchange.

JELClassificationCodes: O34, G32.

ملخص:

الغرض من هذه الدراسة هو دراسة تأثير رأس المال الفكري على القيمة السوقية والأداء المالي للشركات. تم استخلاص البيانات التجريبية من عينة من 16 شركة مدرجة في البورصة التونسية، من ستة قطاعات اقتصادية مختلفة، لوحظت على مدى السنوات العشر مـــن 2008 إلى 2017. تم فحص نماذج الانحدار المختلفة لاختبار الفرضيات المدرجة في الإطار المفاهيمي المقترح. باستخدام منهجية معامل القيمة الفكرية المضافة (*VAIC*) ونسبة القيمة السوقية إلى الدفترية، فشلت النتائج في دعم الفرضيات حول العلاقة بين رأس المال الفكري والقيمة السوقية للشركات بينما توصلت إلى وجود علاقة ذات دلالة إحصائية بين رأس المال الفكري ومكوناته والأداء المالي باستثناء كفاءة رأس المال العامل التي لا علاقة لها بالأداء المالي. العديد من الحجج تم تقديمها لتفسير هذه النتائج مرتبطة بالسياق العام لمجتمع الدراسة، الأزمة المالية العالمية والثورة التونسية.

كلمات مفتاحية: رأس المال الفكري، معامل القيمة الفكرية المضافة، نسبة القيمة السوقية إلى الدفترية، الأداء المالي، سوق تونس المالي.

تصنيفاتJEL : O34، G32.

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INTRODUCTION:

Several studies (Stewart, 1997; Tseng and Goo, 2005; Maditinos, 2011; Fourati and Afes, 2013) have confirmed that the gap between the market and the book value of firms is widening. This gap has been explained by IC which gives a clear picture that the additional value that does not appear in the accounting reports is as a result of investing in IC. This argument has been supported and interpreted by many researchers such as the Fourati and Afes (2013) interpretation that firms referring to higher intangible assets will have a positive response from the market. This is evidenced by the observation that the intangible assets of the firms evaluated increased in the 1980s and 1990s and that the ratio between market value and book value increased continuously. However, there was almost a similar large decrease in the ratio with the explosion of the "Internet bubble" in 1999. As a result, many academic critics advocate a better understanding of this phenomenon, because if it is said that 80 percent of the firm value represented in IC is not recorded in the balance sheet, this, on the one hand, misses an opportunity to understand how IC resources can create value, and on the one hand Others this led to above Academics that the current financial accounting systems are not sufficient to determine the value of economic resources and that this is problematic because the firm's net assets are less than its value. Also, the empirical studies that investigated this relationship were concluded with contradictory results. This opens the way for further investigations on this matter. From the above, the following question can be asked:

To what extent the intellectual capital affects the firm value and its financial performance?

The present paper makes an attempt to enrich the IC literature, thus, hypothesizing:

H1. Companies with greater IC have higher ratios of market-to-book value.

Thus, it is hypothesized:

H1a. Companies with greater capital employed efficiency have higher ratios of market-to-book value.

H1b. Companies with greater human capital efficiency have higher ratios of market-to-book value.

H1c. Companies with greater structural capital efficiency have higher ratios of market-to-book value.

Besides, it is hypothesized that the greater the IC, the higher the financial performance:

H2. Companies with greater IC have better financial performance.

Thus, it is hypothesized:

H2a. Companies with greater capital employed efficiency have better financial performance.

H2b. Companies with greater human capital efficiency have better financial performance.

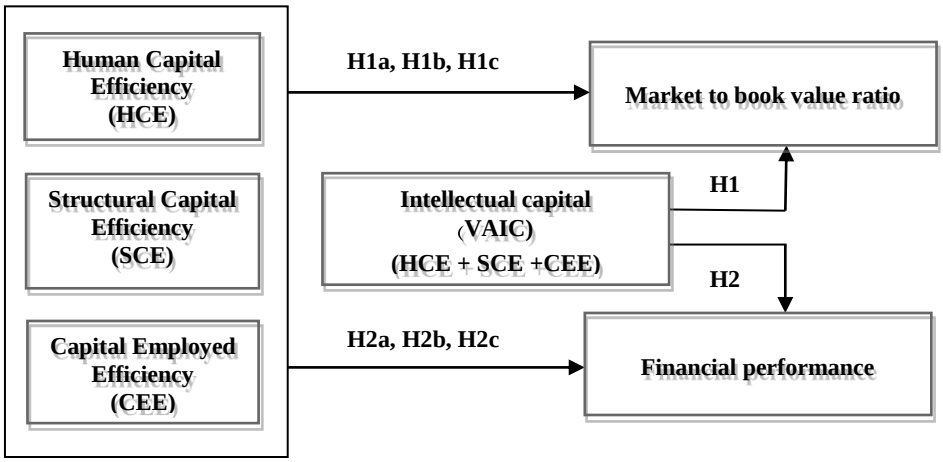
H2c. Companies with greater structural capital efficiency have better financial performance.

