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The intellectual capital as a predictor of a company's future performance: A case study

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ABSTRACT: The accounting and financial reporting system in use today is over half a century old and has failed to capture the new knowledge and innovation economy in which intangible assets are becoming increasingly valuable. Yet, there has been a growing acknowledgment among the research community as to the relevance of intellectual capital as a major enhancer of an organization's well-being. Much of the research provides great support how the IC is instrumental in determining profitability and stock performances.

This article is an attempt to examine intellectual capital impact on corporate performance of the IT sector in Morocco. The purpose of this study is twofold. Firstly, it attempts to verify empirically the influence of intellectual capital on firm performance. Secondly, we aim to analyze the effect of the corporate public listing over the period.

We have undertaken over a nineteen-year period, a longitudinal (2002–2020) case study of a prominent payment-solutions company based in a developing economy and generating 80% of its revenues from global operations in ninety countries.

The paper uses the Pulic framework, in its ameliorated version as modified by Ulum. The paper tests four elements of IC and company performance. For the sake of data analysis, the multiple linear regression with simultaneous entry method was used for this empirical study.

The findings show that: the company's IC has a positive impact on the firm's current and future profitability, IC is not a predictor of market performance. In addition, IC components yield a significant correlation for the performance of the high-tech company, the results indicate that physical capital is not a determinant of corporate financial performance.

KEYWORDS: Human Capital, IT sector, Modified Value Added Intellectual Capital coefficient, Morocco, Structural Capital, Relational Capital, reporting.

1 INTRODUCTION

It is generally accepted in modern times the so-called knowledge assets positively affect the performance of companies in the long term as well as on value creation.

The World Bank (2006), highlights in a study the pertinence of the use and creation of knowledge for long-term economic growth.

In a knowledge-based economy, the importance of investment in intellectual capital (IC) is recognized because knowledge assets affect long-term competitive advantage as well as the creation of business value.

Knowledge gained through information in this context, can be thought of as the gage of organizational resources recognized as a basis for innovation skill, and later, success.

New and successful businesses no longer use productive tangible assets such as "raw materials, fixed capital, and even managerial knowledge" to make investments and create wealth (OECD. 1996. p.15). Rather, they rely on knowledge for their success, as reflected in the huge "overvaluation" of high-tech and Internet companies.

For most businesses, the market value is often much higher than the ledger since the market value comes mainly from assets that are not shown directly on the balance sheet of a business. Indeed, Lev (2001, p. 9) asserted Price to Book of US Standard and Poors (S&P) 500 corporations evolved from a little over 1 to more than 5 fold over four decades.

One explanation (among others) because the difference consists of the company's intangible assets, which are not included in the financial statements. For example, the value of customer relationships, employee experience or organizational culture cannot be determined on the basis of the balance sheet (Kujansivu et al. 2007). This highlights the growing importance of active intangible assets and their accounting practices.

According to Amit and Schoemaker (1993), the specific type, extent and nature of these strategic resources determine the profitability of a business. Barney (1991 plus recent) argues that for a business to generate a sustainable competitive advantage, its resources must be precious, scarce, and difficult to imitate and replace. Conventional accounting does not measure the value of intellectual capital, but the markets clearly reward it.

The main research problem that this paper addresses is assessing the nature and intensity of the relationship between a company's IC and its financial performance. Specifically, we focus on finding and analyzing the causal relationship between financial performance of the most successful listed IT firm in Morocco. To this extent, our aim is to empirically investigate the association between an extant measure of IC – the Value Added Intellectual Coefficient^{TM} developed by Pulic (1998) in its modified version of the firm and traditional measures of financial performance:

(1) Return On Equity (ROE);
(3) Stock return (SR).

If IC is a major driver for the value of the company, then the company that has the higher IC will be more likely to have a better future performance, then the logic, IC growth rate (ROGIC) will also have a positive effect on the company's future performance (Tan et al., 2007). In the study of Tan et al. (2007), it proved that ROGIC had a positive influence on the company's future performance. Therefore, the third goal of the study was to test the positive influence of ROGIC against current and future financial performance.

First, the paper addresses the importance of IC and provides an overview of various IC categories. Second, the topic of measuring IC is analyzed, through a brief overview of different measures developed in the past, specifically focusing on the Value Added Intellectual Coefficient (VAIC) as modified by Ulum. Third, the paper presents several important research contributions with regard to assessing the relationship between IC and corporate performance. The fourth part of the paper presents the important information about the data pertaining to the case study, hypotheses development and variables used, proposition of the research model, and corresponding statistical analyses. Finally, the paper discusses the research results, relevant conclusions, and practical implications, as well as the avenues for further research.

2 CLASSIFYING IC

As a first step to capture the holistic effect that IC has on existing performance and future it is necessary to correctly define the term.

The concept of intellectual capital was first introduced by the economist Galbraith (1969). Hall (1992) sees intellectual capital as an engine for creating value for the enterprise, which transforms production resources into value-added assets.

According to him, intellectual capital is knowledge that transforms raw materials and makes them more precious and comprises principally staff skills, the value of proprietary processes, and the quality of relationships with customers and suppliers.

INTELLECTUAL CAPITAL COMPONENTS

The second important step in understanding the diverse and complex nature of IC is to provide a complete categorization.

Over the past two decades, many researchers have made important contributions to solving the problem of categorizing integrated circuits. The most widely used categorization in the literature focuses on two elements (dichotomous) or three (trichotomic).

A- DICHOTOMOUS CATEGORIZATIONS

One of the first dichotomous categorizations goes to Hall (1992) who argues that intangible assets that reside in human resources are labeled as human capital (HC).

Pulic (1998. 2004) and OECD (1999) agree on the definition of IC as being composed of two elements. which describes intellectual capital as `` the economic value of the two categories of intangible assets of a company:

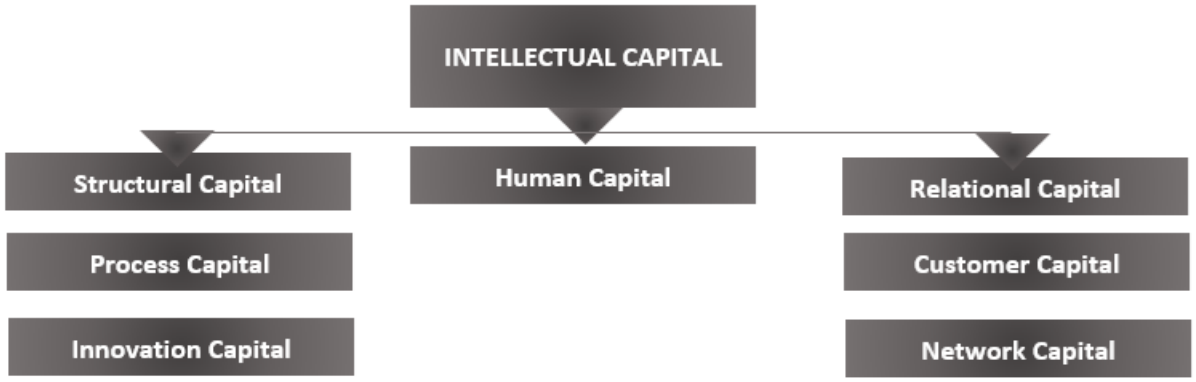
(1) organizational (structural) capital; and
(2) human capital,

More specifically, structural capital refers to things like proprietary software systems. distribution networks and supply chains. Human capital includes human resources within the organization (ie personnel resources) and resources external to the organization, namely customers and suppliers.

