# Impact of shareholders' identity on intellectual capital performance: evidence from Tunisian manufacturing companies

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**Abstract:** The main purpose of this study is to investigate the association between Intellectual Capital Performance (ICP) and ownership structure as an internal corporate governance mechanism. Data are drawn from a sample of 80 manufacturing Tunisian companies divided into nine sectors. These companies are listed and unlisted in the Tunis Stock Exchange for the 2010 fiscal year. Empirical analysis is conducted using linear multiple regression analysis in which Value-Added Intellectual Coefficient (VAIC) was selected to measure ICP. Findings from the empirical analysis revealed that both managerial ownership and ownership concentration have a positive impact on ICP, while institutional ownership has no significant effect on VAIC.

**Keywords:** shareholders' identity; agency theory; intellectual capital; value-added intellectual coefficient; Tunisian context.

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## 1 Introduction

It is owing to the recent changes from product-based economy to knowledge-based economy in which the focus is more on the growth of technology and communication that companies now rely more on human resources and abilities such as R&D as compared with tangible physical assets (Bontis et al., 2000). Nowadays, the most successful companies tend to have an Intellectual Capital (IC) that is ten or 20 times the value of their material assets (Roos et al., 2005). This development of knowledge economy has changed the main value of a firm from traditional physical assets (Magdi, 2008) to IC or intangible assets (Bartlett and Ghoshal, 1995; Ho Kim and Taylor, 2014). In fact, in a knowledge-based economy, one must take into consideration not only the traditional ways to measure the company value, but it is also necessary to recognise IC (Lu et al., 2014). Traditional measures of a company's performance, which are based on conventional accounting principles, may be unsuitable in this new economy driven by IC which has become not only the driving force and an important source of value creation and sustainable development of enterprises, but also the source of innovation and key to profit growth (Francesco et al., 2014).

This increasing shift towards knowledge-intensive organisations is one of the persistent problems facing corporate governance (Keenan and Aggestam, 2001; Degryse et al., 2005; Ana et al., 2012; Zahra et al., 2013). Owners, who often ignore the potential development of IC of their business owing to the inability and lack of knowledge in this field, could constitute a restraint against the IC development (Keenan and Aggestam, 2001; Amitava and Santanu, 2012; Anne-Laure and Nick, 2013).

But a sufficient and reliable disclosure of IC information will bring good governance for firms. As a result, firms can have an excellent corporate governance practice if they really put an effort to continuously disclose, report and measure the IC performance (Sanni and Abdifatah, 2014). Good governance through corporate governance mechanisms like ownership structure will lead to corporate accountability and build up the corporate essential value in the form of IC performance (Garcia-Meca et al., 2005; Paola and Paola, 2013). We envisage that good governance through the ownership structure would promote corporate accountability and strengthen the corporate fundamental value in the form of IC performance. In fact, companies with good governance would focus their attention towards activities that can increase value creation such as investing more in training existing as well as acquiring new experts, improving process, procedures and work culture and put more effort that would enhance their external relationships with stakeholders. These efforts would make the companies more efficient and increase their corporate accountability and their overall performance. In short, good corporate governance practices can promote corporate accountability and business prosperity which in turn would enhance shareholders' value. This would in the end be reflected in an increase in the IC performance. This circumstance leads us to investigate, by classifying the corporate governance mechanism 'ownership structure' into ownership concentration, managerial ownership and institutional ownership, the factors that may influence IC performance.

However, most previous studies are limited to analysing the relevance of IC, firm value, firm performance, measuring the extent of IC information disclosed in corporate annual reports or addressed the corporate governance effect on IC disclosure. For example, Keenan and Aggestam (2001) investigated the corporate governance impact on efficient IC management, Cerbioni and Parbonetti (2007) explored the relationship

between IC disclosure score and corporate governance in European-listed companies and Li et al. (2008) explored the relationship between the IC disclosure index and corporate governance in UK-listed companies. Those researches and practices, traditionally concerned with governance responsibility for financial and physical capitals, have not much focused on the relations between governance mechanisms and IC, and few of them are pursuing a new direction in the analysis of corporate governance based on the effect of its internal mechanisms on IC performance. Among the studies that examine the relationship between ownership structures and IC are Firer and Williams (2003), Saleh et al. (2009), Tsai et al. (2013), Kalyta (2013), Bohdanowicz and Urbanek (2013), Zahra et al. (2013), Gan et al. (2013) and more recently Parastou et al., (2014) and Sanni and Abdifatah (2014).

But the relationship between IC and ownership structure except for emerging countries has been, to the authors' knowledge, little investigated especially in a developing country like Tunisia. The current study attends to this gap and investigates the impact of shareholders' identity on IC performance using a sample of manufacturing Tunisian companies which consist of several industry sectors.

Therefore, examining the relationship between ownership structure and IC performance seems to be necessary because by discovering how different combinations of ownership affect the IC performance, proper measures can be taken to make the firm's IC performance better. Thus, applying appropriate practices of managing a company can improve its financial performance, which in turn increases the value of this company's capital in the form of IC performance (Saleh et al., 2009).

