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Abstract

Purpose – The purpose of this paper is to analyze the relationship between firms' intellectual capital (IC), financial performance (FP) and market value (MV) as well as the relationship between ownership concentrations on IC performance.

Design/methodology/approach – A large sample of non-financial listed firms belonging to 14 countries in Western Europe, for the period between 2004 and 2015, was investigated using the GMM system (1998) dynamic estimator and the effect of lagged explanatory variables on firm's FP and MV.

Findings – The results reveal that IC is an important resource for firms' value creation. Human capital is found to be a key factor of firms' wealth. Results show that capital employed efficiency positively impacts on firms' FP in the short run. The impact of IC components on firms' MV may not be immediate. The structural capital positively affects firms' FP in the long run. Also, the results reveal that ownership concentration and owners' management involvement constrain firms' IC performance.

Originality/value – The current study contributes to IC research by exploring a large sample of firms across countries in Western Europe using econometric modeling. Considering that the effect of IC on firms' FP needs time to be realized, thus to be measured, the effect of lagged explanatory variables on performance was tested, using dynamic panel estimators, specifically the GMM system (1998) dynamic estimator.

Keywords Financial performance, Intellectual capital, Ownership concentration, Market value

Paper type Research paper

1. Introduction

In a knowledge-based economy, the importance of intellectual capital (IC) investments is recognized because the knowledge assets affect the firm's long-term competitive advantage and value creation (Lev, 2001, 2004; Cabello-Medina *et al.*, 2011). Furthermore, IC is an important resource for firm's innovations and human development through knowledge share (European Commission, 2010, 2013; Nonaka and Takeuchi, 1995). The recognized discrepancy between firm's book value and market value (MV) has been attributed to hidden values that are not recognized in the annual reports. In that sense, IC has been suggested to explain the gap between firm's MV and book value (Lev, 2004).

The difficulties in evaluating IC investments increase agency costs due to the information asymmetry between the firm and the external investors (Aboody and Lev, 2000; Lev, 2004; Lev and Zambon, 2003). The specificities of IC investments may lead to adverse selection, moral hazard and an opportunistic behavior of managers (Holland, 2006; Aboody and Lev, 2000). High ownership concentration and lack of willingness to share control may block the entrance of qualified and well-trained managers (Miller and Le Breton-Miller, 2006; Westhead and Howorth, 2006; Greco *et al.*, 2014), and the presence of a high number of family members as executives can increase conflicts and loss of efficiency which affects the firm's objectives (Gomez-Meja *et al.*, 2007; Miller and Le Breton-Miller, 2006; Greco *et al.*, 2014).

Ownership concentration can have a negative effect on IC value creation and development. On the one hand, Gedajlovic and Carney (2010) argue that firms with ownership concentration are disadvantaged in value creation from IC. On the other hand,

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empirical evidence suggests that ownership concentration might positively impact on firm's performance and value (Shleifer and Vishny, 1986; Denis and McConnell, 2003).

This study aims to extend the literature of IC (e.g. Ballester *et al.*, 2003; Chan *et al.*, 2001; Xing, 2014; ul Rehman *et al.*, 2011; Tseng *et al.*, 2013; Nimtrakoon, 2015) by analyzing the impact of IC investments on firms' financial performance (FP), measured by return on assets (ROA), and firms' MV, measured by Tobin's Q. These measures were used in several studies (Goebel, 2015; Bharathi Kamath, 2008; Mehralian *et al.*, 2012; Gerpott *et al.*, 2008). Moreover, this study also aims to verify the influence of ownership concentration and owner's management involvement on the firms' IC performance in the context of countries in Western Europe.

To reach the objective of the study, a large sample of non-financial listed firms across 14 countries in Western Europe is used (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and UK) in order to capture some variability of the relevant variables in study, namely of IC investments. Data were collected for the period between 2004 and 2015. Considering that the effect of IC on firms' performance needs time to be realized, thus to be measured, Nimtrakoon (2015) argues that studies exploring the effect of IC on lagged performance seem to require the use of econometric modeling techniques. Thus, following this suggestion, this study tests the effect of lagged explanatory variables on performance, using dynamic panel estimators, specifically the GMM system (1998) dynamic estimator.

Findings allow contributing to IC literature, revealing that IC is an important resource for firms' value creation. Human capital (HC), referring to employees' competence, knowledge and innovativeness, is found to be a key factor for firms' wealth. Results show that capital employed efficiency (CEE) positively impacts on firms' FP in the short run. The impact of IC components on firms' MV may not be immediate. According to the findings of the study, the structural capital (SC) positively affects firms' FP in the long run. If we take into consideration that SC comprises the firms' most valuable strategic assets (Bontis *et al.*, 2015; Denicolai *et al.*, 2015; Janosevic and Dzenopoljac, 2012), then it is understandable that it takes time for employees to assimilate and adapt to firms' particularities, such as, culture and processes. Also, results show that ownership concentration and owners' management involvement constrain firms' IC performance.

The current paper is structured as follows. Section 2 presents a theoretical framework and hypotheses formulation, Section 3 describes the used methodology, Section 4 presents the results, the results discussion is presented in Section 5 and finally, Section 6 presents the conclusion and implications.

2. Literature review and hypotheses development

2.1 IC and firm's FP

IC can be defined as the sum of all knowledge and knowing capabilities that allow firms to acquire and/or maintain a sustainable competitive advantage (Wang *et al.*, 2014; Nahapiet and Ghoshal, 1998; Youndt *et al.*, 2004). Edvinsson and Malone (1997, p. 44) define IC as "the possession of knowledge, applied experience, organizational technology, customer relationships and professional skills that provide the firm with a competitive edge in the market." Lev (2004) interprets intangible assets as claims of future benefits, but without physical or financial form. Moreover, there is consensus among academics that IC, i.e., non-monetary and non-physical resource, strongly contributes to value creation through employee's knowledge and organizational processes, databases and relationships (Serenko and Bontis, 2004; Youndt *et al.*, 2004; Wang *et al.*, 2014).

Although we can find different frameworks to conceptualize IC (Edvinsson and Malone, 1997; Sveiby, 1997; Sydler *et al.*, 2014), there are three components that are widely accepted among researchers, i.e., HC, SC (or organizational capital) and relational (or customer) capital (RC) (ul Rehman *et al.*, 2011; Wang *et al.*, 2014; Nimtrakoon, 2015; Bontis *et al.*, 2015).