B- TRICHOTOMOUS CATEGORIZATIONS

Currently, there are several views on the main components of intellectual capital and their hierarchy: some researchers use the Skandia Navigator scheme and assume that intellectual capital can be subdivided into human and structural capital, which includes innovation and capital of processes [Edvinsson. 1997; Zeghal. 2010; Clarke. 2011], while others identify not only human and structural capital, but also relational capital as an equally distinct component [Sharabatia. 2013; Andreeva. 2016].

Researchers have used different terms to designate components of intellectual capital, most of them have identified human, structural (organizational) and relational capital. In turn, it is possible to subdivide structural capital into innovation and process capital, and relational capital between the client (client) and the network subcomponent. Thus, the structure of intellectual capital can be represented according to the following taxonomy:



Source: compiled by the author according to Edvinsson. 1997; Zegal. 2010; Clarke. 2011.

I. HUMAN CAPITAL

The origin of human capital can be attributed to the work of Schultz (1961) and Becker (1964) in the 1960s. They conducted studies focusing on economic behavior, in particular on how the accumulation of knowledge and skills allow individuals to increase their productivity and income.

Bontis (1999) has shown that stock prices respond to changes in direction, arguing that investors value the skills and expertise of their CEOs and other senior executives.

Human capital consists of the knowledge and skills held by employees. Human capital includes the factors that create added value for staff, including training and skills (Edvinsson et al. 1997). intellectual agility and skills (Roos et al. 1997). Human capital can also be defined as the implicit knowledge assets of employees and it affects the company's work performance. To create organizational value, it is important to convert this implicit knowledge into explicit knowledge throughout the organization (Bozbura 2004).

The pure intelligence of the members of the organization is at the heart of human capital and it is important because it functions as a source of innovation and strategic renewal according to Bontis (1998).

II. STRUCTURAL CAPITAL

In order to take advantage of human and social capital, an organization must provide a support mechanism.

Organizational capital includes the mechanisms and structures of the organization that support employees and their performance. If an organization has poor systems and procedures, the overall intellectual capital of the organization will not be fully used.

Bontis (2000. 1998. 1996) has shown that there is a positive relationship between organizational capital and business performance. He believed that good management of the organization's capital is important because it allows human capital, technological capital, businesses and social capital to be exploited by an organization.

III. RELATIONAL CAPITAL

Different authors agree on the definition of relational capital. On the basis of work presented during the symposium organized by the OECD (1999), this capital includes relations with external stakeholders, networks with suppliers, distributors, lobbying organizations, partners, relations with customers (image, loyalty, network partners and investors) and brand image (attitude, preference, reputation, brand recognition).

In particular, relational capital is the value of a company's relationships with the people and organizations with which it does business (Cabrita et al. 2008; Hormiga et al. 2010)

According to Canibano (2000) relational capital encompasses knowledge integrated into the value chain, that is, in addition to relationships with suppliers and customers, there are strategic partners or external collaborators such as subcontractors, a client, researchers or advisers.

3 MEASURING IC

(Ulum et al. 2014b) asserted in his work the need to come up with models for measurement and reporting IC in light of the limited provisions of accounting standards.

In recent decades, interest in the management of IC has led to the development of different measurement methods. Some of these methods were attempts made by different companies for their internal use rather than the development of a universal measurement method. Indeed, Edvinsson developed the first IC assessment model called Skandia Navigator, for the Swedish financial services firm, Skandia.

According to Luthy (1993), there are two general methods for measuring intellectual capital.

- **The first method** consists in carrying out a component by component evaluation. This includes the use of appropriate units of measure for each component. For example, market share, patent value and the number of work-related skills each have unique units of measure. We find in this category the following models: Skandia Navigator. Balanced Scorecard and "Dashboard" in reference to the Conference Board (1997) imagined by the Board Conference, New York
- **The second method** consists in measuring the value of intellectual assets in financial terms at the organizational level without reference to the individual components of intellectual capital. The models in this category: market-to-book ratio, Tobin's Q, and calculated intangible value.

Accordingly, Sveiby (2001. Updated in 2010) has inventoried 42 Methods of Measuring Intangible Assets, which later were complemented by two additional metrics by Osinski. et al. (2017)

Overall, it is frequently featured in scholarly works that IC measuring methods can be classified according to the use of a monetary unit in the process of valuation, and fall into two groups: monetary and non-monetary.

A non-exhaustive list of models using non-monetary indication of IC:

- **Balance Scorecard,** developed by Kaplan and Norton (1992);
- **Skandia IC Report** method by Edvinssion and Malone (1997);
- **IC-Index** developed by Roos et al. (1997);
- **Intangible Asset Monitor approach**; Sveiby's (1997)

A non-exhaustive list of models using monetary indication of IC:

- **Tobin's q** method (Luthy. 1998);
- **EVA and MVA** model (Bontis et al. 1999);
- **Market-to-Book Value** model (various authors);
- **VAIC**^{TM} Model (Pulic 1998. 2000)

For the purposes of this paper the Pulic model was used for its valuation merits out of all classifications and measures of IC as this method is designed to provide information about the value creation efficiency of physical assets and intangibles of the company.

4 THE PULIC MODEL AS REVISED

The Value-Added Intellectual Coefficient VAIC method developed by Pulic has proven over time to be the most widespread tools used to measure intellectual capital components according to Feruleva et al 2018. Supportive to the use of VAIC are the following reasons:

- VAIC provides a standardized and consistent basis of measure (Pulic and Bornemann. 1999). allowing hence for comparative analysis
- Easy to compute by management and stakeholders (Chan (2009a).
- The VAIC calculation uses readily available audited financials; (Pulic. 1998. 2000)
- It produces quantifiable, objective and quantitative measurements

Pulic relies on two key resources in creating company's value added, namely capital employed and IC with the latter consisting of human capital and structural capital. The VAIC model reveals the intellectual capability of a firm and whether its sources are used efficiently or not. In other words, VAIC measures the newly-created value per monetary unit invested in each source. The higher the VAIC of a firm, the more the value added created by overall sources of that firm.

Nonetheless, the VAIC method has been improved ever since its introduction by Ulum et al. (2014) to overcome Pulic's method shortcomings. VAIC does not measure relational capital and according to Ulum et al (2014) VAIC does not capture all components of IC. By introducing relation capital, the modified M-VAIC becomes, hence, a more comprehensive tool to measure the performance of IC.

M.VAIC CALCULATION

STEP 1: VA DEFINITION

As stated earlier, the VAIC is based on value added (VA) created by all resources. i.e. human, structural, financial, and physical, of an institution. Pulic (2000) states that higher the VAIC^{TM} coefficient, the better will be the efficiency of VA by a firm's total resources. Thus, the VA can be calculated as the difference between the output and input of the company.

This study uses the approach advocated by A. Riahi-Belkaoui (2003) when value added (VA) is calculated:

VA = I+DP+D+T+MI+RE+EC

Where:

I = the sum of interest expenses;
DP = depreciation expenses;
D = dividends;
T = corporate taxes;
MI = equity of minority shareholders in net income of subsidiaries;
RE = retained earnings for the year; and
EC = employees' costs including wages and salaries.