According to the aforementioned and given the role of the ownership structure in the IC development, the central question is to examine the shareholders' identity impact on the IC performance. This question seems to us original on the side of its position and legitimate in its involvement given the role of the ownership structure in the IC.

The underlying theory to be used in this study is agency theory and the remainder of this paper is organised as follows. Section 2 provides theoretical background, Section 3 presents the literature review and hypotheses, Section 4 focuses on sample selection, data sources, methodology design and variables measurement, Section 5 reports the results of the empirical study and Section 6 provides the conclusions.

## 2 Conceptual framework

### *2.1 The concept of IC*

There is no commonly agreed upon definition of IC and the term is often used broadly to mean the same as the term 'intangibles'. At the same time, there is a widespread tendency to use the terms 'IC' and 'intangible assets' interchangeably. Intangible assets refer to those assets that, according to the International Financial Reporting Standards (IFRS), are allowed to be recognised in the statement of financial position of a company.

IC was first proposed by the economist John Kenneth Galbraith (1969), as a form of knowledge intellect, and brainpower activity, which uses knowledge to create value. He considered that IC is not only a static capital with the form of pure knowledge, but also a dynamic process of effective use of knowledge, and this process is related to the achievement of organisational goals. His research extended the concept of IC from individual level to organisational level. The most concise definitions of IC is given by

Stewart's (1997) 'packaged useful knowledge'. He explains that this includes an organisation's processes, technologies, patents, employee skills and information about customers, suppliers and stakeholders.

The concept of IC is first developed in Sweden and then extended to Finland, Great Britain, Spain, the USA, Canada and other European countries. Today, Asian and Arab countries have also invested (Karami et al., 2014).

One of the most popular models for classifying IC is Saint-Onge's (1996) model developed in the early 1990s which divides IC into three parts: human capital, structural capital and customer capital. Also, Edvinsson (1997) agrees that IC comprises human capital, structural capital and customer capital. Abeysekera (2003) identifies, likewise, three classes of IC, namely human capital, structural capital and relational capital.

OECD (2007) emphasised that IC includes the competencies of employees, employee know-how, education, attitudes and morale, motivation, developmental stage, age, attendance and other work patterns, diversity and work–non-work orientations.

Based on IFRS 3 (IASB, 2008), Brännström and Giuliani (2009) describe IC as follows: IC = identified intangible assets + purchased goodwill. El Tawy and Tollington (2012) have observed that there is no universal definition for IC.

According to the above-mentioned definitions, IC includes relational capital, human capital and structural capital.

The International Federation of Accountants defines those three main components as follows:

- *Human capital*: it consists of the talents and skills of all employees and managers of the company.
- *Organisational capital*: it is composed of processes, systems and organisations offering the possibility to accumulate, store and transmit its knowledge. Synergies developed within the organisation contribute significantly to the innovation of the company.
- *Relational capital*: it is the goodwill and relationships that the company has with its customers.

### *2.2 IC performance, ownership structure and agency theory*

A successful strategy in the immaterial economy is no longer confined to the resolution of conflicts of interest and to find appropriate ways for disciplining the leaders, but it requires a new vision to both firm design and creation and distribution of value or organisational rent (Rajan and Zingales, 2000). Therefore, the accumulation and management of IC is the competitive advantage of knowledge-based industries. IC performance valuation is the essential factor in firm valuation. Management power of modern firms is separate from ownership and easily occurs in the agency problem; therefore, firms must implement corporate governance to solve this problem.

Corporate governance mechanisms are a long-standing issue which has been discussed in the previous literature mainly regarding the agency relationship between principal and agent, whereby conflict of interest arises between both parties (Vafeas and Theodorou, 1998). This occurs when each of them tries to maximise their own wealth before the others as there is separation of ownership and control of a company (Rossi et al, 2015). As a result, the agency problem occurs when principal (shareholder) and agent (management) have different interest and attitude.

Drawing on agency theory, guidelines of governance mechanisms establish the nature of the relationship between management and employees for the equitable distribution of shareholder wealth. Intellectual resources constitute a strategic asset to drive the successful performance of the company, so that companies need to adopt processes to effectively protect and retain them (Bradley, 1997).

Ownership structures refer to the various patterns in which shareholders seem to set up with respect to a certain group of firms. Generally, ownership structures are identified by using type of ownership and the ownership concentration. The share ownership structure is defined as the proportion of the voting shares of a sample company owned directly and/or indirectly by corporate insiders. Besides contributing to the body of knowledge, this study enhances the understanding of ownership structure attributes (ownership concentration, managerial ownership and institutional ownership) and its relationships with IC performance from the lenses of the agency theory since modern companies are characterised by a separation of ownership and control (Owusu-Ansah, 1998). This separation may induce conflicting incentives, leading to agency costs (Jensen and Meckling, 1976). Consistent with this view, we believe that ownership types could, to some extent, determine the performance of investments in IC.