Figure 1 summarizes all the above hypotheses, thus, presenting the proposed conceptual framework of the study.

This study used the value-added Intellectual Coefficient (VAIC) methodology to measure IC. It is a global index developed by Ante Pulic (Pulic, 2000) to measure the efficiency of value creation in a firm that uses accounting-based numbers. It represents a measure of business efficiency in a knowledge-based economy. This methodology was

chosen due to the dependence of VAIC on the disclosed accounting data, which facilitated the collection of data and the conduct of the applied study.

Fig. (1): The conceptual framework of the study



Source: Prepared by the researcher based on previous studies.

The main objective of the present study is to examine the relationship between IC, market value and financial performance to test the two major theories of IC, the first theory states that IC explains the gap between the market value and the book value of the firm while the second theory states that the IC detection and disclosure leads to increased profitability (Dumay, 2012). The IC measurement methodology was based on the studies of Maditinos (2011) and Fourati and Afes (2013). The empirical investigation was conducted using data drawn from a sample of 16 Tunisian firms listed in the Tunis Stock Exchange (TSE), from six different economic sectors, observed over the ten years of 2008 to 2017. Moreover, based on the aforementioned VAIC methodology, the study, analytically examines the separate effects of capital employed efficiency, human capital efficiency, and structural capital efficiency on market value and financial performance.

The following section includes a short literature review concerning the main variables of the study. In the secand and third sections, the research methodology and the results are being discussed. The conclusion and bibliography List are presented in sections 4 and 5 respectively.

1- Literature review

Three authors contributed greatly to the IC concept formulation, Stewart, Edvinson and Malone, as Stewart defined it as: "intellectual resources such as knowledge, experience, information, and intellectual property that can be used to create wealth" (Stewart, 1997). As for Edvinson and Malone, they have defined it as possessing knowledge, application experience, organizational technology, customer relations, and professional skills that provide a competitive advantage in the market (Edvinson and Malone, 1997).

Many studies have gathered on the positive relationship between IC and the firm market value (Stewart, 1997; Tseng and Goo, 2005; Swartz and Swartz, 2006; Wang, 2008; Maditinos, 2011; Fourati and Afes, 2013). This demonstrates that IC explains the gap between market and book value. Many other studies have not been able to prove this

relationship (Najibullah, 2005; Puntillo, 2009; Maditinos et al, 2011; Chang and Hsieh, 2011; Roodposhti and Rajaei, 2011; Ferraro and Veltri, 2011; Mehralian et al, 2012). Besides, Many studies supported the existence of a positive relationship between IC and financial performance, with no relationship between IC and firm value (Puntillo, 2009; Zéghal and Maaloul, 2010; Maditinos et al., 2011; Chang and Hsieh, 2011).

Empirical studies that used the VAIC approach to investigating the impact of IC on different financial variables have been concluded with contradictory results (Maditinos et al, 2011). This raises criticism about the effectiveness of this approach, which is related to the context in which these studies are conducted, most empirical studies have been conducted in emerging and developing countries (South Africa, Taiwan, Malaysia, Turkey, Singapore, Thailand, and Bangladesh), because of its easy implementation, and is based on basic accounting procedures and limited reporting requirements (compared to other methods of measurement). One can assume that the failure of VAIC to verify the important relationships between IC and various commercial variables (market value, productivity, financial productivity, etc.) is due not to the inefficiency of the VAIC itself, but to ignore the intellectual assets of emerging and developing-country firms and their inefficient operation of the capital market (the latter has an impact on the relationship between IC and Market valuation).