STEP 2: M.VAIC COMPUTATION

The next step it to obtain VAIC, which is a composite sum of the **Capital Employed Efficiency** and the **Intellectual Capital Efficiency**:

VAIC = CEE + ICE
= CEE + (HCE + SCE)

Where:

Capital Employed Efficiency (CEE) – the indicator of VA efficiency of capital employed; and

Intellectual Capital Efficiency (ICE) – the indicator of VA efficiency of company's Intellectual Capital base, which in turn is composed of

(a) **Human Capital Efficiency (HCE)** – the indicator of VA efficiency of human capital; and

(b) **Structural Capital Efficiency (SCE)** – the indicator of VA efficiency of structural capital.

With the introduction of relational capital as the third constituent of IC, M-VAIC is then the sum of four components representing the independent variables as follows:

M.VAIC = CEE+ (HCE+SCE+RCE)

(c) **Relational Capital Efficiency (RCE)** – the indicator of VA efficiency of relational capital.

Where:

CEE=VA/CE HCE=VA/HC SCE=SC/VA RCE=RC/VA

CE = capital employed is the book value of total assets minus the intangible assets.

HC= Human Capital, measures personnel expenses, including salaries, wages, and all other expenses incurred on employees, including training.

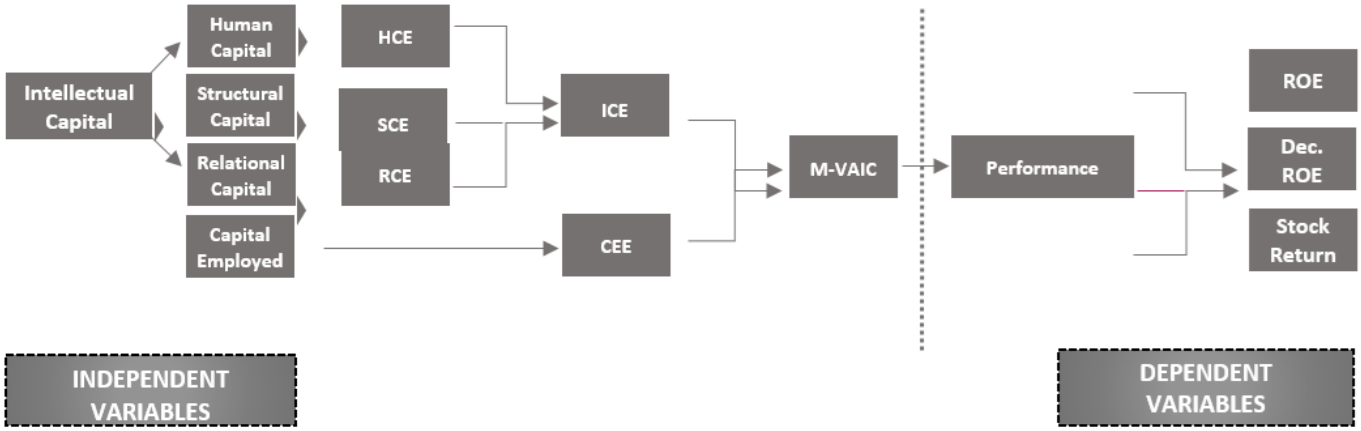
SC = VA – HC, structural capital is equated to VA less the human capital:

Pulic (1998) stated that there is an inverse relationship between SC and HC. i.e. the less the HC, the more the SC is associated with the value creation of the firm.

RC= Relational Capital is the sum of selling, marketing, and advertising expenses.

Marketing and advertising costs are concerned with developing and maintaining customer relations. Hence, marketing and advertising costs are used as proxies for relational (customer) capital (Nazari et al. 2007).

CONCEPTUAL FRAMEWORK OF THE RESEARCH USING THE M-VAIC



Source: compiled by the author according to Pulic (1998, 2000) and Ulum (2004)

5 THEORETICAL FOUNDATION

For the theoretical basis, some theories have been mobilized throughout the various studies. These are the resource-based theory "RESOURCE BASED VIEW OF THE FIRM", the Human Capital Theory, the Social Capital Theory and the SIGNALING TEORY.

RESOURCE BASED VIEW OF THE FIRM - RBV

Inspired by the research of Penrose (1959). the theory of management by RBV resources was introduced by Wernerfelt (1984) and refined by Barney (1991) who is behind the emergence of the RBV.

Barney states that a business represents a collection of unique resources and capabilities that provide the basis for lasting competitive advantage as long as they are:

- precious,
- rare,
- not substitutable and
- difficult to imitate.

According to this view, business performance can be attributed to unique resources rather than to the structure of the industry, Guthrie. et al. (2004).

However, the effect of resources in isolation remains underused. Barney (1991) argues that a firm's competitive advantage can be attributed to unique resources, particularly intangible resources when combined or integrated.

THE HUMAN CAPITAL THEORY

The underlying proposition of the theory is that people have knowledge, skills and abilities that have economic value to the business, Schultz. (1961); Becker (1964).

Becker (1964) argues that according to this theory, individuals choose a profession or a job that

maximizes their current economic value and consciously make rational choices about investing time, effort, money in education, training and experience.

Indeed, human capital theory maintains that the level of education, experience and level of training affect performance.

SOCIAL CAPITAL THEORY

From the perspective of social capital theory, organizations that acquire greater social capital will occupy a central position in social networks and reap the benefits by facilitating exchanges within the organization. Burt adds that the central proposition of this theory is that the network of relationships constitutes a precious resource for the conduct of social affairs providing their members with community-owned capital, a title that entitles them to credit.

THE SIGNALING THEORY

According to Spence (1973), the Signaling Theory suggests that signals represent the action of the business which transmits information about the capabilities of the business.

He adds that proactive companies engage in symbolic activities to influence public perception, signaling high forms of human capital. As with the RBV proposals, the companies are not homogeneous and have high distinct individual characteristics and resources.

In summary, since intellectual capital, reputation and corporate culture are intangible assets that adhere to the conditions of Barney (1991), RBV is proposed as the main theory of the study.

6 RESEARCH QUESTIONS AND MEASURES

Based on above literature reviews and on the modified version of Pulic's model M-VAIC, we hypothesize that:

H1. There is a positive association between IC and corporate performance.

The IC of the year x is tested against companies' performance of the same year. This is to verify if IC is a determinant of a company's performance.

H2. The higher value of a company's IC, the higher the company's future performance.

In this case, IC of year x is tested against company' performance of year x + 1. This is to test whether IC is a predictor of future company' performance.