## 3 Literature review and hypotheses

### *3.1 Managerial ownership and IC performance*

Jensen and Meckling (1976) argue that separation between stock ownership and control over public companies creates conflict of interests between managers and stockholders. The conflict arises when managers have the incentives to increase their own wealth (e.g. through maximisation of bonuses) at the expense of shareholders. Firm's management focuses more on short-term benefits of protecting their position, while shareholders place more importance on long-term benefits of firm value maximisation. In line with agency theory, as the proportion of managerial equity ownership increases, the interests of the shareholders and managers start to converge. This is supported by Singh and Davidson (2003) who found that managerial ownership reduces the conflict between shareholders and managers, and it aligns the interest of managers and shareholders towards increasing the long-term value of the firm. In this regard, Cho (1992) and Himmelberg et al. (1999) show that the involvement of managers in the company (holding a part of capital) reduces agency costs and increases the expenditure level on R&D and, therefore, innovation. Similarly, Barker and Mueller (2002) argue that leader's ownership share is positively associated with the expenditure level of R&D. Thus, the leaders will have to undertake long-term investments to maximise firm value when there is alignment of their interests with those of shareholders (Cho, 1998). This promotes the firm's IC. Wang (2011) found that managerial ownership has a positive influence on intangible asset. Past studies have shown, also, that managerial ownership is positively associated with IC performance. However, Warfield et al. (1995) argued that the positive impact of managerial ownership might invert at such time as it exceeds a certain threshold, e.g. 25% as reported in their study. They believed that in line with the entrenchment hypothesis, managerial ownership above a certain threshold may cause the managers to focus on their self-interest and ignore the interests of minority shareholders.

As this study seeks to show the importance of the industry leaders' participation in the management activities related to the intangible, companies could take advantage of the resources and expertise of these leaders (Lacetera, 2001). This led us to check whether the industrial leaders, with a scientific background in the field of ingenerate in the various branches, assume or do not assume the management function. If so, it then holds decision-making power (owner-manager) and knowledge (industry leader) that are needed to support intangible investment. Such reasoning examines leader's cognitive contribution in building strategies focused on the immaterial. The operationalisation of this variable is dichotomous. It is equal to '1' if the owner-manager has a scientific background in the field of ingenerate in its various branches and '0' in the opposite case (Jarboui et al., 2009).

Consistent with the above arguments, we predict that the leader's participation in the firm capital positively influences the development of IC. Therefore, we hypothesise the following:

*Hypothesis 1: The managerial ownership positively affects the IC performance.*

### *3.2 Ownership concentration and IC performance*

Various studies have been conducted on shareholders who are ready to provide, quickly, financing means with attractive growth prospects. Cescon (2002) shows that in the short term, Italian and UK companies are pressurised for investment in R&D. These are seen as a fixed cost. The results of Lee (2005) also suggest that bankers or large holdings ownership is negatively associated with patents. Berrone et al. (2005) find a significantly positive effect that is different when block holders are financial institutions and not different when they are individuals.

Furthermore, various innovation economists have shown that business success is the result of an organisational learning by which resources are developed and used (Lazonick and O'Sullivan, 2000). Thus, the innovation strategies evolve with time, which requires that an enterprise adopt flexible and innovative structures to adapt. This requires specific and additional qualifications gained through the effective learning process. However, these specific qualifications that could increase economic performance could be useless. In fact, such a situation happens upon the occurrence of the claims of economic actors denying that these qualifications are no longer sufficient to produce surpluses (O'Sullivan, 2000; Parastou et al., 2014). While this criticism has a lot of substance, it is based on a conception rather restrictive of organisational learning's cognitive processes.

In this regard, ownership concentration is interpreted positively, while the main shareholder is the one who has perfect knowledge concerning these projects, who is aware of their cognitive and mental models and the legitimacy of control (Domenico and Fabrizio, 2013; Kalyta, 2013; Parastou et al., 2014). This discussion provides support to the second hypothesis:

*Hypothesis 2: The ownership concentration positively affects the IC performance.*

### *3.3 Institutional ownership and IC performance*

Usually institutional shareholders with other majority owners tend to have a long-term perspective. Thus, they exert influences on leaders to adopt innovative strategies. However, some institutional investors have short-term interests and seek to maximise their short-term investments. They aim to quickly maximise profits and, therefore, to

influence the leaders' behaviour for not adopting innovation strategies. That type of investors should be seen as different groups pursuing different goals according to their intentions in the firm (Parastou et al., 2014).

Empirical research shows that the specificity of corporate assets requires creditors' risk levels that they refuse to take or assume only at excessive cost (Bah and Dumontier, 2001; Rajan and Zingales, 1995). Similarly, Tylecote and Ramirez (2006) stress the importance of stakeholder engagement and organisational integration to stimulate the innovation process and thus the company image. The strategy of institutional investors differs in terms of investment in R&D and innovation. Their presence would have an obvious impact on innovation policy. Williamson (1988) explains that the choice of the financing mode depends on asset specificity. The debt is suited to the non-specific assets and the shares issuance to specific assets. Eng and Shackell (2001) find a positive effect of the presence of institutional investors on R&D expenditures. In contrast, the results of Cherian (2000) show that the participation of those investors in the capital has a negative effect on R&D spending. This can be explained by the thesis that self-financing or shares issuance is better suited to specific assets, while debt will be adequate to finance traditional assets (Shleifer and Vishny, 1997). In this regard, the strategies adopted by the control holders differ from one shareholder to another. Our concern is to examine the power of the shareholder who exercises control.