2- Research methodology

2-1 Sample and data selection

The applied study targeted the firms listed on the Tunis Stock Exchange TSE. The final sample consists of 16 Tunisian firms listed in the TSE. These firms belong to six economic sectors (according to official sector classification): Consumer services sector (3 firms), health sector (1firm), The consumables sector (4 firms), Industry sector (5 firms), Basic materials sector (2 firms) and Oil and gas sector (1firm). The selected data cover a period of then years, from 2008 to 2017. The initial target of the study was to draw data from all firms listed in the TSE (approximately 51 firms with constant participation in the TSE for the then-year examination period).

As a first stage of specifying the sample, banks and financial institutions were excluded due to some specific considerations - numbering 22 institutions so that the study is limited to 29 firms. As a second stage of the sample selection, the 6 firms that did not publish their financial reports for one of the study years were excluded. The sample now includes 23 firms. To ensure the validity of the data, the conditions that were identified in the previous studies were adopted, namely the exclusion of firms with a negative book value of property rights, or firms with a negative value for human capital or structural capital from the sample, the number of these firms is 7 firms. Thus, the final sample includes 16 firms.

2-2 Variable definition

2-2-1 Independent variables

The independent variable is IC, measured by the VAIC Factor, a global indicator developed by (Pulic, 2000) to measure the value creation efficiency of a firm using accounting-based numbers, and represents a measure of business efficiency in a knowledge-based economy. Firms with a higher VAIC indicate that they create higher value through the use of all available resources, i.e. IC, human capital, structural capital, and physical capital.

This procedure is unique in its flexibility to apply to both the macro and micro level for the following reasons (Swartz and Swartz, 2006):

- The methodology can be used to develop an understanding of the IC performance of a single firm, group of specific firms, business sectors, or the entire capital market**;**
- The methodology provides a uniform and consistent basis for measurement, which allows national and international comparison**;**
- All data used in the equation are based on audited information, if the measurements can be considered objective and verifiable**.**

VAIC is calculated in four steps (Laing et Al., 2010):

The first step is to calculate the added value VA, where:

VA = Operational Profit OP + Employee Costs EC + Depreciation D + Amortization A.

When calculating the added value, the costs of workers are added back to the operating profit, because in this case it is treated as part of the IC. Thus, it is considered a type of asset.

The second step is to calculate the intellectual capital IC, where:

IC = HC human capital + structural capital SC,

HC = EC = salaries, wages ...,

SC = VA- HC.

The human capital efficiency is then calculated as HCE, SCE structural capital efficiency, ICE intellectual capital efficiency, and CEE capital employed efficiency. Where:

HCE = VA / HC, an indicator of the efficiency of human capital resources in adding value;

SCE = SC / VA, an indicator of the efficiency of structural capital resources in adding value;

ICE = HCE + SCE, reflects the efficiency of the value created by IC.

CEE = VA / CE, where CE = the book value of capital employed. This indicator indicates the amount of value added created by capital employed.

Finally, the VAIC is calculated, where:

VAIC = ICE + CEE. This indicator measures the firm's efficiency in creating value.

2-2-2 Dependent variables

The dependent variable is the firm value that was measured by the market to book value ratio. This indicator was chosen due to the reasons explained by Mehralian and others (2012) and confirmed by many researchers, that the traditional accounting measurement of the value in the balance sheet is not sufficient to confirm the role of intangible assets as a source of economic value and wealth. The reliance on these measures may mislead stakeholders and decision makers in allocating their resources, because it may only lead to showing the accountant's perspective towards achieving performance.

The market to book value ratio is calculated in the following way (Maditinos et Al., 2012, pp. 140-147):

The market to book value ratio = the market value of ordinary shares MV/ the book value of ordinary shares BV, where:

Market value = number of shares x share price at the end of the year;

Book value = Total Assets - Total Liabilities.

The second dependent variable is the financial performance of the firm. Some indicators that reflect the firm's financial performance were calculated. They are: profitability ratios and investment ratios. It is represented as follows (Collier, 2003):

Net Profit Margin NPM = Net Income NI / Business Turnover BT.

Return on Assets ROA = Income Before Interest and Taxes IBIT/ total assets TA.

Retern On Equity ROE = Net Income NI / Stockholder's Equity SE.

The net profit margin shows the firm's ability to generate profit from sales after all costs have been subtracted, and it gives an indication that the unit price can be determined. While the return on assets index shows the management's ability to generate profits from each of the firm's dinars. While the rate of return on private funds measures the return on the dinar invested by ordinary shareholders (private funds) and is considered a comprehensive indicator of the firm's performance because it gives an indication of how managers use the owners' money to achieve profitability (Collier, 2003, pp. 84 - 87).