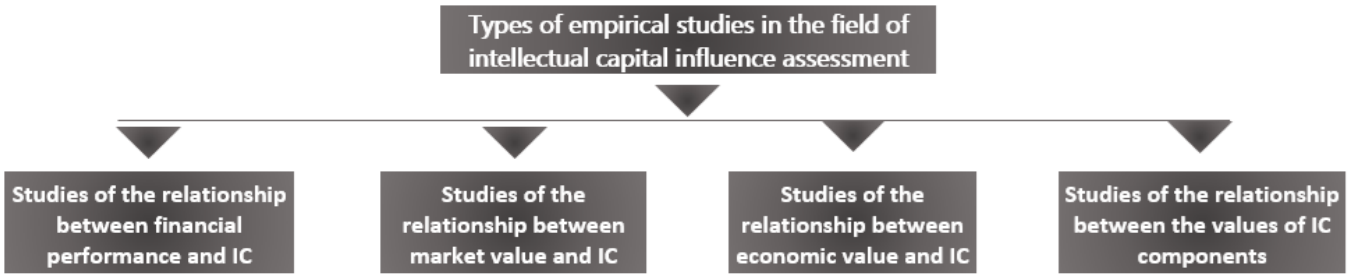
H3. There is a positive association between the rate of growth of IC and future corporate performance.

The rate of growth (ROG) of IC is the year-on-year growth rate of CEE, HCE, RCE and SCE of a company.

The regression results of the M.VAIC against the independent variables will form the evidence supporting or rejecting hypotheses **H1, H2,** and **H3**.

PERFORMANCE CONCEPTS

Based on a collection of works on empirical studies, Feruleva et al (2018) note that most empirical studies are devoted to analyzing the impact of intellectual capital on the financial performance and market value of firms.



Source: compiled by the author according to Feruleva et al (2018) and various researchers

In today's competitive environment, to increase financial performance and market value, companies are required to invest in their intellectual capital.

Subaida (2018) asserts that the performance of the company reflects its capacity to generate a net profit from the activities carried out during an accounting period.

According to Venkatraman. et al. (1986), the narrowest conception of firm performance is based on the use of simple outcome-based financial indicators, which are supposed to reflect the achievement of the firm's economic objectives.

To assess whether the IC affects the performance of companies, the literature offers many perspectives on this relationship. Research studies that have analyzed the relationship between IC and performance have often used financial ratios as proxy measures of corporate performance.

Overall, there exist a number of dependent variables that researchers have used and that are related to the dimensions of performance through the lenses of profitability, productivity, and market valuation.

For the sake of the current study, a proxy for the corporate performance; namely ROE, DECOMPOSED ROE and SR have been used as the dependent variable (Alipour 2012; Chan 2009; Dženopoljac et al. 2017).

Return On Equity (ROE) (for example Chen et al. 2005; Tan et al. 2007; Chiu et al. 2011; Bontis et al. 2015;). ROE represents the return to shareholders of common stocks and is generally considered an important financial indicator for investors.

ROE is also chosen instead of rate of return on assets (ROA) because a company's assets are used in deriving CEE. Thus, to minimize possible multicollinearity, ROE is selected.

The RBV states that IC intensive companies are more competitive and hence, more successful than other companies. To this extent, IC should have a positive impact on corporate performance (Chen et al. 2005).

Furthermore, the Dupont Analysis was introduced to deconstruct the different drivers of ROE. Under DuPont model, Return On Equity is equal to the profit margin (NPM) multiplied by asset turnover multiplied by financial leverage. The breakdown of ROE allows investors to focus on the key metrics of financial performance individually to identify strengths and weaknesses.

- **Net Profit Margin (NPM):** this ratio serves as the main indicators of profitability by the financial community. Particularly, earnings per share is the metric that is used to indicate profitability and relative value of a listed stock. It a metric that incorporates the result of operating, investing, and financing decisions.
- **Asset Turnover:** the ratio measures how efficiently a company uses its assets to generate revenue.
- **Financial Leverage:** also known as the equity multiplier, is an indirect analysis of a company's use of debt to finance its assets.
- Thus,

$$ROE = \frac{\text{Net Income}}{\text{Total Revenues}} \times \frac{\text{Revenues}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Total Equity}}$$

Stock Return measures the changes in stock price performance over a period in time. The total stock return comes from two sources: dividends and capital gains (Siegel, 2002).

Many scholars have considered that the widening gap between the book value and the stock prices over time could be explained by a direct consequence of not factoring in the effect of intellectual capital in the financial statements (Edvinson et al 1997; Lev 2001). Thus, the market considers that IC is perceived as a source of value to the firm and that companies investing in their IC will enjoy better performance.

7 RESEARCH METHODOLOGY

Throughout the numerous empirical studies reviewed, the classification of the different components is used by the researchers analyzed to comment on intellectual capital influence on the value of the company and financial performance.

It has been found that most of these empirical studies are devoted to the analysis of the impact of intellectual capital on financial performance and the market value of companies.

We can deduct from the various empirical studies literature that in addition to the choice of metrics used to measure the IC, the conclusions relating to the impact on the aggregates of the company can naturally vary due to:

- The state of development of an economy.
- The sector chosen to conduct the research: technological or capital intensive
- The sample of companies studied: size of the company, listed or not listed on the stock exchange

However, evidence from the IT sector in the MENA region is still scarce. Moreover, IC studies regarding Moroccan firms are very limited in breadth and depth. The only available IC study pertaining to Morocco considered Arab oil producing and non-producing economies. Furthermore, the prior work of Dženopoljac et al 2017, focused on three firms from the financial sector out of a sample of 100 firms selected among the top 100 firms of the MENA region, with a limited sample over the period 2011-2015. Therefore, this study fills the literature gap by contributing in several ways to the ongoing research regarding the impact of IC on the performance of Moroccan firms in general and the IT companies in particular.

As far as this study is concerned, the methodology of choice used is the Case Study, embracing a more exploratory analysis approach as the subject pertains to an under-researched field economy and sector-wise.

Yin. 2009 asserts that the use of such approach is appropriate in the investigation of real-life context of a topical issue.

This paper reports on a single case study conducted in the Moroccan nascent IT sector. Indeed, we back our decision by the fact that we are "examining and understanding unique, rare, and atypical companies and organizations as well as complex and dynamic events and processes" (Mills et al. 2010).

Specifically, among the local IT sector stands out HIGHTECH PAYMENT SYSTEMS – HPS. The firm can be regarded as presenting the ideal setting to investigate the determinants of corporate performance, since it puts forward knowledge to produce and transfer knowledge throughout the organizational structure.

HPS is a mobile banking solutions provider with global presence in over 90 countries ranking among the Top 150 firms in Africa[1] and 93rd among IT companies in France[2]. Considered yet a startup in the IT field as it was set up in 1995, the company is leader in the design, development, implementation and support of a series of multi-channel electronic payments. And has drawn renowned investors from the US and its valuation today tops close to half a billion dollar, making it rank among the best performers for the last couple of years.

The company has strived in places with fierce competition from Japan to Australia, and hence asserts the fact that the mobile banking business is influenced by information-based resources and is suitable to examine the components of IC (Mondal et al. 2009). HPS has been experiencing double-digit growth figures in revenues over the years and has kept the pace steady and proven high resilience in tough times.

Human capital, relational, and structural capital, including innovation capital and process capital, play an imperative part in the growth and development of the company as witnessed by the early and continuous disclosure of elements pertaining to IC components in its annual reports. Furthermore, HPS relies heavily on R&D as it allocates over 10% of annual revenues to innovation, ranking it thereby with the highest levels among its peers and nationwide.

RBV theory and competitive advantage state that the company is able to create value and develop a competitive advantage if it utilizes, manages, and develops its superior resources, in this case its intellectual capital, on an ongoing basis so that the company is able to create a unique strategy that is superior to those of its competitors.