The relevance of this ownership structure measure is to provide us with a rigor on the importance of the institutional investors' participation in the management of activities related to IC. In this respect, the firm could benefit from its members in terms of resources and skills, reducing uncertainty, increase legitimacy and achieve its collective goals (Lacetera, 2001). This leads us to consider that the institutional owner who has the power and perfect knowledge of the projects is needed to successfully complete innovation. Such reasoning examines shareholders' cognitive contribution. Moreover, the traditional theoretical framework that has been mobilised in the examination of this issue has some limitations. In a context of high uncertainty in terms of innovation, the simplicity of theoretical framework as the agency theory does not allow us to profoundly approach the set of relationships that may exist within companies (Leszek and Grzegorz, 2013; Parastou et al., 2014). Thus, the proposal of a dynamic theoretical framework, such as the contribution of cognitive current of corporate governance, is very legitimate in this specific case.

In this regard, several empirical studies have examined the presence of institutional investors, such as banks, in a disciplinary optic while neglecting their roles as provider of resources and skills. Usually, banks are more or less reluctant to finance investments in R&D and therefore innovation (Damodaran, 1999). In this regard, Le et al. (2006), on the basis of a sample of American companies, found that institutional investors positively and significantly moderate the relationship between R&D and performance. Swartz et al. (2006) show that institutional ownership has a moderating negative and insignificant effect on the relationship between R&D and economic performance. In line with arguments and literature support, the third hypothesis of this study is as follows:

*Hypothesis 3: Institutional ownership positively affects the IC performance.*

## 4 Research methodology

This section is devoted to describe the sample, the tools and procedures applied for data collection, empirical model and research design for this study.

### *4.1 Sample selection and data source*

As our sample includes non-financial listed and unlisted companies and considering the diversity of variables, certain information has been gathered through a survey administered to the companies in question (managerial ownership). The target population consists of managers (CEO). As we have not been able to speak directly, we sent the questionnaire to 210 firms via email. Of 210 questionnaires sent through the internet, we were able to recover only 80. In this questionnaire, we asked the managers to give us their capital share as well as their scientific training and areas of this training. Additional information about our sample has been manually collected from several sources relying on the following information sources: regarding listed companies, accounting data were collected from the consolidated financial statements available on the website of the Tunis Stock Exchange (http://www.bvmt.com.tn/) and company reports available at Financial Market Council (http://www.cmf.org.tn/). For unlisted companies, the data are collected directly from the accounting office (consolidated financial statements of unlisted firms are requested from the accountants of those firms).

To note, our sample contains a total of 80 industrial Tunisian firms that we have arranged with the site of the Industrial Promotion Agency (IPA) (www.tunisieindustrie.nat.tn). Of these, 26 are listed on the Tunis Stock Exchange, while 54 are not. In this study, we are exclusively interested in manufacturing firms. Data of this study (IC performance and ownership structure) were collected from the 2010 fiscal year annual firms' reports.

Table 1, below, highlights the sample companies and their sectoral affiliations.

**Table 1** Firms' distribution

| *Sector* | *Firms' number* |
|---|---|
| High-tech | 12 |
| Textiles and clothing | 6 |
| Electrical and electronic material | 10 |
| Agro-alimentary | 16 |
| Household products and personal care | 4 |
| Mechanics and metals | 8 |
| Construction materials, pottery ceramic and glass industry | 12 |
| Chemicals | 10 |
| Petrol and gas | 2 |
| Total | 80 |

*Source*: Author (own elaboration)

### 4.2 Regression model

To test the hypotheses developed in the previous section, an empirical model using VAIC™ is used as dependent variable to measure IC performance. The regression is as follows:

$$VAICTM_i = \alpha_0 + \alpha_1 MO_i + \alpha_2 OC_i + \alpha_3 IO_i + \alpha_4 LOGTA_i + \alpha_5 LEV_i + \alpha_6 QUOT_i + \alpha_7 SECT_i + \varepsilon_i$$

where $VAIC^{TM}{}_i$: value added intellectual coefficient; $MO_i$: managerial ownership; $OC_i$: ownership concentration; $IO_i$: institutional ownership; $LOGTA_i$: firm's size; $LEV_i$: firm's leverage; $QUOT_i$: quoted firm (on TSE); $SECT_i$: activity sector.

### 4.3 Variables measurement

With the vast research studies in IC, this study will explore the extent of the influence of corporate governance mechanisms on IC performance. It only focuses on internal mechanisms and especially on ownership structure, which, in its turn, concentrates on managerial ownership, ownership concentration and institutional ownership.

#### 4.3.1 Dependent variable measurement

Scholars have presented valuation methods of IC, such as Tobin's *Q*, Knowledge Capital Earnings (KCE) and Value-Added Intellectual Coefficient (VAIC™) (Mao-Chang, 2013).