HC refers to the sum of employee's knowledge, competence, innovativeness, commitment and wisdom (Ahangar, 2011; Bontis, 1998; Morris, 2015; Johnson, 1999). This is the individual's knowledge that does not belong to firms and that employees take with them when they leave the organization. SC comprises the firms' most valuable strategic assets, such as, organizational capabilities, culture, processes, patents, copyrights, trademarks, databases and so on (Ahangar, 2011; Denicolai *et al.*, 2015; Janosevic and Dzenopoljac, 2012; Johnson, 1999). The RC is the knowledge obtained through the establishment of relationships with external stakeholders (Kweh *et al.*, 2014; Yu *et al.*, 2015; Johnson, 1999).

Previous studies investigated the impact of IC and IC components on firm's FP across different countries and industries. Regarding the relationship between IC and firm's FP, the majority of the studies show a positive and significant effect of IC on firm's FP (ul Rehman *et al.*, 2011; Tseng *et al.*, 2013; Nimtrakoon, 2015; Bontis, 1998; Ahangar, 2011; Denicolai *et al.*, 2015).

Regarding HC component of IC, ul Rehman *et al.* (2011) found a positive and significant impact on firm's FP. Tseng *et al.* (2013) used operating profit per employee as an indicator for HC component and verified a positive impact of HC on firm's FP. Wang *et al.* (2014) also found a positive and significant correlation between HC and firm's FP. Morris (2015) analyzed the impact of HC across different industries and the results show a positive and significant association between HC and firm's FP. In the study conducted by Nimtrakoon (2015) across five ASEAN countries, i.e., Indonesia, Malaysia, Philippines, Singapore and Thailand, the results show a positive and statistically significant correlation between HC and firm's FP.

Concerning the SC component of IC, ul Rehman *et al.*'s (2011) study shows a positive and significant impact on firm's FP. In other study, Tseng *et al.* (2013), following Edvinsson and Malone's (1997) suggestion and decomposing SC into process capital (proxied by current capital turnover rate) and innovation capital (proxied by research and development (R&D) intensity), results show a positive relationship between innovation capital and firm's FP and a negative association between process capital and firm's FP. Wang *et al.*'s (2014) study verified a positive and statistically significant correlation between HC and firm's FP. Guo *et al.* (2012) examined the influence of patents and R&D expenses on accounting performance. Although results show a non-statistically significant relationship between patents and firm's FP, the authors found a negative and statistically significant effect of R&D on firm's FP. Also, when testing the influence of compensation of CEOs or vice presidents (HC), the authors found a positive and statistically significant correlation between salary and bonus for CEOs and firm's FP. Results from Nimtrakoon's (2015) study revealed a positive and statistically significant correlation between SC and firm's FP for Malaysia and negative and statistically significant correlation between SC and firm's FP for Philippines.

Regarding RC component of IC, Tseng *et al.* (2013) used revenue growth rate as an indicator for RC. The authors found a positive correlation between RC and firm's FP. The study of Wang *et al.* (2014) shows a positive and statistically significant correlation between HC and firm's FP. The study conducted by Nimtrakoon (2015) shows a positive and statistically significant correlation between RC and firm's FP for Malaysian and Philippines. In accordance with the above-mentioned studies, the following hypotheses are proposed:

H1. IC has a positive impact on firms' FP.

H1a. CEE has a positive impact on firms' FP.

H1b. Human capital efficiency (HCE) has a positive impact on firms' FP.

H1c. Structural capital efficiency (SCE) has a positive impact on firms' FP.

H1d. RC has a positive impact on firms' FP.

2.2 IC and firm's MV

Although the existence of empirical evidence on the positive impact of IC on firm's MV can be found in several studies (Ballester *et al.*, 2003; Chan *et al.*, 2001; Xing, 2014), there are several studies with contradictory results regarding the relationship between IC and firm's MV. Chen *et al.* (2005) carried out a study to analyze the impact of IC on firm's MV, using a sample of listed firms on Taiwan Stock Exchange. The results show a statistically significant positive relationship between IC and firm's MV. Next, when the authors analyzed the effect of R&D and advertising, which are considered the part of SC and RC, respectively, on firm's MV, the results reveal a positive and statistically significant relationship between R&D and firm's MV; however, the relationship between advertising and firm's MV was not statistically significant. In other study, Ramirez and Hachiya (2012) also analyzed the impact of R&D and advertising on firm's MV. The results obtained show that although there is a positive and statistically significant relationship between R&D and firm's MV, the results for the advertising were mixed, which made the authors suggested that this divergence could be attributed to the type of industry. Tseng and Goo (2005) analyzed the relation between IC and firm's MV on Taiwanese manufacturing industry. Results from the structural equation model reveal a positive association between IC and firm's MV. When analyzing five ASEAN countries, Nimtrakoon (2015) did not find statistical significance in the association between IC and firm's MV, except for the case of Thailand.

Based on results from above-mentioned studies, a positive impact of IC on firm's MV is suggested. Therefore, the following hypotheses are formulated:

H2. IC has a positive impact on firms' MV.

H2a. CEE has a positive impact on firms' MV.

H2b. HCE has a positive impact on firms' MV.

H2c. SCE has a positive impact on firms' MV.

H2d. RC has a positive impact on firms' MV.

2.3 The influence of ownership concentration on IC investments

Empirical evidence suggests that ownership concentration might positively impacts on firm's performance and value (Shleifer and Vishny, 1986; Denis and McConnell, 2003). However, agency problems might be noticed among firms with ownership concentration. On the one hand, the lack of willingness to share control may block the entrance of qualified and well-trained managers (Miller and Le Breton-Miller, 2006; Westhead and Howorth, 2006; Greco *et al.*, 2014). On the other hand, agency problems might be solved in firms managed by their owners (McVey and Draho, 2005; Miller and Le Breton-Miller, 2006) due to the absence of divergent interests between owners and managers (Lemmon and Lins, 2003).

Saleh *et al.* (2009) conducted a study, where results show a negative and statistically significant relation between ownership concentration and IC. Regarding the IC components, the authors also found a negative and statistically significant correlation between ownership concentration and SC. Contrasting with the previous study, Greco *et al.* (2014) found a positive and statistically significant association between ownership concentration and IC. However, when owners' management involvement was tested, the authors found a non-linear inverted U-shaped relationship with IC. Therefore, it is predicted that ownership concentration reduces the investments on IC, and consistent with this perspective, the following hypotheses are formulated:

H3. Ownership concentration has a negative impact on IC performance.

H4. Owner management involvement has a negative impact on IC performance.