Companies that are able to create value added and competitive advantage on an ongoing basis get more valuation in the eyes of investors, affecting the increasing value of the company (Randa et al. 2012). Previous research showing a positive influence between intellectual capital and firm value was conducted by Belkaoui (2003) and Chen et al. (2005).

DATA

HPS is a publicly traded company and thus all the financials are available since its listing on the exchange in 2006. Nonetheless, we consider financial reports over the period 2002-2020 to allow for enough data to investigate both IC disclosure and performance as the company has experienced prolonged growth globally.

For this research, a total of nineteen annual reports out of 24 periods since the company set up in 1995 and covering financials up to 2020 were gathered from the Casablanca stock exchange and HPS corporate website and top management. The choice of the period covered is a reasonable representation of the history of the firm for two reasons: first the financials were reported in a consolidated format only since 2011. Second, much of the expansion stemmed from external growth through multiple acquisitions achieved mainly during the last decade.

DATA ANALYSIS

In order to analyze the relationship between the independent variables VAIC and the dependent variable (profitability), we have applied multiple regression analysis. This method is appropriate when sample size is small (less than 100) and there is linearity between variables and when models are not correctly specified (Smith. 2003). The software used for statistical analysis of this research is JAMOVI has been applied to examine the relationship between IC and the company's performance, i.e. ROE, decomposed ROE and SR.

Furthermore, as we cannot conduct the analysis with unequal data sets, we decided to fill the missing figures of stock return data during 2002-2005 to account for stock performance prior to the listing of HPS on the exchange. The moving average method was used to smooth out predicted values of stock return during this period. The induced values come out above 20% but fall with the average of the entire study period 2002-2020.

REGRESSION MODELS

Three proposed research models attempt to explain the nature of relationships between dependent and independent variables. For each hypothesis established, regression models 1-3 are applied in the corporate and market performances; namely ROE and SR,. Model 1 examines the relationship between the performance proxy and the aggregate measure of Intellectual capital M.VAIC. Model 2 explores the association between the dependent variable and the specific ICE component of the M.VAIC. Model 3 considers the effect of the individual components of MVAIC, namely, CEE, HCE, SCE and RCE.

As for H1; we examine the relationships between performance metrics; namely ROE, Decomposed ROE, SR and the aggregate measures of IC.

Next, for H2 we analyze the association between the value of a company's IC and its future performance. To achieve these regressions, the value of IC of a particular year x is tested against the performance of the company of the following year x + 1. The goal is to verify whether IC is able to predict the future performance of a company.

In order to confirm the finding of the preceding model, we look up the association between the rate-of-growth of a company's IC and the company's future performance. The rate of growth (ROG) of IC is the year-on-year growth rate of MVAIC's components. Conceptually, the rate of growth of IC from year 2005 to 2006 is tested against the companies' performance of 2006. If the higher the value of a company's IC the higher is the company's future performance, then logically, the rate of growth of IC will also correlate with future performance. The results of H3 further reaffirm the findings of H2 and help to reinforce the contribution of IC to companies' performance.

All research tests are performed at 95 percent confidence interval.

These models are illustrated in the following regression equations as follows:

$$Yi = \alpha + \beta_1 (M.VAIC) \quad (1)$$

$$Yi = \alpha + \beta_1 (ICE) \quad (2)$$

$$Yi = \alpha + \beta_1 (CEE) + \beta_2 (HCE) + \beta_3 (SCE) + \beta_4 (RCE) \quad (3)$$

Where:

Yi is the dependent variable

the dependent variables ROE, Decomposed ROE and SR were tested sequentially using the regression model), and the independent variables are M.VAIC, ICE and IC components; CEE, HCE, SCE and RCE.

β 1... β4 are the coefficients of the regression model.

In Model 3, we use block-wise regression which consists of setting up several models that sequentially ad additional variables. The goal is to study the isolated effect of each variable we introduce in a block that composes the model and get the additional impact to the model fit. Any positive change in the model significance would indicate a better contribution to the overall model significance as indicated by Adjusted R^2.

8 EMPIRICAL RESULTS

The required data has been collected from the financial statements of the company; then, we classified and measured the related variables in order to perform the analysis.

For the purpose of empirical analysis, this study uses descriptive analysis, Pearson correlation analysis and linear multiple regression as the underlying statistical tests. A descriptive analysis of the data obtained is conducted to obtain sample characteristics. The Pearson correlation analysis is executed to check for multicollinearity problem among the variables.

The multiple regression analysis is performed in order to test the relationship between the dependent and the independent variables.

8.1 DESCRIPTIVE STATISTICS

The following table presents the means, standard deviations, medians, minimum and maximum values of all the variables.

Table 1. Descriptive statistics for selected variables

	ROE	NPM	SALES/TA	TA/TE	SR	M.VAIC	CEE	ICE	HCE	SCE	RCE	SIZE
N	19	19	19	19	19	19	19	19	19	19	19	19
Mean	0.140	0.0976	0.707	2.10	0.218	2.40	0.515	1.89	1.49	0.300	0.0982	19.2
Median	0.195	0.126	0.689	2.08	0.253	2.55	0.507	2.02	1.58	0.367	0.0948	19.4
Standard deviation	0.186	0.138	0.135	0.544	0.353	0.486	0.0920	0.448	0.277	0.170	0.0213	0.933
Minimum	-0.386	-0.286	0.426	1.33	-0.593	1.07	0.314	0.684	0.808	-0.237	0.0676	17.6
Maximum	0.321	0.254	1.05	2.98	0.731	3.10	0.745	2.52	1.91	0.477	0.131	20.9

Source: Author's calculation - Note: Size of the company (Size) is measured by natural log of annual revenues

Table I presents the means, standard deviations, medians, minimum and maximum values of all the variables.

The comparison between ICE and CEE values suggests that during the sample period, HPS was generally more effective in creating VA from its Intellectual Capital (ICE=1.89) than from physical and financial capital employed (CEE=0.52). This finding justifies the arguments in the prior literature as indicated by (Zéghal, 2000; Pulic, 2004) where wealth created by intellectual resources surpasses that created by physical and financial resources. The mean of aggregate M-VAIC which is 2.4 indicates that HPS created 2.4 dirhams for every DH employed.

These findings suggest that high-tech industries prove to be more effective in generating value using their intangibles, namely their IC as compared to than traditional industries relying the physical and financial capital employed. As a matter of fact, M-VAIC exceeds by more than four times the Capital Employed Efficiency (M-VAIC=2.4 vs. CEE=0.5). It is also consistent with the obsolescence of conventional factors of production such as physical and financial capital as demonstrated in earlier work (Firer et al. 2003)

8.2 CORRELATION ANALYSIS

In this study, we have recourse to the correlation analysis as the statistical technique to analyze the association between the dependent and the independent variables.

Table II shows the correlation outcome based on Pearson pair wise analysis which indicate that the Intellectual Capital Efficiency (ICE) is significantly positively associated (p<0.001) with financial performance, namely ROE, and NPM, on the one hand, but insignificant with the other attributes of ROE; the assets efficiency indicated by Sales/TA and the leverage as measured by TA/TE, on the other.