To test the hypotheses developed in the previous section, we use an empirical model for the VAIC™ as a dependent variable to measure IC performance (Pulic, 2000). It was created by the Austrian IC Research Centre (AICRS) under Professor Ante Pulic (1998), and it uses data from financial statements. The procedures to measure different constructs in the VAIC™ model are described in Appendix A.

There have been several studies in the field of IC using the VAIC™ model as the primary measurement method of IC [Austrian industries with Bornemann (1999); UK publicly listed companies with Williams (2001); and publicly traded South African firms with Firer and Williams (2003)]. We will use this model in our study conducted in emerging economies (Tunisia) and, therefore, our option for this model is justifiable as it will allow comparison between studies.

There are two primary sources in the VAIC™ value creation model: physical capital and IC. The former refers to tangible assets employed (CE) and the latter refers to human capital (HC) and structural capital (SC).

By calculating the VAIC™, a company can determine the extent of value created by its resources. The higher the VAIC™, the more value created by the company given its resources, and vice versa.

This method, which generates variables which represent IC and its components, has several advantages. First, its figure is comparable among companies; as it provides a standardised and consistent way of measuring IC performance, it can also be reported to external stakeholders. Second, the data needed for the calculation can be found in financial statements. The data are also objective and reliable, since these data are gathered from audited sources. Third, the method is simple, and the results are easy to interpret.

It also has certain limitations. First, the existence of an inverse relationship between human capital (HC) and structural capital (SC) is not immediately apparent from the model (Chu et al., 2011). Second, its measure for SC may be incomplete. The study conducted by Chen et al. (2005) showed that after controlling for SCE, R&D expenditure is positively related with firms' market value and profitability, suggesting R&D and advertisement expenditure may capture additional information on innovative and customer capital that is excluded from the measure of structural capital efficiency. Third, it has been criticised because it may not sufficiently identify the synergistic effects for value creation from interactions of different forms of capital (Andriessen, 2004). However, as Kujansivu and Lonnqvist (2005) emphasise, at this point in time, there are no perfect solutions available for measuring the value and efficiency of IC.

The IC performance is obtained in the following way:

$$VAIC^{TM}{}_{i} = ICE_i + CEE_i$$

where $VAIC^{TM}{}_{i}$: the IC coefficient for firm $i$; $ICE_i$: the IC efficiency for firm $i$, which is calculated as the sum of the partial coefficients of human and structural capital ($HCE_i$ + $SCE_i$); and $CEE_i$: the communicational capital coefficient for firm $i$.

### *4.3.2 Independents variables measurement*

As we examine the impact of shareholders' identity structure on IC performance, three measurements related to the ownership structure are retained in this study: managerial ownership, ownership concentration and institutional ownership. Table 2 shows the exogenous variables' measurements.

**Table 2** Explanatory variable measurement summary

| *Variables* | *Symbols* | *Measures* | *Authors* |
|---|---|---|---|
| Managerial ownership | MO | A binary variable which takes the value of 1 if the manager is the owner and holds a scientific training in the different areas of engineering or in the field of technology, and 0 otherwise. | Jarboui et al. (2009) |
| Ownership concentration | OC | A binary variable which takes the value of 1 if the main shareholder detains more than 50% of the firm's capital, and 0 otherwise. | Shabou (2003) |
| institutional ownership | IO | Percentage of the capital held by the institutional investors (number of shares held by institutional investors/total number of shares). | Kane and Velury (2004) |

*Source:* Author (own elaboration)

### *4.3.3 Control variables measurement*

For purposes of empirical analysis, several control variables have also been included to ensure valid results. Indeed, firm size, firm leverage, activity sector and stock exchange listing have been considered as controller variables. A number of authors have suggested that these variables might influence the firm's IC performance (Firer and Williams, 2003). Table 3 shows the control variables' measurements.

**Table 3** Control variables definitions and measurements

| *Variables* | *Symbols* | *Measures* |
|---|---|---|
| Firm size | LOGTA | Natural log of the total assets. |
| firm's leverage | LEV | Total debt/total assets. |
| Listed firms | QUOT | A binary variable that takes the value of 1 if the firm is listed on the Tunis stock exchange, and 0 otherwise. |
| Activity sector | SECT | A binary variable that takes the value of 1 if the firm belongs to a high-tech sector, and 0 otherwise. |

*Source:* Author (own elaboration)

## 5 Empirical results and discussion

This section consists of two sub-sections that describe the empirical results, including descriptive statistical analysis and a discussion of the regression analysis.

### *5.1 Descriptive statistical analysis*

Table 4 presents the descriptive statistics of the variables used in the regression analysis.

**Table 4** Descriptive statistics

| *Variables* | *N* | *Min* | *Max* | *Mean* |
|---|---|---|---|---|
| VAIC$^{TM}$ | 80 | 1.89 | 12.98 | 4.09 |
| MO | 80 | 0.00 | 1.00 | 0.58 |
| OC | 80 | 0.1 | 0.9 | 0.6 |
| IO | 80 | 0.000 | 0.25 | 0.085 |
| LOGTA | 80 | 1.01 | 7.782 | 2.6254 |
| SECT | 80 | 0.000 | 1.000 | 0.15 |
| QUOT | 80 | 0.000 | 1.000 | 0.325 |
| LEV | 80 | 0.000 | 0.400 | 0.1011 |

Notes: $VAIC^{TM}_i$: value-added intellectual coefficient; $MO_i$: managerial ownership; $OC_i$: ownership concentration; $IO_i$: institutional ownership; $LOGTA_i$: firm's size; $SECT_i$: activity sector; $QUOT_i$: quoted firm (on TSE); $LEV_i$: firm's leverage.