3. Data, variables and method

3.1 Database

In order to analyze the impact of firms' FP and MV as well as to capture some variability of the relevant variables in study, namely of IC investments, data of 2,090 non-financial listed firms across 14 countries in Western Europe (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, Sweden and UK) were gathered for the period between 2004 and 2015. Table I reports the number of firms per country.

The countries with more firms in the sample are France, Germany and the UK, whereas Austria, Greece, Ireland and Portugal are the less represented countries. The data used in this study were retrieved from the DATASTREAM database by Thomson Reuters that provides current and historical economic and financial data for all listed firms from the major world stock exchanges. All financial firms are excluded. Ownership data were gathered from AMADEUS database by Bureau Van Dijk. The sample has an unbalanced panel structure, where the number of years varies between 4 and 12. Following the suggestions of Guariglia (2008), in order to mitigate potential survivor bias, we allowed the entrance and exit of firms in the research sample. The observations at 1 percent tails were excluded in order to control the potential effects of outliers, which may derive from particular events, such as large mergers or errors in coding.

3.2 Estimation method and variables measurement

Due to the dynamic character of the main research variables in the study, dynamic panel data estimators will be used, which allows the use of time series data taking into account the heterogeneity in adjustment dynamics between different type of firms. Therefore, this study uses GMM system (1998), which is a dynamic estimator proposed by Blundell and Bond (1998) that allows to control endogeneity problem and avoids significant bias in estimates (Wooldridge, 2007). The efficiency of this estimator lies in the possibility to control the correlation errors over time and the heteroscedasticity across firms. The results from GMM system (1998) estimator can only be valid under the following conditions: validity of the restrictions created by the use of instruments; and it should not exist second-order autocorrelation. In order to test the first condition, i.e., the validity of the restrictions created by the used instruments, the Hansen test is used where the null hypothesis is the validity of the restrictions created by the used instruments. For the second condition, the existence of second-order autocorrelation is tested, where the null hypothesis indicates that there is no second-order autocorrelation. In the case of not rejecting the null hypothesis for Hansen and second-order autocorrelation tests, it is possible to conclude that GMM system (1998) estimator is valid and robust.

This study uses the value added intellectual coefficient (VAIC™) model to measure IC. The VAIC™ model, developed by Pulic (1998), is one of the most adopted methods to valuate IC

Variable	*n*	Mean	SD	Min.	Max.
Dependent variables					
ROA	2,090	0.0105685	0.2091852	−3.546324	3.991124
TobinQ	2,090	1.712327	1.496299	0.0701452	29.27833
Independent variables					
VAIC	2,090	1.747303	1.144375	−5.971396	5.994712
CEE	2,090	0.5699616	0.4772858	−5.221453	5.794343
HCE	2,090	1.244293	0.8694041	−5.832143	5.991013
SCE	2,090	0.4733021	0.6752345	−5.897365	5.921043
RCap	2,090	0.325609	1.418735	−5.323659	77.05882
RDintensity	2,090	2.894352	78.47195	0	6,099

Table I. Descriptive statistics of the variables for the overall sample

among researchers. Pulic (2000) proposed value added (VA) as an indicator for measuring performance in a knowledge economy context. Furthermore, VAIC™ components measure two dimensions of IC, HC and SC, and it also takes into consideration the CEE. Therefore, VAIC™ measures the CEE, HCE and SCE (Firer and Williams, 2003; Montequin *et al.*, 2006; Pulic, 2000). However, one commonly identified limitation of VAIC™ is related to the absence of the RC component (Chen *et al.*, 2005; Nimtrakoon, 2015; Ståhle *et al.*, 2011). Therefore, in the current study, revenues growth is used as proxy of RC.

According to Iazzolino and Laise (2013), part of the criticism that VAIC™ has received derives from misunderstandings of different meanings that Pulic gave to HC and SC in comparison to Skandia Navigator, namely the words used by IC research community.

Ståhle *et al.* (2011) pointed out several drawbacks to the VAIC™ model. The model is based on financial indicators, which rely on past strategy and decision making. According to the authors, the model does not measure IC, it just measures operational efficiency in different ways, i.e., the efficiency of labor and capital invested by firms. For example, since HC embeds factors such as employee's skills and knowledge, training and motivation, the model only takes into consideration the annual salaries of human resources. The SC has a similar problem. The authors also pointed problems in the way which the model is calculated. In the case of HC, the higher the HC, the higher will be the HC value. However, in the calculus of HCE, the lower the HC, the greater will be the efficiency of HC. This problem could be eliminated if it is taken into account that HCE measures the use of HC.

According to Ståhle *et al.* (2011), there is a limitation on the comparability of high-salary firms with low-salary firms, since to compare VAIC and IC efficiency (ICE), ICE = HCE + SCE, the same level of salaries has to be taken into consideration. The authors also suggest that the application of VA is problematic. VA is given by the expression VA = OP + EC + A + D, where OP is the firm's operating profit and EC is personnel costs consisting of salaries and social costs, A is depreciations in firm assets and D is write-downs in firm's long-term and current assets. According to the authors, A and D are independent of VA. In the case of SC which is given by VA minus HC costs (OP + A + D) and thus it binds VAIC and SC variable, which limits the comparability of capital-intensive with non-capital-intensive industries or countries rich in capital with countries poor in capital due to the differences in HC costs.

Despite the above-mentioned disadvantages, the VAIC model has been widely accepted by academics and practitioners has a good indicator of ICE (Bontis *et al.*, 2015). Some of the pointed advantages of the VAIC™ model are the accessibility of needed data as it is obtained from firm's financial reports, its simplicity to use to determine the IC value and for comparability purposes (Nimtrakoon, 2015; Young *et al.*, 2009; Janosevic *et al.*, 2013; Al-Musali and Ku Ismail, 2016). Moreover, according to Zéghal and Maaloul (2010), VAIC is used by the UK's Department for Business, Innovation and Skills as the indicator of IC's use in firms which contributes to the VAIC model validity.