As for the first component of the M-VAIC; namely the Capital Employed Efficiency (CEE), Table II does not indicate of the prevalence of any association with performance metrics; ROE, NPM or SR. Nonetheless, CEE shows a high association with Asset Turnover at 0.823 (p<0.001). Capital employed includes physical assets and fall within the category of the ratio of TA/TE.

This result seems to be in line with expectations in the new economic era, especially for a high tech firm operating in a global context.

At the individual components of ICE level, the components of IC reflect mixed results. While Human Capital and Structural Capital components indicate strong associations with both performance metrics namely ROE and NPM with correlation coefficients exceeding 0.84 (p<0.001), Relational Capital Efficiency, which was introduced to improve Pulic's initial measure of IC Efficiency, fails to show any relation with corporate performance as the association as reflected by the correlation coefficient was not statistically significant, except for the component of ROE; namely Assets turnover showing moderate inverse relationship with RCE (p=0.097).

These findings lead us to accept partially the H1, as there is a strong positive association between M-VAIC and profitability as indicated by ROE and its component NPM but not as high a correlation with stock return.

Ulum introduces the relational capital as a third component to the IC calculation and uses marketing and advertising charges as a proxy. For the purpose of this study, and based on the public financial information available, we use the equivalent account "Commercial Cost" as reported by HPS and detailed as follows:

Travel Expenses
Communication Costs
fairs and exhibitions
Users Meeting
Receptions Expenses
Sales Commissions

Although some accounts may fall outside the definition of Relational Capital account, we decided to include all these accounts as we feel they all contribute in one way or another to entertaining and developing good relations with the different stakeholders. Furthermore, despite the fact that we include all these accounts as a proxy of the RCE, the contribution of RCE as a component of ICE remains very limited as the coefficient hovers around 0.1, less than 5% of the sum of the three components of ICE, namely HCE, SCE and RCE. In particular, as data was not available before HPS went public in 2006, we estimate the commercial costs using the average ratio to turnover over the remaining study period 2006-2009. We chose to cover the pre-IPO period as the contribution of RCE was feeble and accounted for less than 10% as compared to M-VAIC.

Table 2. Correlation analysis of selected variables

	ROE	NPM	SALES/TA	TA/TE	SR	M.VAIC	CEE	ICE	HCE	SCE	RCE	SIZE
ROE	—											
p-value	—											
NPM	**0.941**	**—**										
p-value	< .001	—										
SALES/TA	**-0.050**	**-0.047**	**—**									
p-value	0.838	0.849	—									
TA/TE	**0.094**	**0.014**	**-0.135**	**—**								
p-value	0.703	0.954	0.581	—								
SR	**0.411**	**0.246**	**-0.332**	**0.204**	**—**							
p-value	0.041	0.140	0.203	0.237	—							
M.VAIC	**0.844**	**0.869**	**0.212**	**0.045**	**0.232**	**—**						
p-value	< .001	< .001	0.383	0.854	0.340	—						

CEE	**0.269**	**0.243**	**0.826**	**-0.137**	**-0.064**	**0.494**	**—**					
p-value	0.266	0.316	< .001	0.575	0.796	0.032	—					
ICE	**0.861**	**0.894**	**0.061**	**0.077**	**0.265**	**0.984**	**0.331**	**—**				
p-value	< .001	< .001	0.804	0.753	0.274	< .001	0.167	—				
HCE	**0.842**	**0.876**	**0.077**	**0.032**	**0.260**	**0.980**	**0.331**	**0.996**	**—**			
p-value	< .001	< .001	0.754	0.896	0.283	< .001	0.167	< .001	—			
SCE	**0.855**	**0.894**	**0.089**	**0.135**	**0.226**	**0.981**	**0.401**	**0.982**	**0.965**	**—**		
p-value	< .001	< .001	0.717	0.581	0.351	< .001	0.089	< .001	< .001	—		
RCE	**0.323**	**0.256**	**-0.433**	**0.131**	**0.377**	**0.107**	**-0.552**	**0.230**	**0.229**	**0.106**	**—**	
p-value	0.177	0.290	0.064	0.594	0.112	0.662	0.014	0.344	0.345	0.666	—	
SIZE	**0.308**	**0.218**	**0.025**	**0.871**	**0.273**	**0.292**	**0.051**	**0.306**	**0.256**	**0.355**	**0.283**	**—**
p-value	0.200	0.370	0.920	< .001	0.259	0.225	0.835	0.202	0.291	0.136	0.241	—

Source: Author's calculation

Overall, from Table II, we can see that none of the independent variables are strongly correlated with each other, thus indicating that the multicollinearity will not be a problem in the regression analysis. Gujarati et al. 2009 suggest that the degree of correlation exceeding 0.8 or 0.9 leads to the problem of multicollinearity.

In the present study, the degree of correlation between all independent variables ranges between 0,11 et -0,55.

A further test of collinearity is the VIF which quantifies the extent of correlation between one predictor and the other predictors in a model. According Table III, all figures show values between 1 and 2; which indicates the absence of correlation between the explanatory variables.

Because of the absence of correlation between the predictor variables in the regression model, they can independently predict the value of the dependent variable.

Table 3. Collinearity statistics

VARIABLE	VIF	TOLERANCE
SCE	1.46	0.685
RCE	1.76	0.568
CEE	2.07	0.482

Source: Author's calculation

8.3 HYPOTHESIS TESTING RESULTS

The statistical data about relationships between the various components of M.VAIC and company performance in the observed nineteen-year period for HPS are shown in Tables IV-V. Overall, M.VAIC yields the highest Adjusted R square but only for the first hypothesis, and the second hypothesis to a lesser extent.

Table 4. General testing results

Independent	Dependent	Ajdusted R2	T-Statistic	Constant	β	Sig.
M.VAIC	ROE	0.695	6.48	-0.636	0.322	<.001
ICE		0.741	7.25	-0.494	0.246	<.001
M.VAIC	SR	-0.00196	0.982	-0.186	0.168	0.340
ICE		0.0153	1.131	-0.176	0.208	0.274
M.VAIC	ROEx+1	0.214	2.37	-0.304	0.190	0.031
ICE		0.166	2.09	-0.202	0.188	0.052
M.VAIC	SRx+1	-0.0264	0.750	-0.104	0.134	0.464
ICE		-0.0409	0.5766	0.00509	0.11343	0.572
ROG M.VAIC	ROEx+1	-0.0114	0.899	0.144	0.102	0.382
ROG ICE		0.00985	1.08	0.1416	0.0957	0.296
ROG M.VAIC	SRx+1	-0.0624	-0.0371	0.21833	-0.00848	0.971
ROG ICE		-0.0606	0.171	0.2149	0.0307	0.866

Source: Author's calculation

8.3.1 LINEAR MULTIPLE REGRESSION RESULTS OF HYPOTHESIS TESTING - H1

The first hypothesis H1 postulates a positive correlation between the company's IC and its performance.

Particularly, the IC of the company of the year was tested against the performance metrics of the same year.

The data in Table IV shows that a robust explanatory power of the regression models as indicated by Adjusted R^2. The results indicate that the model is able to explain of the variance in the firm's ROE by ICE component and by the M.VAIC by 74.1% and 69.5%, respectively

This result is further confirmed as shown in Table V where we consider individual components of IC.