*Source:* Author (software output)

The maximum value assumed by VAIC$^{TM}$ is 12.98, with a mean and minimum values equal of 4.09 and 1.89, respectively. Regarding the control variables, the descriptive statistics show that listed companies represent 32% of the total sample.

For the activity sector, we find that 12 companies, representing 15% of the sample, belong to the high-tech sector and 68 companies belong to the traditional sector. Regarding the debt ratio, the firms in question have an average ratio in the order of 10%. The companies under review have an average size (log total assets) of about 2.6254 with a minimum of 1.01 to a maximum of 7.78. This shows that the sample size is not uniform and this could have a positive or negative effect on the IC performance. In addition, the companies studied are characterised by the dominance of the ownership concentration.

Table 4 also shows that institutional investors take part in the firm capital by an average of about 8.57% with a minimum of 0% and a maximum of 25%. This disparity is owing mainly to the sample heterogeneity regarding the presence of institutional investors in the capital of the studied companies.

## *5.2 Correlations analysis*

The correlation coefficients between the various explanatory variables used in the model is shown in Table 5.

**Table 5** Correlation coefficients

| *Variables* | *MOA* | *OC* | *IO* | *LOGTA* | *LEV* | *QUOT* | *SECT* |
|---|---|---|---|---|---|---|---|
| MO | 1 | | | | | | |
| OC | 0.004 | 1 | | | | | |
| IO | 0.004 | 0.499 | 1 | | | | |
| LOGTA | 0.575 | 0.018 | 0.419 | 1 | | | |
| LEV | 0.325 | 0.111 | 0.676 | 0.649 | 1 | | |
| QUOT | 0.412 | 0.113 | 0.513 | 0.542 | 0.233 | 1 | |
| SECT | 0.352 | 0.122 | 0.412 | 0.456 | 0.335 | 0.465 | 1 |

*Source:* Author (software output)

Pearson correlation coefficients were computed to examine the associations between the independent variables. According to Gujarati (2004), the rule of thumb is, if the pair-wise between two independent variables is in excess of 0.8, serious multi-collinearity exists. The maximum pair-wise value in this study is 0.676 (see Table 5); thus, multi-collinearity should not be a concern for regression analysis. We accept the null hypothesis of autocorrelation, the fact that explanatory variables are weakly correlated with each other, as well as the Durbin–Watson statistics which is equal to 1.798, indicating that the autocorrelation constitutes no problem (Table 6).

## *5.3 Regression analysis*

Table 6 summarises the results obtained from the regression estimation. This table contains $\beta$ coefficients, *t*-Student's and coefficients significance.

The adjusted $R^2$ of 0.263 for the model implies that 26% of the variance in capital performance can be explained by the variances of variables related to the ownership structure and to the control variables.

As for the Fisher's statistics ($F$), which are equal to (4.336), it confirms the good quality of the model at a significant threshold level lower than 1%. Hence, the model's explanatory power seems to be satisfactory since Fisher's statistics ($F$) appear to be significant at the threshold of 1%. Consequently, we tend to reject the null hypothesis and turn to stipulate that regression is generally significant.

It can be concluded that the model is statistically significant and explanatory for the studied phenomenon. As for the significance of the independent variables, it can be stated that all the variables are statistically significant. As far as the significance of the independent variables is concerned, we can deduce that all the variables are statistically significant. Concerning the control variables introduced into the model, the results show that they have not been statistically significant.

**Table 6** Multiple regression results

| *Variables* | *Coefficients (b)* | *t-student* | *Significance* |
|---|---|---|---|
| CONSTANT | –0.203 | –0.694 | 0.489 (n.s.) |
| MO | 0.447 | 4.610 | 0.000*** |
| OC | 0.163 | 1.783 | 0.077** |
| IO | 0.113 | 1.278 | 0.204 (n.s.) |
| LOGTA | 0.232 | 2.642 | 0.010** |
| SECT | –0.106 | –1.253 | 0.213 (n.s.) |
| QUOT | –0.040 | –0.471 | 0.639 (n.s.) |
| LEV | 0.215 | 2.974 | 0.004*** |
| Model statistics | $F = 4.336$ ($p = 0.000$)<br>$R^2 = 0.342$, $R^2$ adj = 0.263<br>$D - W = 1.798$ | | |

Notes: ***Significant at the level of 1%; **significant at the level of 5%;
(n.s.): no significance.