2-3 Regression models

This study aims to test the effect of IC on the firm value and its financial performance. Therefore, four indicators were prepared that translate value and financial performance through four models.

The first and second models test the relationship between VAIC and the market to book value ratio, the relationship between HCE, SCE, CEE, and the market to book value ratio, while the third and fourth regression models (from 3a to 4c) test the relationship between the VAIC and the firm financial performance (NPM, ROA, ROE), and the relationship between HCE, SCE, CEE and the firm financial performance (NPM, ROA, ROE).

The first model: the market to book value ratio = constant + value added intellectual coefficient

H1: $M / B = a0 + a1VAIC + e$ …… (1)

The second model: the market to book value ratio = constant + human capital efficiency + structural capital efficiency + capital employed efficiency

H1a, H1b, H1c: $M / B = a0 + a1HCE + a2SCE + a3CEE + e$ …… (2)

The third model:

Net profit margin = constant + value added intellectual coefficient

H2: $NPM = a0 + a1VAIC + e$ …… (3a)

Return on assets = constant + value added intellectual coefficient

H2: $ROA = a0 + b1VAIC + e$ ……. …… (3b)

Return on equity= constant + value added intellectual coefficient

H2: $ROE = a0 + c1VAIC + e$ …….. (3c)

The fourth Model:

Net profit margin = constant + human capital efficiency + structural capital efficiency + capital employed efficiency

H2a, H2b, H2c: $NPM = a0 + a1HCE + a2SCE + a3CEE + e$ …….. (4a)

Return on assets = constant + human capital efficiency + structural capital efficiency + capital employed efficiency

H2a, H2b, H2c: ROA = b0 + b1HCE + b2SCE + b3CEE + e …….... (4b)

Return on equity = constant + human capital efficiency + structural capital efficiency + capital employed efficiency

H2a, H2b, H2c: ROE = c0 + c1HCE + c2SCE + c3CEE + e ……..... (4c)

3- Results and discussion

3-1 Descriptive statistics and correlation analysis

Table (1) provides descriptive statistics for dependent and independent variables. It includes the upper and lower limits, the mean and the standard deviation, for 160 observations in each of the study variables.

Table (1): Descriptive statistics for all study variables

statistic	HCE	SCE	ICE	CEE	VAIC	M/B	NPM	ROA	ROE
minimum	1,198	0,165	0,688	-880,517	-877,775	-16,828	-0,128	-0,056	-1,556
maximum	908,12	0,877	9,006	23,461	26,410	72,208	0,411	0,205	4,693
mean	3,083	0,608	3,671	-5,086	-1,415	4,281	0,091	0,083	0,109
standard deviation	701,45	0,156	1,611	69,498	69,595	9,7401	0,091	0,053	0,446

Note: observations numbers: 160, missing values: 0

Source: Based on the results of the SPSS program.

Through the average efficiency of IC (3,6716, standard deviation = 1,6112) in the firms under study, it was found that the firms performance in relation to their IC is successful. It indicates that firms invest in human and structural resources and these investments are a considering part of the added value in the firm. Whereas, every dinar invested in human capital and structural capital achieves for the studied firms, respectively, 3,0833 and 0.6084 dinars of added value.

The average value-added intellectual coefficient (-1,4152, standard deviation = 69,5951) shows that the firms under study have no ability to create value, especially from their material resources because the capital employed efficiency is negative (-5,0868). In return, They have the ability to create value from its intellectual resources (ICE = 3,6716).

The comparison between capital employed efficiency (-5,0868, standard deviation = 69,4980) and human capital efficiency (3,0833, standard deviation = 701,45) and structural capital efficiency (0,6084, standard deviation = 0 (1569), showed that during the period 2008-2017, the studied firms significantly improved their value through human capital rather than structural and working capital, since each dinar invested in working capital costs the firm a loss in added value of 5 , 0868 dinars. This finding is consistent with the findings of Fourati and others in their studies.

The mean of the market to book value ratio (4,2817, standard deviation = 9,7401) indicates that the investors value the firms listed on the Tunis Stock Exchange with more than their book value of the net assets. It also indicates that 76.64 percent of the market value does not appear in the financial statements of the studied firms:

Hidden value = [(4,2817 - 1) /] 4,2817 * 100 = 76.64%.