Noticeably, the adjusted R2 increases from 0.695 to 0.742, suggesting investors may place different value on the different components of VA efficiency. More specifically, the T-statistics of SCE and RCE are greater than 1.96, which means that the loading is significant at the $p< 0.05$ level and indicates that profitability is determined by the values of structural and relational capital of the company as shown in Table V. Expectedly for a high-tech firm, physical capital has no bearing on performance regardless of the metric but astonishingly human capital does not affect HPS' profitability. Yet, HPS has been forward-looking among its peers in terms of human capital management. In fact, HPS allocates above average budget to R&D and is very keen as to human resource matters by providing ongoing training and setting up HPS Academy very early on. Nonetheless, we presume that the immediate effect is not reflected on performance. Furthermore, the high level of employee turnover in an industry experiencing rapid technological evolution making it difficult to stay abreast. Thus, this interpretation could provide a fair explanation why HCE is dissociated with corporate performance.

The results support H1 hypothesis when considering corporate profitability indicating that investors place higher value on firms with greater intellectual capital, and that all components of M.VAIC are recognized as valuable intellectual capital.

The results appear to support partially H1. In fact, changes in the predictors IC; are highly associated with changes in the response variable ROE but weakly with stock return. This further confirms the findings from the correlation analysis.

IC is not a determinant of stock performance. This unexpected finding implies that Moroccan investors do not appreciate the importance of IC within the IT industry as represented by the emblematic HPS, though it is highly creative of VA. This finding is in contradiction with earlier work by Zéghal et al. (2010) who found a positive impact of IC on profitability and stock performance of 300 British high tech firms. This result may be due to the lagging effect of IC on performance and will be tested in H2 and H3.

8.3.2 LINEAR MULTIPLE REGRESSION RESULTS OF HYPOTHESIS TESTING - H2

The second hypothesis H2 posits that if IC is a major driver of corporate value, then logically IC should also correlate with the increase in future performance.

We follow the same steps as in testing for H1. The IC of the company of the year was tested against the performance metrics of the following year.

Table IV indicates a moderate explanatory power of M.VAIC and ICE when attempting to predict next year profitability as indicated by ROE. The adjusted R^2 is 0.214 for M.VAIC, and 0.166 for ICE. These are reasonably good numbers for an exploratory study. They indicate that the model is able to explain more than 16 percent of the variance in the dependent variable for the period. Although the R 2 numbers are not very large, nevertheless, the paths are statistically significant with T-statistic greater than 1.96. In an exploratory model, an R^2 of 0.10 (R^2>0.2 in our case) can be considered satisfactory and worth reporting (Bellman, 2003).

Nonetheless, as shown in Table V, individual components of IC better explain the link with profitability. Specifically, when testing IC against the forward ROE, the model fit for the profitability metric comes out at 39,1% but the only statistically significant factors are human and structural capital. However, the negative value for β of SCE implies that this relationship is inverse as advocated by Pulic 1998. In other words, the lower the SCE, the higher is the ROE. Yet, physical and relational capital are not determinants of future corporate performance.

According to these findings, the hypothesis H2 is partially confirmed when considering the impact of the components of M. VAIC as there exist a somewhat moderate association between IC and future profitability.

IC is not a good predictor of future stock performance as we can depict from Tables IV and V.

The results lend modest yet partial support to H2 that the higher the value of a company's IC, the higher the company's future profitability.

8.3.3 LINEAR MULTIPLE REGRESSION RESULTS OF HYPOTHESIS TESTING - H3

H3 posits a positive association between the rate of growth of IC and future corporate performance.

Considering the conceptual framework of the research and the third hypothesis, the growth rate of the individual components and the aggregate measure of the Modified Value Added Intellectual Capital (M-VAIC) was contrasted with firms' future performance metrics.

The results of H3 are intended to back the findings of H2 and help reinforce the prediction attributes of IC to companies' performance.

Table IV show no indication that specific IC measures, namely M. VAIC and ICE have association with future corporate performance

Yet, in a block-wise configuration, IC components together (the growth rate of human capital, structural capital and relational capital) are able to predict 62,3% of the future financial performance ROE x+1, and 21,6% of the forecasted stock performance.

Furthermore, human capital proves to be a good indicator of performance but financial capital fails to predict stock performance. This latter finding contradicts with the results of the study by Dženopoljac, et al. (2107) focusing on Arab firms where financial capital prevailed as a predictor of corporate performance

H3 is thus confirmed and this finding implies that Moroccan investors appreciate the importance of IC within the IT industry as HPS is highly creative of VA and that physical capital is not relevant to investors in the stock price prediction.

Table 5. Testing results of M. VAIC components

Independent	Dependent	Ajdusted R2	T-Statistic	Constant	β	Sig.
CEE	ROE	0.7421	0.858	-0.360	0.301	0.406
HCE			-0.600		-0.213	0.558
SCE			2.063		1.162	0.058
RCE			2.049		3.189	0.060
CEE	SR	-0.0481	0.356	-0.670	0.478	0.727
HCE			-0.121		-0.164	0.905
SCE			0.244		0.526	0.811
RCE			1.246		7.416	0.233
CEE	ROEx+1	0.391	1.469	-1.705	0.791	0.166
HCE			2.621		1.454	0.021
SCE			-2.307		-2.029	0.038
RCE			-0.450		-1.151	0.660
CEE	SRx+1	-0.1679	0.379	0.447	0.554	0.711
HCE			-0.254		-0.382	0.804
SCE			0.367		0.876	0.719
RCE			-0.312		-2.167	0.760
ROG CEE	ROEx+1	0.623	-4.436	0.151	-0.726	<.001
ROG HCE			5.050		0.763	<.001
ROG SCE			3.471		0.094	0.004
ROG RCE			0.033		0.004	0.974
ROG CEE	SRx+1	0.2159	-1.5445	0.16079	-0.72107	0.146
ROG HCE			2.0304		0.87511	0.063
ROG SCE			0.0233		0.00180	0.982
ROG RCE			1.5085		0.55254	0.155

Source: Author's calculation

9 DUPONT ANALYSIS – EARNINGS IS A KEY DRIVER

Next, we consider the isolated effect of each metric that makes up the financial performance ROE in order to identify the drivers of performance.

We shall look at each of the three components; namely profit margin, asset turnover and leverage.

Table 6. Results – Decomposed ROE

Independent	Dependent	Ajdusted R2	T-Statistic	Constant	β	Sig.
M.VAIC	NPM	0.741	7.25	-0.494	0.246	<.001
ICE		0.787	8.21	-0.421	0.274	<.001
M.VAIC	ATO	-0.0111	0.896	0.565	0.0591	0.383
ICE		-0.0549	0.252	0.6723	0.0184	0.804
M.VAIC	LEV.	-0.0566	0.187	1.9783	0.0508	0.854
ICE		-0.0525	0.320	1.9227	0.0941	0.753
M.VAIC	NPMx+1	0.166	2.09	-0.194	0.126	0.053
ICE		0.146	1.98	-0.139	0.131	0.066
M.VAIC	ATO x+1	0.131	-1.89	0.991	-0.115	0.077
ICE		0.193	-2.25	0.986	-0.144	0.039
M.VAIC	LEV.x+1	-0.0458	0.506	1.824	0.133	0.620
ICE		-0.0360	0.639	1.801	0.182	0.532
ROG M.VAIC	NPMx+1	0.0416	1.32	0.0999	0.1066	0.206
ROG ICE		0.0677	1.50	0.0983	0.0937	0.154
ROG M.VAIC	ATO x+1	0.103	1.72	0.707	0.133	0.105
ROG ICE		0.0473	1.36	0.7076	0.0853	0.193
ROG M.VAIC	LEV.x+1	-0.0624	-0.0371	0.21833	-0.00848	0.971
ROG ICE		-0.0606	0.171	0.2149	0.0307	0.866

Source: Author's calculation

As indicated in Table VI, regression results prove as expected that the earning indicator NPM is the only dependent variable that responds to IC variance. We proceed with single input testing of ICE, which encompasses the three other variable including human, structural and relational capital. The explanatory power comes out at 0.787 and reveals thereby, that 79% of the data fit the regression model. Furthermore, since the p-value is less than the significance level (of 0.05) then the model fits the data well.