Considering that the main objective of the current study is to analyze the influence of IC on the firm's FP and MV, as well as to analyze the influence of ownership concentration and owner management involvement on the IC performance, the following regression models were developed:

$$\begin{aligned}\mathrm{ROA}_{i,t} = {} & \propto_0 + \beta_1 \mathrm{ROA}_{i,t-1} + \beta_2 \mathrm{VAIC}_{i,t} + \beta_3 \mathrm{RDintensity}_{i,t} + \beta_4 \mathrm{OWNCONC}_{i,t} \\ & + \beta_5 \mathrm{Tlev}_{i,t} + \beta_6 \mathrm{SIZE}_{i,t} + \beta_7 \mathrm{AGE}_{i,t} + \varphi_s D_s + \varphi_t d_t + \eta_i + \varepsilon_{i,t} \end{aligned} \quad (1)$$

$$\begin{aligned}\mathrm{ROA}_{i,t} = {} & \propto_0 + \beta_1 \mathrm{ROA}_{i,t-1} + \beta_2 \mathrm{CEE}_{i,t} + \beta_3 \mathrm{HCE}_{i,t} + \beta_4 \mathrm{SCE}_{i,t} + \beta_5 \mathrm{CEE}_{i,t-1} \\ & + \beta_6 \mathrm{HCE}_{i,t-1} + \beta_7 \mathrm{SCE}_{i,t-1} + \beta_8 \mathrm{RCap}_{i,t} + \beta_9 \mathrm{RCap}_{i,t-1} + \beta_{10} \mathrm{RDintensity}_{i,t} \\ & + \beta_{11} \mathrm{OWNCONC}_{i,t} + \beta_{12} \mathrm{Tlev}_{i,t} + \beta_{13} \mathrm{SIZE}_{i,t} + \beta_{14} \mathrm{AGE}_{i,t} + \varphi_s D_s + \varphi_t d_t + \eta_i + \varepsilon_{i,t} \end{aligned} \quad (2)$$

$$\text{TobinQ}_{i,t} = \propto_0 + \beta_1 \text{TobinQ}_{i,t-1} + \beta_2 \text{VAIC}_{i,t} + \beta_3 \text{RDintensity}_{i,t} + \beta_4 \text{OWNCONC}_{i,t} + \beta_5 \text{Tlev}_{i,t} + \beta_6 \text{SIZE}_{i,t} + \beta_7 \text{AGE}_{i,t} + \varphi_s D_s + \varphi_t d_t + \eta_i + \varepsilon_{i,t} \quad (3)$$

$$\text{TobinQ}_{i,t} = \propto_0 + \beta_1 \text{TobinQ}_{i,t-1} + \beta_2 \text{CEE}_{i,t} + \beta_3 \text{HCE}_{i,t} + \beta_4 \text{SCE}_{i,t} + \beta_5 \text{CEE}_{i,t-1} + \beta_6 \text{HCE}_{i,t-1} + \beta_7 \text{SCE}_{i,t-1} + \beta_8 \text{RCap}_{i,t} + \beta_9 \text{RCap}_{i,t-1} + \beta_{10} \text{RDintensity}_{i,t} + \beta_{11} \text{OWNCONC}_{i,t} + \beta_{12} \text{Tlev}_{i,t} + \beta_{13} \text{SIZE}_{i,t} + \beta_{14} \text{AGE}_{i,t} + \varphi_s D_s + \varphi_t d_t + \eta_i + \varepsilon_{i,t} \quad (4)$$

$$\text{VAIC}_{i,t} = \propto_0 + \beta_1 \text{VAIC}_{i,t-1} + \beta_2 \text{ROA}_{i,t} + \beta_3 \text{OWNCONC}_{i,t} + \beta_4 \text{OWNINVOL}V_{i,t} + \beta_5 \text{Tlev}_{i,t} + \beta_6 \text{SIZE}_{i,t} + \beta_7 \text{AGE}_{i,t} + \varphi_s D_s + \varphi_t d_t + \eta_i + \varepsilon_{i,t} \quad (5)$$

where η_i are non-observable individual effects; $\varepsilon_{i,t}$ is the error; d_t correspond to the year dummies and D_s are industry sector dummies. The dependent variables used in this study were measured as follows: $\text{ROA}_{i,t}$ is the return on assets, given by the ratio of net profits of the current period to total assets of the current period; $\text{TobinQ}_{i,t}$ is used as a proxy for firms' MV of the current year, given by the ratio of equity MV of the current period to equity book value of the current period. Next, measures for the independent variables are presented as follows: $\text{TobinQ}_{i,\,t-1}$ is used as a proxy for firms' MV of the previous year, given by the ratio of equity MV of the previous period to equity book value of the previous period. $\text{VAIC}_{i,t}$ is the VAIC™ of the current period corresponding to sum of HCE plus SCE plus CEE, where HCE = VA/HC; SCE = SC/VA; and CEE = VA/capital employed (CE). $\text{VAIC}_{i,\,t-1}$ is the VAIC™ of the previous period; $\text{CEE}_{i,t}$ is the CEE of the current period; $\text{CEE}_{i,t}$ = VA/CE; VA = sales – operational expenses + employee costs; $\text{CEE}_{i,\,t-1}$ is the CEE of the previous period. $\text{HCE}_{i,t}$ is the HCE of the current period; HCE = VA/HC; $\text{HCE}_{i,\,t-1}$ is the HCE of the previous period; $\text{SCE}_{i,t}$ is the SCE of the current period; SCE = SC/VA; $\text{SCE}_{i,\,t-1}$ is the SCE of the previous period; $\text{RCap}_{i,t}$ is the RC of the current period, given by revenues growth of the current period; and $\text{RCap}_{i,\,t-1}$ is the RC of the previous period, given by the revenues growth of the previous period. The measurement of control variables are as follows: $\text{Tlev}_{i,t}$ is the leverage of the current period, given by the ratio of book value of total debt of the current period to total assets of the current period; $\text{RDintensity}_{i,t}$ is the intensity of firms' R&D activities, given by the ratio of R&D expenses of the current period to total revenues of the current period; $\text{SIZE}_{i,t}$ is the size of the current period, given by the natural logarithm of total assets of the current period; $\text{AGE}_{i,t}$ is firm's age of the current period, given by the natural logarithm of the number of years of existence of the firm of the current period. Based on the variable NOSHEM (source: DATASTREAM database), which aggregates the percentage of holdings of 5 percent or more by employees or family members, a dummy variable $\text{OWNCONC}_{i,t}$ was created, which is a dummy variable that assumes the value of one if the firm has ownership concentration (if percentage of holdings is higher than 5 percent) and zero otherwise. $\text{OWNINVOLV}_{i,t}$ is a dummy variable which assumes the value of one if the firms' Global Ultimate Owner (GUO) has a function as director/manager or if GUO is a board member, and the value of zero otherwise.

4. Empirical results

4.1 Descriptive statistics and correlation matrix

Descriptive statistics of the variables used in the study are presented in Table II. It summarizes the descriptive statistics of the dependent variables, related to firms' FP and MV, and independent variables used in this study.