This research supports empirical research that confirmed an increasing gap between the market value and the book value of firms. Fourati and others studied 21 firms listed on the Tunis Stock Exchange during the period 2002-2006 and concluded that about 38% of the firms' market value was removed from the financial statements. While this percentage reached 50% in a longitudinal study (2006-2008) by Maditinos and others on the Athens market. While it does not exceed 24% in the study of Tseng and Goo for 289 listed companies in the Hong Kong Stock Exchange 2000.

The financial performance of the study sample is relatively good, especially noting that all indicators of NPM, ROA, ROE are positive but low, especially NPM (0,0918, standard deviation = 0,0913) and ROA (0,0839, standard deviation = 0,0538).

Correlation analysis provides a preliminary examination of the results (table 2), where the linear correlation coefficient of Pearson shows that the market to book value ratio is not statistically significant at the level of significance ($\alpha = 0.05$) except with one of the components of the VAIC which is the structural capital efficiency only, but this Correlation is negative and weak. Besides, there is no statistically significant correlation between the human capital efficiency, the IC efficiency, the capital employed efficiency, the VAIC and M /B.

Table (2): Correlation analysis for selected study variables

Variable	HCE	SCE	ICE	CEE	VAIC	M/B	NPM	ROA	ROE
HCE	1	0,890	*0,987	0,052	0,075	-0,131	0,477	0,545	0,064
SCE		1	*0,894	0,037	0,057	*-0,172	*0,503	*0,625	-0,009
ICE			1	0,048	0,071	-0,134	*0,468	*0,553	0,056
CEE				1	*0,999	0,017	0,074	0,066	0,017
VAIC					1	0,0147	0,0849	0,079	0,018
M/B						1	*-0,174	-0,143	*-0,367
NPM							1	*0,693	0,048
ROA								1	0,101
ROE									1

Note: *Correlation significant at the 0.05 level

Source: Based on the results of the SPSS program.

It is noted that the human capital efficiency is statistically significant only with the IC efficiency, and this correlation is positive and strong. This is a logical result because the human capital efficiency is an important part of the IC efficiency.

On the other hand, both structural capital efficiency and IC efficiency are positively related statistically with net profit margins and return on assets. As this correlation is a strong and positive between the structural capital efficiency and the net profit margin and return on assets and weak and positive between the IC efficiency and the net profit margin, while strong and positive between the IC efficiency and return on assets.

3-2 Hypothesis testing

In this part of the study, the study hypotheses will be tested, through simple linear regression models to test the relationship between VAIC and M / B, and between VAIC and financial performance indicators. Also, through multiple linear regression models to test the relationship between the VAIC and M / B components, and between the VAIC components and the financial performance indicators**.**

A statistically significant negative relationship between VAIV and M / B was shown in Table (3). This doesn't support H1's hypothesis that firms with a high VAIC have a high market-to-notebook ratio.

Table (3): Regression results – Model 1: M/B and VAIC

Estimated parameters		Statistical characteristics of the model			
Constant	**a_1**	**F**	numerator freedom Degree	Denominator freedom Degree	**Sig.**
8.036	-0.779	8.732	1	151	0.004
Note: Significant at the 0.05 level					

Source: Based on the results of EXCEL/STATA and SPSS programs.

The results of Table (4) don't provide any support for the partial hypotheses H1a, H1b, H1c, as the results demonstrated that there is no statistically significant relationship between both human capital efficiency, structural capital efficiency, capital employed efficiency and the M/ B ratio.

Table (4): Regression results – Model 2: M/B and VAICs components

Independent variables	Coefficients (a_1, a_2, a_3)	**Standard error**	t	Sig(t)	F	Sig(F)	R^2
Constant	12,191	3,806	3,203	0,001			
HCE	0,706	0,173	0,607	0,544	1,745	0,160	0,032
SCE	-16,557	0,173	-1,538	0,125			
CEE	0,003	0,078	0,282	0,778			

Source: Based on the results of EXCEL/STATA and SPSS programs.

On the other hand, according to the results of Table (5), there was a significant positive relationship between VAIC, net profit margin and return on assets. This confirms the validity of the second hypothesis H2 that firms with a high VAIC have a high financial performance represented by the net profit margin and return on assets.

Table (5): Regression results – Model 3: financial performance and VAIC

		NPM	ROA	ROE
Estimated parameters	constant	0.027	0.060	0.117
	a_1	0.018	0.006	0.006
Statistical characteristics of the model	**F**	49.160	23.275	0.114
	numerator freedom Degree	1	1	1
	Denominator freedom Degree	137	147	138
	Sig.	0.000	0.000	0.736

Source: Based on the results of EXCEL/STATA and SPSS programs.