By the same token, we test the effect of M-VAIC against profitability. The regression results produce an adjusted R2 value of 74,1% for a p-statistic of <0.001.

Looking at the effect of individual constituent of M.VAIC, Table VII reveals that structural capital is the only significant determinant of the corporate earnings with a T-Statistic greater than 1.96.

Both outcomes confirm that intellectual capital is a determinant of HPS's profitability and that NPM is the key driver of financial performance.

In order to check whether IC is a predictor of future companies' performance, IC of the year is tested against companies' earnings of next year. Regression a mere 17 percent and 15% of the variance in the dependent variable vs. M.VAIC and ICE, respectively

Table 7. Results – NPM

Independent	Dependent	Ajdusted R2	T-Statistic	Constant	β	Sig.
CEE	NPM	0.777	0.241	-0.1285	-0.0488	0.843
HCE			-0.269		-0.657	0.792
SCE			2.125		0.8232	0.052
RCE			0.968		1.0366	0.349

Source: Author's calculation

10 TIME SERIES ANALYSIS

HPS went public in 2006 when historic shareholders sold their stake in the company through an IPO. Ever since, the company's revenues grew rapidly yoy by 17% to reach 720MDH from a mere 45MDH between 2002 and 2020.

Consequently, the stock followed suit rising more than seven fold by 15% annually to reach 6.490dh/share by the end of 2020, up from its IPO price of 850DH in 2006.

Consequently, we would expect the IC of the company to experience similar impact accordingly. To this end, we conduct a time-series analysis to check for any impact of the company listing on the Casablanca Stock Exchange.

Based on a block-entry linear regression, the introduction of a dummy variable IPO to test for the impact of the HPS listing on the explanatory power of the independent variables on performance yields inconclusive results.

Table 8. Testing results – IPO impact

Independent	Dependent	Ajdusted R2	T-Statistic	Constant	β	Sig.
CEE	ROE	0.750 Î 0.742	1.026	-0.1851	0.3579	0.654
HCE			-1.145		-0.4692	0.323
SCE			2.410		1.6131	0.273
RCE			2.404		4.2949	0.031
IPO			-1.203		-0.0842	0.250

Source: Author's calculation

As a matter of fact, the change in the Adjusted R^2 is only minimal and account for a mere 0.8% improvement in the model fit. Predictor variables composing M.VAIC, namely CEE, HCE, RCE and SCE explain 74.2% of the variance in the dependent variable as opposed to only 75% when we add the second block containing IPO dummy variable. Furthermore, the significance level exceed the 0.005 threshold, indicating that IPO as predictor variable of the corporate performance.

Hence, we can conclude that the listing of HPS does not have an impact of the relation between the predictor variables; IC and the dependent variable; financial performance.

11 RESULTS DISCUSSION

In a case study configuration of a publicly listed company in the IT sector on the Casablanca Stock Exchange over the period 2002-2020, this paper has examined the association between IC and company performance. In doing so, it has examined three aspects of the relationship:

(1) a positive correlation between a company's IC and its financial performance;
(2) a positive relationship between IC and the company's future performance;
(3) a positive correlation between the rate of growth of a company's IC and that company's future performance

Among the multiple measures of IC and for the purposes of this paper the Pulic model was used in its modified version as introduced by Ulum. Specifically, The Modified Value Added Intellectual Coefficient (M.VAIC) is used to measure the IC of companies.

M.VAIC provides a standardized and consistent basis of measure of the value creation efficiency of tangible and intangible assets within a company during operations. In this model is a composite sum of the **Capital Employed Efficiency** and the **Intellectual Capital Efficiency**:

M.VAIC = CEE + (HCE + SCE + RCE)

The M.VAIC method provides ease of data sourcing and the calculation of ratios from readily available financial data from annual reports published by the company and the stock exchange.

For the sake of data analysis, the multiple linear regression with simultaneous entry method was used for this empirical study. Furthermore, we use block-wise regression by setting up models that sequentially ad additional variables. The goal is to study the isolated effect of each variable we introduce in a block that composes the model and get the additional impact to the model fit.

To further analyze the financial performance of the company HPS, we have recourse to the Dupont Method. It allows to break down ROE into three financial ratios with the purpose of detecting the performance key drivers.

Finally, in order to neutralize the effect of public listing, we decide to conduct a time series analysis to check for the effect on the IC impact on performance pre and post IPO.

The regression results provide mixed support for the three hypotheses as to the impact of IC on corporate performance, namely ROE and SR.

This paper has examined three aspects of the relationship:

(1) A positive correlation between a company's IC and its profitability, but no correlation with stock performance
(2) A positive relationship between the value of a company's IC and that company's future profitability but not stock return;
(3) The rate of growth of a company's IC does not predict the company's future performance;

Thus, we can conclude that companies that work towards increasing and entertaining their intellectual capital will be more profitable and hence propel the stock price. Furthermore, physical capital proves to be less important in such a knowledge-sensitive environment.

For this reason, the M-VAIC method could be an important tool for many decision makers to integrate IC in their decision process.

Overall, HPS has adopted a proactive stance in externally reporting intangibles. Indeed, the company has proven to be sensitive to the importance of intellectual capital and the role it assumes in ensuring long-term organizational success.

12 AVENUES FOR FUTURE INVESTIGATION

This research would suggest that Ulum's revised VAIC model provides companies with a simple approach to measuring their IC.

In addition, the investors' appreciation of a stock would be considerate of IC performance and the efforts the company put to nurture it.

This research is by nature limited in scope as at deals with a particular company operating a specific and IC sensitive sector. Furthermore, despite the fact that HPS is present in over ninety countries worldwide, it is subject to Moroccan legal context and the fact that it is a publicly listed company in a inefficient stock market. Privately held companies would experience a different fate.

In summary, the results of this case study empowers earlier research with additional empirical support on the contribution of IC to companies' current and future performance from the IT sector in an emerging economy environment. To this end, managers in knowledge-sensitive industries need to pay extra attention as to the importance of IC and that knowledge is a critical factor affecting a company's ability to remain competitive in the new global marketplace.

Thus, how well companies do in acquiring, applying and nurturing knowledge will be a decisive and a competitive factor.

NOTES:

1: Annual Report 2017
2: http://www.linktechnology.fr/classement-entreprises-SSII.html

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