Countries	Sample	% of sample
Austria	29	1.4
Belgium	82	3.9
Denmark	94	4.5
Finland	109	5.2
France	411	19.7
Germany	352	16.8
Greece	49	2.3
Ireland	37	1.8
Italy	195	9.3
Netherlands	93	4.4
Portugal	41	2.0
Spain	59	2.8
Sweden	200	9.6
UK	339	16.2
Total	2,090	100

Table II.
Number of firms per country

ROA presents low mean scores of 0.01 suggesting that firms have been facing difficulties in obtaining profits. The high standard deviation suggests high variations of FP across firms. The high value of TobinQ suggests that firms' MV is on average higher compared with the firms' book value of the firms analyzed. The mean score of VAIC is 1.747, suggesting that Western European firms created an average of 1.747 for every 1 monetary unity utilized. HC is a key driver of firms' value creation as HCE presents the higher mean score of 1.244 compared to CEE and SCE, 0.569 and 0.473, respectively. The combined mean score of the intangible components of IC, HCE and SCE is 1,718, which is three times higher than the mean score of CEE. Therefore, this suggests that firms create much more value by the intangible components from IC than from the physical and financial component CEE. Furthermore, it shows the importance of IC for Western European firms' value creation in the actual knowledge economy. The RC, RCap, presents a mean score of 0.326 and RDintensity has a mean score of 2.894. However, the higher standard deviation of RCap and RDintensity, 1.419 and 78.472, respectively, suggest a high volatility of these variables.

Due to the differences between the countries in Western Europe, the descriptive statistics of the variables by country can be seen in Table III.

Regarding profitability, the countries with a higher median score for ROA are the UK (0.057), Sweden (0.046), Finland (0.042) and the Netherlands (0.042), whereas countries with the lowest median score for ROA are Italy (0.016) and Portugal (0.018). Concerning MV, the countries with a higher median score for TobinQ are the UK (1.600) and Sweden (1.600). Countries with the lowest median score for TobinQ are Italy (1.100), Portugal (1.100) and Greece (1.000). The countries with higher VAIC median scores are the UK (2.200), Austria (1.900), the Netherlands (1.900) and Finland (1.800), whereas the countries with the lowest median score are Sweden (1.000) and Greece (1.100). Regarding the components of IC, i.e., CEE, HCE and CEE, it can be observed that HCE presents the higher median score for all countries. Only Belgium, Greece, Ireland and Italy present higher median scores of SCE compared to CEE, i.e., a tangible component of IC. Regarding the efforts taken by firms in the RC, Greece (0.170), Sweden (0.150) and the UK (0.110) are the countries with a higher median score, and countries such as Spain (0.054), the Netherlands (0.062) and Denmark (0.073) present the lowest median scores. The countries with higher median scores of RDintensity are Denmark (0.033), France (0.033) and Sweden (0.032), whereas Portugal (0.0012), Spain (0.0035) and Greece (0.0035) present the lowest median scores.

The correlation and magnitude of the variables in the study were analyzed through the Pearson correlation coefficient, which can be seen in Table IV.

Country		ROA	TobinQ	VAIC	CEE	HCE	SCE	RCap	RDintensity
Austria	Obs	336	313	348	348	348	348	348	207
	Mean	0.038	1.4	2	0.4	1.3	0.37	0.22	0.023
	Median	0.045	1.3	1.9	0.33	1.3	0.28	0.084	0.011
	SD	0.053	0.44	0.82	0.28	0.68	0.59	0.57	0.069
Belgium	Obs	884	824	984	984	984	984	984	379
	Mean	0.00039	1.6	1.6	0.51	1.2	0.57	0.37	12
	Median	0.031	1.2	1.5	0.46	1.1	0.49	0.079	0.025
	SD	0.25	1.2	1.2	0.43	1.1	0.64	1.8	125
Denmark	Obs	1,081	1,033	1,128	1,128	1,128	1,128	1,128	403
	Mean	−0.0053	1.9	1.7	0.58	1.1	0.48	0.24	1.3
	Median	0.032	1.3	1.7	0.48	1.1	0.34	0.073	0.033
	SD	0.25	2.1	1.1	0.48	0.93	0.74	0.95	9.2
Finland	Obs	1,205	1,149	1,308	1,308	1,308	1,308	1,308	772
	Mean	0.027	1.6	1.8	0.66	1.2	0.38	0.28	0.045
	Median	0.042	1.3	1.8	0.53	1.1	0.27	0.075	0.015
	SD	0.14	0.91	0.99	0.48	0.53	0.56	1.2	0.098
France	Obs	4,415	4,150	4,932	4,932	4,932	4,932	4,932	1,638
	Mean	−0.0033	1.5	1.7	0.55	1.2	0.44	0.35	7.9
	Median	0.03	1.2	1.7	0.43	1.1	0.29	0.085	0.033
	SD	0.22	1.2	1.1	0.47	0.9	0.68	1.9	164
Germany	Obs	3,660	3,461	4,224	4,224	4,224	4,224	4,224	2,026
	Mean	−0.0072	1.7	1.5	0.57	1.1	0.49	0.33	1.3
	Median	0.036	1.3	1.5	0.5	1	0.36	0.1	0.025
	SD	0.25	1.4	1.1	0.42	0.79	0.77	1.4	28
Greece	Obs	564	550	588	588	588	588	588	172
	Mean	0.037	1.3	1.6	0.48	1.4	0.58	0.46	0.011
	Median	0.03	1	1.1	0.24	1	0.6	0.17	0.0035
	SD	0.09	0.89	1.1	0.42	0.88	0.63	1.4	0.025
Ireland	Obs	386	354	444	444	444	444	444	100
	Mean	−0.00093	1.9	1.8	0.56	1.2	0.71	0.23	0.17
	Median	0.031	1.4	1.7	0.45	1.1	0.6	0.092	0.0039
	SD	0.21	1.9	1.3	0.71	1	0.8	0.44	0.81
Italy	Obs	2,133	2,055	2,340	2,340	2,340	2,340	2,340	493
	Mean	−0.012	1.3	1.6	0.38	1.2	0.38	0.26	3.5
	Median	0.016	1.1	1.5	0.27	1.1	0.32	0.081	0.016
	SD	0.19	0.72	1.3	0.36	0.97	0.83	0.61	43
Netherlands	Obs	977	918	1,116	1,116	1,116	1,116	1,116	371
	Mean	−0.015	1.9	1.7	0.63	1.2	0.46	0.23	6.7
	Median	0.042	1.4	1.9	0.54	1.1	0.32	0.062	0.014
	SD	0.3	2	1.2	0.61	0.93	0.65	0.54	87
Portugal	Obs	474	447	492	492	492	492	492	28
	Mean	0.0041	1.2	1.6	0.35	1.4	0.28	0.33	0.0026
	Median	0.018	1.1	1.5	0.19	1.1	0.29	0.1	0.0012
	SD	0.15	0.46	1.3	0.34	0.98	0.82	0.79	0.0064
Spain	Obs	622	554	708	708	708	708	708	149
	Mean	0.032	1.9	1.8	0.43	1.4	0.37	0.17	0.5
	Median	0.035	1.4	1.7	0.28	1.2	0.32	0.054	0.0035
	SD	0.12	1.6	1.1	0.38	0.77	0.59	0.39	4.7
Sweden	Obs	2,040	1,854	2,400	2,400	2,400	2,400	2,400	838
	Mean	0.0034	2.3	1.6	0.8	1.1	0.64	0.45	0.92
	Median	0.046	1.6	1	1	1	0.95	0.15	0.032
	SD	0.23	2.4	1.1	0.57	0.73	0.65	1.6	16
UK	Obs	3,613	3,376	4,068	4,068	4,068	4,068	4,068	1,410
	Mean	0.063	2	2.2	0.61	1.6	0.48	0.33	0.11
	Median	0.057	1.6	2.2	0.53	1.4	0.38	0.11	0.012
	SD	0.13	1.4	1.1	0.45	0.85	0.44	1.5	0.93
Total	Obs	22,390	21,038	25,080	25,080	25,080	25,080	25,080	8,986
	Mean	0.011	1.7	1.7	0.57	1.2	0.47	0.33	2.9
	Median	0.036	1.3	1.7	0.47	1.1	0.35	0.094	0.02
	SD	0.21	1.5	1.1	0.48	0.87	0.68	1.4	78