Finally, tables (6), (7) and (8) show the results of multiple regression:

Table (6): Regression results – Model 4a: NPM and VAICs components

Independent variables	Coefficients (a_1, a_2, a_3)	Standard error	t	Sig(t)	F	Sig(F)	R^2
Constant	-0,068	0,031	-2,195	0,029	18,271	< 0.0001	0,260
HCE	0,008	0,009	0,904	0,367			
SCE	0,220	0,088	2,499	0,013			
CEE	0,000	0,000	0,767	0,444			

Source: Based on the results of EXCEL/STATA and SPSS programs.

Table (7): Regression results – Model 4b: ROA and VAICs components

Independent variables	Coefficients (a_1, a_2, a_3)	Standard error	T	Sig(t)	F	Sig(F)	R^2
Constant	-0,0506	0,0167	-3,037	0,002	33,813	< 0.000	0,394
HCE	-0,0023	0,0051	-0,444	0,657			
SCE	0,2328	0,0471	4,944	< 0.000			
CEE	0,0000	0,0000	0,715	0,475			

Source: Based on the results of EXCEL/STATA and SPSS programs.

Table (8): Regression results – Model 4c: ROE and VAICs components

Independent variables	Coefficients (a_1, a_2, a_3)	Standard error	t	Sig(t)	F	Sig(F)	R^2
Constant	0,338	0,175	1,932	0,055	1,407	0,242	0,026
HCE	0,109	0,053	2,039	0,043			
SCE	-0,929	0,495	-1,875	0,062			
CEE	0,000	0,000	0,136	0,891			

Source: Based on the results of EXCEL/STATA and SPSS programs.

tables (6), (7) and (8) show a significant correlation between structural capital efficiency and net profit margin, and between structural capital efficiency and return on assets. This supports the hypothesis H2b that firms with high structural capital efficiency have high financial performance. On the other hand, the H2a hypothesis was confirmed that firms with high human capital efficiency have high financial performance, by having a significant positive relationship between the human capital efficiency and the return on equity.

3-3 Results discussion

The results obtained are consistent with the findings of several studies that have used the VAIC methodology in studying the relationship between IC and the M/B ratio (Najibullah, 2005; Puntillo, 2009; Maditinos et al, 2011; Chang and Hsieh, 2011; Mehralian et al, 2012). Even using different indicators to measure study variables, many studies found results similar to the current study (Roodposhti and Rajaei, 2011; Ferraro and Veltri, 2011).

Many studies supported the existence of a positive relationship between IC and financial performance, with no relationship between IC and firm value (Puntillo study, 2009; Zéghal and Maaloul, 2010; Maditinos et al., 2011; Chang and Hsieh, 2011).

Numerous explanations can be provided for these results, according to what was mentioned in previous studies. First, this relationship is meaningful in technology-intensive

firms (Goo and Tseng, 2005; Zéghal and Maaloul, 2010). Second, the imperfect performance of the studied capital market, in other places, where the financial markets are broad and highly efficient, business value can be obtained through the market value of the firm (Puntillo, 2009). Third, considerations related to the VAIC methodology. As the structural capital in this methodology may be incomplete because the spending on research, development and advertising is treated as expenses and therefore is not recorded as part of the structural capital (Komnenic and Pokrajcic, 2012). Nor does intellectual property appear in this heading especially that strategic intellectual property management is the way to increase influence and lead the firm to increase overall performance (Bollen et al., 2005). Fourth, the use of the VAIC methodology to assess this relationship in the context of emerging economies is because evaluation in those countries often depends on tangible assets and tends to forget about intangible assets (Maditinos, 2011). Fifth: The dependence of the studied firms on government ownership makes managers do not have a sufficient incentive to use IC to improve the efficiency of their business (Mehralian et al., 2012). Finally, Veltri and Ferraro (2011) found that only the internal analysis of a firm allows researchers to understand the firm's value creation process data. Research can only make progress if firms provide him with systematic, reliable (audited) information about their intangible assets. After obtaining the data, consideration must be given to the interaction of the elements of IC with each other and their interaction with physical capital as a way to create value.