*Source:* Author (software output)

### *5.3.1 Evidence of the managerial ownership impact on the IC performance*

The Hypothesis 1 predicts that the industrial leader has a positive relationship with VAIC™. An examination of the statistical tests shows that this variable has had a positive and significant impact on the variation of IC performance. The regression model shows that there is a positively significant relationship between the industrial leaders (MO) and the value-added intellectual coefficient ($\beta$= 0.447, $t$ = 4.610, $p$ = 0.000). Hence, Hypothesis 1 is accepted and validated.

Also, the results show that there is a positive and significant relationship between the industrial owner-manager and the IC performance. This result is consistent with the findings of Saleh et al. (2009) and Abidin et al. (2009). Consequently, in a risky and uncertain environment, decision-makers are required to have power tools on the resources to invest them in an innovative process. Thus, in firms which follow a policy of intangible resources' valuation with which a lot of information is produced and analysed, professional managers are not able to cope with this kind of specific information's volume relating to the intangible investment projects. Similarly, the specificity of these projects makes the knowledge possession an asset to improve the decision quality (Haleblian and Rajagopalan, 2006). In this sense, the leader who assumes both the targeted roles (owner and industrial) helps increase the growth prospects by holding the information and knowledge, elements on which intangible investments' strategies are based (Fosfuri and Tribo, 2008). It turns out that the industrial logic in the medium to long term is opposed to the short-term financial logic for industry leaders. The opposition between the industrial development logic and the financial logic is explained by the fact that the development projects related to the IC is based on the 'know how to make and know how to be' of the decision-makers.

### *5.3.2 Evidence of the ownership concentration impact on the IC performance*

Hypothesis 2 predicts a positive relationship between the ownership concentration and the IC performance. In the model, the relationship between the ownership concentration (OC) and the VAIC$^{TM}$ is positively significant ($\beta$ = 0.163, $t$ = 1.783, $p$ = 0.077). Therefore, Hypothesis 2 is confirmed.

The second main hypothesis test results indicate that there is a positive and significant relationship between corporate ownership and performance of IC. Considering corporate ownership in the field of private investors, this result is inconsistent with the researches of Saleh et al. (2009) and Sanni and Abdifatah (2014). The cause of this finding can be stated as that corporate investors, because of a tendency to higher profit, by long-term investments make the company benefit more in future; which in the long term will bring about competitive advantages and will result in higher efficiency.

In this context, companies that need to pursue investment strategies into innovation or into human resources are led to involve the knowledge holders in the decision-making process (Fosfuri and Tribo, 2008). In this respect, the ownership concentration is interpreted positively as the main shareholder is the one who has a perfect knowledge about these projects and on the basis of its cognitive and mental patterns in the field and on the control legitimacy that he enjoys. Thus, in some cases and based on the assumptions of the agency theory, the main shareholder has no incentive to get involved in risky and specific projects like innovation development or intangible investment projects. Therefore, he withdrew his engagement to preserve his financial capital. Conversely, if the main shareholder holds knowledge about the growth opportunities of these projects, he would be in favour of adopting these investments. In this sense, his decisions are based on these mental patterns that focus on IC projects.

### *5.3.3 Evidence of the institutional ownership impact on the IC performance*

The statistical tests show that the relationship between the institutional ownership and the IC performance is positively not significant ($\beta$ = 0.113, $t$ = 1.278, $p$ = 0.240). So, the results do not support Hypothesis 3.

The first main hypothesis test results indicate a negative and significant relationship between institutional ownership and IC performance. This result is consistent with the researches of Saleh et al. (2009) and Sanni and Abdifatah (2014). The reason behind this result could be that those institutional investors, unlike private investors who are looking for maximising profits, have multiple objectives of economic, financial, social and political, which are sometimes in conflict with the objective of maximising profits. In other words, they value achieving the objectives more than profit maximisation and thus they are less efficient. This indicates that the IC value is valued as claimed by investors as charges rather than as expenses of investment-generating future economic benefits. Thus, the short-term focus of institutional investors in the Tunisian context could mean a reduced effort on the support of IC elements that are considered long-term investments. To some extent, the participation of corporate governance instances in the development and consolidation of knowledge capital and organisational capital might be affected by the need to reduce costs and maximise current profits. This policy could take the form of reduced training plans and skills development, lay-offs and reductions in staff. This could worsen the IC performance of the company.

Regarding the control variables, statistical tests show that the activity sector and stock exchange listings' variables have no significant impact on the IC performance. This implies that the performance achieved is independent of these two control variables mentioned. This is justified by the fact that various activities' exercise on the IC in the new economy concerns both traditional sector firms and high-tech firms.

In contrast to these two variables, size and leverage are determinants of strategies' success concerning IC. In addition, firm size is an important variable of the variation in the IC performance. This goes in the opposite of the smaller companies that are expected to submit to more financial constraints than larger firms, especially in funding IC elements (Jefferson et al., 2003).

The information asymmetry in this context remains a fundamental characteristic of the relationship between banks and companies. Banks will require panoply of conditions against credit granting (accounting documents and financial statements) as well as a set tangible guarantee. It therefore seems difficult to invest into innovation or into human resources to have the chance in a bank financing, which will impact positively the IC performance of the firms.

Hypotheses results, expected signs and obtained signs are summarised in Table 7.