Table III.
Descriptive statistics of the variables by country

Table IV.
Pearson correlation matrix

Variables	ROA	ROA_{t-1}	TobinQ	$TobinQ_{t-1}$	VAIC	$VAIC_{t-1}$	CEE	CEE_{t-1}	HCE	HCE_{t-1}	SCE	SCE_{t-1}	RCap	$RCap_{t-1}$	RDintensity
ROA	1.0000														
ROA_{t-1}	0.5059**	1.0000													
TobinQ	−0.0889**	−0.0733**	1.0000												
$TobinQ_{t-1}$	−0.0193	−0.0989**	0.7457**	1.0000											
VAIC	0.3058**	0.2695**	0.0605**	0.0701**	1.0000										
$VAIC_{t-1}$	0.2590**	0.3024**	0.0425**	0.0659**	0.6334**	1.0000									
CEE	0.1914**	0.1350**	0.1022**	0.0972**	0.1082**	0.0724**	1.0000								
CEE_{t-1}	0.1500**	0.1953**	0.0899**	0.0938**	0.0968**	0.0966**	0.8262**	1.0000							
HCE	0.3534**	0.3109**	−0.0037	0.0178	0.6890**	0.5417**	0.0457**	0.0229	1.0000						
HCE_{t-1}	0.2977**	0.3523**	−0.0173	0.0045	0.5445**	0.6939**	0.0094	0.0462**	0.7246**	1.0000					
SCE	−0.1187**	−0.1005**	0.1657**	0.1641**	0.1577**	−0.0712**	0.0754**	0.0675**	−0.1312**	−0.0924**	1.0000				
SCE_{t-1}	−0.1251**	−0.1224**	0.1652**	0.1721**	−0.0881**	0.1606**	0.0480**	0.0747**	−0.1029**	−0.1327**	0.4554**	1.0000			
RCap	0.0023	0.0056	0.0025	0.0102	−0.0000	−0.0012	0.0051	−0.0002	−0.0072	−0.0088	0.0144	0.0023	1.0000		
$RCap_{t-1}$	0.0104	0.0075	0.0034	0.0062	−0.0002	−0.0024	0.0013	0.0070	−0.0083	−0.0104	0.0111	0.0175	0.0590**	1.0000	
RDintensity	−0.1361**	−0.1113**	0.0630**	0.0846**	−0.0396*	−0.0713**	−0.0389*	−0.0709**	−0.0833**	−0.0916**	0.0689**	0.0483**	0.0018	0.0020	1.0000

Note: *,**Significance at 5 and 1 percent levels respectively

Through the correlation coefficients analysis, it can be noticed that there are a significant and positive correlations for the majority of variable pairs. VAIC has a significant and positive correlation with ROA (0.305) and TobinQ (0.065). Therefore, as expected, VAIC has a significant positive correlation with firms' FP and MV, which indicates a significant association between ICE and firms' FP and MV. Regarding the components of VAIC, CEE has a positive and statistically significant correlation with firms' FP and MV, while HCE has a statistically significant positive correlation with firms' FP and a statistically significant negative correlation with firms' MV. The correlations between RCap and firms' FP and MV are not statistically significant. RDintensity has a negative and statistically significant correlation with firms' FP and a positive and statistically significant correlation with firms' MV. Through the correlation matrix analysis, the statistically significant positive correlation between VAIC and its components is notorious. The strongest correlation between VAIC and its components is with HCE (0.689), followed by its correlation with SCE (0.157) and CEE (0.108). According to Aivazian *et al.* (2005) and Gujarati and Porter (2010), the problems of endogeneity between independent variables are relevant for correlation coefficients above 30 percent. Three correlations coefficients above 30 percent among independent variables were found, which are the VAIC components, CEE, HECE and SCE, between the current and previous periods. Therefore, to overcome the problem of endogeneity, the GMM system (1998) dynamic estimator was applied as it allows the use of instrumental variables to reduce the endogeneity problem. Also, the coefficients of the correlations between the variables, ROA, TobinQ and VAIC of the current and previous periods are high. Therefore, ROA, Tobin Q and VAIC are variables with high persistence. Consequently, according to Blundell and Bond (1998), it is more appropriate to use the GMM system (1998) estimator than the GMM (1991) estimator.

Next, the results obtained with the application of GMM system (1998) are presented. According to the results of the Hansen test and second-order autocorrelation test, the null hypothesis cannot be rejected in both tests, for all estimations in this study. Therefore, the validity of the restrictions of the instruments is not rejected and the hypothesis of the existence of second-order autocorrelation for the estimated models is not rejected. This being so, the results of GMM system (1998) dynamic estimator are robust and can be used to support our interpretation of the empirical results.