CONCLUSION

In this applied chapter, the effect of IC on firm value was examined by studying a sample firms listed on the TSE during the period 2008-2017, numbering 16 firms from 6 different economic sectors. Given the multiplicity of methods of measuring study variables and the difficulty of applying most of them, the VAIC methodology has been adopted to measure IC because of the advantages it provides, such as relying on accounting data. Besides, it allows an objective comparison between several firms and sectors. It was also relied on the M/B ratio to measure the firm value to open further investigation on the existence of a gap between the market and the book value of the firm, which was explained by IC.

The results of analyzing the data using simple and multiple linear regression rates showed that, although the first major theory of IC explains the gap between the market value to the book value through IC, however, within the framework of the Tunisian firms listed on the stock exchange, the study was unable to explain the rate of 76.64 Percentage of the market value that was not included in the financial statements, by way of IC as measured by the VAIC or one of its components. Investors do not show any positive reaction to the published financial information about human capital, structural capital, or working capital, but rather they consider costs that burden the firm's budget. On the other hand, they interact with the financial results of the firm and this explains the existence of a strong correlation between VAIC and its components and financial performance indicators.

These results can be explained by several reasons, some of which are related to the efficiency of the Tunisian market. Elsewhere, where the financial markets are broad and highly efficient, business value can be obtained through the market value of the firm. Besides,

the study sample does not contain high-tech firms and other considerations related to the VAIC measurement methodology. Also, the dependence of the studied firms on government ownership makes managers do not have a sufficient incentive to use IC to improve the efficiency of their businesses.

On the other hand, (Ortiz, 2006) spoke of the context importance in measuring IC. Some assets are more valuable in one region (country, country, hemisphere, etc.) than others because of perception, resources, supply, demand, and fashion, etc. An examination of the context of measuring study variables finds that in emerging markets such as the Tunis Stock Exchange, investors are still unaware of the importance of IC in assessing the firm. This is evidenced by the fact that the firms value during the 2008-2017 study period was affected by other factors far from the intangible resources of firms such as economic indicators for the national economy, accounting results for firms, the extent of the existence of a financing culture through the capital market for businessmen, the extent of progress of the democratic path and the security conditions of the country. On the contrary, in the years leading up to the study period, the stock exchange achieved a good performance starting from the year 2003 which continued to the year 2010 before the January 2011 revolution. This made the Fourati and Afes study that investigated the relationship between the two variables during the period 2002-2006 prove a positive relationship between VAIC and M / B, between capital employed efficiency and return on assets.

PRACTICAL IMPLICATIONS

It is believed that the results from the current study provided an understanding of the importance of IC in emerging economies applying to the Tunisian economy. It also provides valuable insights into the link between IC and traditional perceptions of firm performance. Moreover, the breakdown of the total IC of these firms into smaller descriptive categories using the methodology of the intellectual added value factor allows managers to realize and develop the capabilities of their firms within these areas. Besides, the concept of IC is a newly emerging concept, and so far, it has not been fully understood by most firms in the Arab world. This study represents a major basis for raising awareness of this concept within the Arab business community.

LIMITATIONS OF THE RESEARCH

While this study presents different perspectives that should be of interest to researchers, contributors, institutional investigations, policymakers, and other relevant stakeholders, the findings from this study indicate ways to continue the investigation. Especially in light of the presence of some limits on generalizing the results, such as limiting itself to one Arab financial market, not measuring the capital variable of relationships in the model used, and using one indicator of the value of the institution is the market value to the book. Besides, it is only ten years, the study is a time series and maybe one of the reasons for these results. Intellectual capital and the value of the firm may be closely related in the first years of the stock market activity compared to the following years. The analysis in this study also relies on data from within the business sectors that are not dependent on IC or technology-intensive.

RECOMMENDATIONS

In the future, the model of the study can be tested by using different and more effective measures of intellectual capital and firm value, such as the use of a mixed approach that allows the use of statistical analysis in the collection of data related to human and structural

capital such as patents and research and development expenditures, while the form is used to collect Some data related to customer capital, such as customer satisfaction and loyalty. In addition to using several indicators to measure the value of the firm. Moreover, the scope of the research can be expanded to include other countries and comparisons between several Arab markets, to test the moderate role of financial markets and can be expanded to include a longer time. The study can also be conducted on a group of institutions in the technology sector. All of the above is a scope for future studies. More exploration should be opened in this field, especially for emerging economies such as the Tunisian economy and the Algerian economy where intellectual capital, measurement, management, evaluation, and reporting are all in their nascent stages, and even the financing culture through financial markets is still nascent in these markets.

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