**Table 7** Results of testing the hypotheses

| *Hypothesized relationship* | *Result* | *Expected sign* | *Obtained sign* |
|---|---|---|---|
| H1: The ownership managerial positively affects the IC performance. | Supported | + | + |
| H2: The ownership concentration positively affects the IC performance. | Supported | + | + |
| H3: Institutional ownership positively affects the IC performance. | Not supported | + | + |

*Source:* Author (own elaboration)

## 6 Summary and conclusion

There are very few studies that seek to analyse the association between corporate governance and corporate performance within the context of value addition (Morck et al., 1988; Hermalin and Weisbach, 1991). The association between corporate governance and IC efficiency has been discussed in the literature conceptually (Keenan and Aggestam, 2001) and empirically (Ho and Williams, 2003). In this study, we analysed the impact of the ownership structure's characteristic on IC performance.

The principal purpose of the present paper is to investigate the association between the value-added efficiency by the major components of the firm's resources (physical capital, human capital and structural capital) and ownership structure (managerial ownership, concentration ownership and institutional ownership), in the context of manufacturing Tunisian firms. The value-added intellectual coefficient (VAIC$^{TM}$) has been selected as a fundamental basis for measuring IC performance in this study. This measure has been considered a universal indicator showing a firm's ability to create value. Similarly, it represents a measure of the business efficiency in a knowledge-based economy (Pulic, 1998).

The analysis revealed that owner-manager and ownership concentration positively affect the IC performance. On the other hand, institutional ownership had no significant impact on IC performance. Also, statistical tests have shown that the control variables (size, debt level, activity sector and quotation) have had no remarkable impact on IC performance.

This paper proposes a set of answers to the impact of ownership structure on IC performance in Tunisian context. Thus, this study has attempted to provide explanations and managerial solutions for the Tunisian companies suffering from a lack of IC. In other words, based on the identification of governance mechanisms that have the greatest impact on IC, this research provides an insight into the managers and the different types of shareholders. The decisions to consolidate leader ownership can help mitigate the problems of IC investment of the Tunisian firms to reach the ranks of the most competitive firms.

These contributions, both theoretical and practical, remain subject to two major constraints associated with the restrictions imposed by the implementation of such works. The first limitation is the composition of a suitable sample and its relatively reduced size. More explicitly, the generalisation of the results depicted in this study is not possible. Still, these limits should not conceal the numerous original results achieved by this study relevant in the Tunisian context. We intend to articulate our quantitative study by a further qualitative study on the subject.

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## Appendix A: Measurement of IC performance: VAIC™

The VAIC™ method measures the efficiency of a firm's three types of input: physical/financial capital, human capital and structural capital. So there are two primary sources in the VAIC™ value creation model: physical capital and IC. The former refers to tangible assets employed (CE) and the latter refers to human capital (HC) and structural capital (SC). IC efficiency is calculated as the sum of the partial coefficients of human and structural. capital We denote this as ICE.

The formulation of VAIC™ indices is the following:

$$VAIC™_i = ICE_i + CEE_i$$

where $VAIC^{TM}_i$: IC coefficient for firm $i$; $ICE_i$: IC efficiency for firm $i$, calculated as the sum of the partial coefficients of human and structural capital ($HCE_i + SCE_i$); and $CEE_i$: communicational capital coefficient for firm $i$.

VAIC™ is calculated in several steps. The first step in calculating CEE, HCE and SCE is determining a firm's total Value Added (VA):

1 *Value added ($VA_i$) of firm i is calculated as below:*

$$VA = OUT - IN$$

where $VA$: the value addition from current year resources; $OUT$: total sales; and I$N$: cost of materials, components and services.

Alternatively value added can be calculated (by using information contained in the annual report) as follows:

$$VA_i = I_i + DP_i + D_i + T_i + M_i + R_i$$

where $I_i$: total interest cost of firm $i$ for year $t$; $DP_i$: depreciation costs of firm $i$ for year $t$; $D_i$: dividend of firm $i$ for year $t$; $T_i$: tax for year $t$; $M_i$: equity capital for year $t$; and $R_i$: retained earnings of firm $i$ for year $t$.

It can also be presented as

$$VA = OP + EC + D + A$$

where $OP$: operating profits; $EC$: employee cost; $D$: depreciation; and $A$: amortisation.

2 *Capital employed efficiency ($CEE_i$):* indicator of VA efficiency of capital employed.

$CEE_i$ is calculated by the following relation:

$$CEE_i = VA_i / CE_i$$

where $VA_i$: total value added for firm $i$; $CE_i$: net book value of assets for firm $i$.

3 *Human capital efficiency ($HCE_i$):* indicator of VA efficiency of human capital. As salary is one of the indices of human capital efficiency, $HCE_i$ is calculated as below:

$$HCE_i = VA_i / HC_i$$

where $HC_i$ is the total invested amount of salary and wage for company.

4 *Structural capital efficiency ($SCE_i$):* indicator of VA efficiency of the structural capital, $SCE_i$ is calculated as below:

$$SCE_i = SC_i / VA_i$$

where $SC_i$ (the structural capital of company $i$) = $VA_i - HC_i$.