4.2 IC impact on firms' FP and MV

The results for the estimated models, regarding firms' FP and MV, using the GMM system (1998) dynamic estimator are presented in Table V.

Regarding the firms' FP, results from Equation (1) show that ROA of the previous period, VAIC, RDintensity, OWNCONC and SIZE have a positive impact on firms' FP, while Tlev and AGE have a negative impact on firms' FP. Results from Equation (2) show that ROA of the previous period, CEE, HCE, RCap, RCap of the previous period, RDintensity, OWNCONC and SIZE have a positive impact on firms' FP, while SCE, CEE of the previous period and Tlev negatively impact on firms' FP.

Concerning firms' MV, results from Equation (3) show that TobinQ of the previous period, VAIC, RDintensity and AGE positively impact on firms' MV, whereas OWNCONC, Tlev and SIZE negatively impact on firms' MV. Results from Equation (4) show that TobinQ of the previous period, HCE, SCE, CEE of the previous period, RDintensity have a positive impact on firms' MV, while CEE, HCE of the previous period, RCap, RCap of the previous period, OWNCONC, Tlev and SIZE have a negative impact on firms' MV.

Regarding the ownership concentration, the results of the Equation (5), related to the influence of ownership concentration on IC performance, using the GMM system (1998) dynamic estimator is presented in Table V. The results show that VAIC of the previous period, ROA and SIZE positively impact on IC performance, while OWNCONC and OWNINVOLV negatively impact on IC performance.

Table V.
Regressions (1), (2), (3), (4) and (5) results

Variables	Model (1) ROA	Model (3) TobinQ	Variables	Model (2) ROA	Model (4) TobinQ	Variables	Model (5) VAIC
ROA_{t-1}	0.41166*** (0.00755)		ROA_{t-1}	0.07102*** (0.01513)		$VAIC_{t-1}$	0.37651*** (0.06251)
$TobinQ_{t-1}$		0.41376*** (0.02330)	$TobinQ_{t-1}$		0.45218*** (0.02393)	ROA	1.22736*** (0.34149)
VAIC	0.01879*** (0.00300)	0.27226*** (0.04174)	CEE	0.26764*** (0.03161)	−0.46654*** (0.16937)	OWNCONC	−0.74921** (0.31447)
RDintensity	0.00020*** (0.00004)	0.00172*** (0.00053)	HCE	0.08236*** (0.00376)	0.42427*** (0.08586)	OWNINVOLV	−0.87687** (0.43775)
OWNCONC	0.28739*** (0.02079)	−0.55388*** (0.13629)	SCE	−0.02701*** (0.00427)	0.17315*** (0.02431)	Tlev	−0.00488 (0.01444)
Tlev	−0.10609*** (0.00663)	−0.02688*** (0.00342)	CEE_{t-1}	−0.16446*** (0.01587)	0.78421*** (0.26684)	Size	0.29927** (0.13063)
SIZE	0.02877*** (0.00288)	−0.13417*** (0.01660)	HCE_{t-1}	0.00595 (0.00391)	−0.22218*** (0.05279)	Age	0.22939 (0.22641)
AGE	−0.02447** (0.01234)	0.04637* (0.02546)	SCE_{t-1}	−0.00009 (0.00361)	0.02180 (0.02341)	Constant	−7.28198* (4.19996)
Constant	−0.40245*** (0.01652)	0.00000 (0.00000)	RCap	0.06292*** (0.00786)	−0.07583*** (0.01700)		
			$RCap_{t-1}$	0.01835*** (0.00246)	−0.27940*** (0.05283)		
			RDintensity	0.00025** (0.00010)	0.00384*** (0.00065)		
			OWNCONC	0.40482*** (0.02837)	−0.72443** (0.30487)		
			Tlev	−0.15994*** (0.01517)	−0.02147*** (0.00330)		
			Size	0.03228*** (0.00238)	−0.11766*** (0.02703)		
			Age	0.00190 (0.00605)	−0.00065 (0.02447)		
			Constant	−0.73241*** (0.04023)	2.41364*** (0.49237)		
Observations	7,825	7,648	Observations	7,143	7,586	Observations	7,250
$F(N(0,1))$	847.0***	524.5***	$F(N(0,1))$	24,415***	88.24***	$F(N(0,1))$	8.584***
Hansen ($N(0,1)$)	76.64	52.48	Hansen ($N(0,1)$)	62.27	66.80	Hansen ($N(0,1)$)	38.86
m1 ($N(0,1)$)	−5.965***	−4.820***	m1 ($N(0,1)$)	−5.790***	−4.981***	m1 ($N(0,1)$)	−6.505***
m2 ($N(0,1)$)	1.931*	−1.386	m2 ($N(0,1)$)	0.305	−1.647	m2 ($N(0,1)$)	1.514

Notes: Standard errors in parentheses. *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

5. Discussion of the empirical results

The hypotheses verified in this study are depicted in Table VI.

Results from Equation (1) suggest that IC enhances Western European firms' FP. According to the results, for each monetary unit invested on VAIC, it is expected that firms increase their ROA in 0.412 monetary unit. Therefore, the findings do not allow us to reject *H1*. This result suggests that the efficient use of IC increases the Western European firms' FP of the current year. A higher level of IC investments is associated with greater efficiency, which affects positively the firms' FP and, likely, the firms' growth and wealth. This result is consistent with previous studies (Chen *et al.*, 2005; Ting and Lean, 2009).

Regarding the components, VAIC and RCap, results from Equation (2) do not allow to reject *H1a*, *H1b* and *H1d*. The findings show that CEE, HCE and RCap of the current period have a positive effect on ROA, while SCE of the current period has a negative impact on ROA. Therefore, although *H1a*, *H1b* and *H1d* cannot be rejected, *H1c* is rejected. The results for the impact of IC components on firms' FP are in line with previous studies (Bontis *et al.*, 2015; Nimtrakoon, 2015; Chen *et al.*, 2005; Ting and Lean, 2009; Tseng *et al.*, 2013). Financial capital, physical capital and HC are beneficial sources for firms' higher performance. The HC is a key driver of firms' FP. The investment in employees' knowledge and competencies increases firms' capacity to innovate, on processes, products, services and so on. The investment in RC allows firms to establish relationships with their customers, suppliers and partners as well as to increase their relational networks, which seem to be fundamental for firm's FP.

The analysis of the impact of CEE, HCE, SCE and RCap of the previous period on firms' FP shows that only CEE of the previous period has a negative impact on firms' FP. Moreover, results show no statistical significance for the impact of HCE and SCE of the previous period on firms' FP. These results reveal the importance on the long run of the financial and physical capital for firms' future FP. Also, the results of the investment in RC show persistence over time, which leads to the development of trust in the relationships between firms and their relational networks.

Regarding the impact of IC on firms' MV, results of Equations (3) and (4) suggest that IC has a positive effect on firms' MV. It is expected that for each monetary unit invested on IC, firms increase their MV in 0.414 monetary unit, and therefore *H2* cannot be rejected. This result corroborates previous studies (Nimtrakoon, 2015; Shiu, 2006). Positive reactions of investors seem to increase the firms' MV. IC investments allow firms to innovate and disclose signals to the market about their growth opportunities, which probably leads to the increase of firms' MV.

According to the results of Equation (4), CEE and RCap of the current period have a negative impact on the firms' MV, and therefore, *H2a* and *H2d* are rejected. SCE and HCE of

Hypothesis	Rejected/not rejected
H1. IC has a positive impact on firms' FP	Not rejected
H1a. CEE has a positive impact on firms' FP	Not rejected
H1b. HCE has a positive impact on firms' FP	Not rejected
H1c. SCE has a positive impact on firms' FP	Rejected
H1d. RC has a positive impact on firms' FP	Not rejected
H2. IC has a positive impact on firms' MV	Not rejected
H2a. CEE has a positive impact on firms' MV	Rejected
H2b. HCE has a positive impact on firms' MV	Not rejected
H2c. SCE has a positive impact on firms' MV	Not rejected
H2d. RCap has a positive impact on firms' MV	Rejected
H3. Ownership concentration has a negative impact on IC performance	Not rejected
H4. Owner involvement in management has a negative impact on IC performance	Not rejected

Table VI.
Hypotheses verified in this study

the current period have a positive effect on firms' MV, thus *H2b* and *H2c* cannot be rejected. These results are broadly in line with findings of previous studies (Nimtrakoon, 2015; Shiu, 2006; Morris, 2015). HC is an important resource for the firms' value creation. SC comprises the firms' most valuable strategic assets (Bontis *et al.*, 2015; Denicolai *et al.*, 2015; Janosevic and Dzenopoljac, 2012; Tseng and Goo, 2005). The interaction of HC with SC allows firms to innovate through the development of products, patents, trademarks and so on. Therefore, investors recognize these events that seem to contribute to the increase of firms' MV.

Taking into account the CEE, SCE, HCE and RCap of the previous period, results suggest that CEE and RCap of the previous period have a negative impact on firms' MV, while HCE of the previous period positively impacts on firms' MV. Results suggest that SCE of the previous period has no statistical significance on firms' MV. The inexistence of a positive effect of CEE of the current period on firms' MV reveals that the CEE of the previous period positively impacts on the firms' MV. Interestingly, the financial and physical capital investments in the past are recognized by investors as an opportunity for firms' value creation. These results suggest that these investments lead to better conditions to the appliance of employees' knowledge.

Regarding the ownership concentration, the findings show that the existence of ownership concentration has a positive effect on firms' FP, corroborating previous studies (Shleifer and Vishny, 1986; Denis and McConnell, 2003), but a negative effect on firms' MV. The alignment of interests between owners and managers' increases firms' FP. The ownership concentration provides commitment, knowledge and capabilities as well as it enforces relationships with the stakeholders in the long run (Greco *et al.*, 2014). However, this alignment of interests is not recognized by investors, and therefore, it negatively impacts on firms' MV.

Results from Equation (5) show that ownership concentration and owner's management involvement have a negative effect on IC performance (VAIC), which corroborates the study of Saleh *et al.* (2009). These results suggest that the opportunistic behavior of the owners in pursuing their personal interests and objectives at the expense of minorities decreases IC performance. Regarding owner's management involvement, the results suggest that the efficiency of IC is negatively affected by the owners' management involvement, which has negative consequences on IC performance (VAIC).

6. Conclusion

In a knowledge-based economy, the importance of IC investments in firms' value creation is recognized due to the distinctive characteristics that IC provides. Furthermore, IC is an important resource for firm's growth and innovation. Based on a large sample of non-financial listed firms of 14 countries in Western Europe, and using the GMM system (1998) dynamic estimator, the current study seeks to analyze the impact of IC on firms' FP and MV, as well as to analyze the influence of ownership concentration and owner's management involvement on IC performance. Regarding the empirical evidence provided by the current study, our findings reveal that IC is an important resource to enhance firms' FP and MV. Results show that ownership concentration and owner's management involvement constrain IC performance. Particularly, a significant and positive relationship between IC and FP and MV was found, measured by ROA and Tobins' Q, respectively. Regarding the VAIC components, the highest contributions to firms' FP were found to be the HCE and CEE. Concerning firms' MV, the current study shows that HC and SC have higher contribution to firm's MV. Therefore, HC can be seen as the main driver of firms' future growth and innovativeness.

The results contribute to IC research, suggesting that IC is an important resource to firms' value creation in the Western European context. Also, by using dynamic panel data, our findings reveal that HCE of the previous period positively impacts on firms' FP, while

CEE and SCE of the previous period positively impact on firms' MV. These results suggest that IC investments do not produce immediate outcomes. Furthermore, results suggest that ownership concentration and owner's management involvement constrain IC performance.

Several practical implications of results from this study can be addressed. Managers should invest in HC, particularly in firms that verify higher ownership concentration and/or firms in which owners are involved in management. Investing in HC, employees contribute with the knowledge to the firm, therefore the firm benefits from innovative capacity and greater FP. Also, firms should invest in continuous training programs, because it increases HCE and the performance of managers and employees. However, it may occur that the outcomes of IC are not immediate due to aspects, such as the style of management and internal processes of the firm. Regarding the policy makers, the creation of incentives for the investment on IC is suggested due to the difficulty that firms may have to finance this type of assets, which contributes to firms' value creation, country wealth and human development.

The current study has the following limitations. Given that a large sample of countries in Western Europe was used, the differences between countries were not analyzed, which limits our extrapolation of the results to each country, as well to the type of industry. This being so, some of the direction of the relationships may change for individual countries due to the country characteristics, such as legal aspects, accounting practices or industrial sectors. For future research, longitudinal studies comparing countries and industries are suggested. Finally, the analysis of the relationship between different corporate governance variables and IC is suggested to extend.

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