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Exploring the impact of intellectual capital on company reputation and performance

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Abstract

Purpose – The purpose of this paper is to analyse the impact of intellectual capital (IC) on the reputation and performance of Italian companies.

Design/methodology/approach – The paper exploits a unique data set of 452 non-listed companies that obtained a reputational assessment from the Italian Competition Authority (ICA). To test the hypotheses, this study implemented several regression analyses.

Findings – Results support the argument that human capital efficiency is a key driver of corporate reputation. Findings also reveal that companies, which obtained reputational rating under ICA scrutiny, show a positive relationship between IC elements and various measures of financial performance.

Research limitations/implications – The study focuses on a single country; it is not free from the imprecisions of Pulic's VAIC model.

Practical implications – This paper recommends companies that are interested to achieve a robust reputation should consider the human capital as a strategic intangible asset. Second, the results suggest that companies with an ICA reputational rating are able to leverage their intangibles to potentiate performance and competitiveness.

Originality/value – This is the first empirical investigation on the contribution of IC in generating value for corporate reputation. Additionally, the study contributes to the literature on the link between IC and performance by examining a sample of firms not yet explored in prior research.

Keywords Financial performance, VAIC, Corporate reputation, Intellectual capital, Accounting ratios

Paper type Research paper

1. Introduction

The topic of intellectual capital (IC) has gained relevant consideration among academics, practitioners and consultants because, in the current knowledge era, companies compete, relying more on intangible resources such as technologies, innovations in process and organization, employee abilities, creativity, relationships with external partners and industry networks (Starovic and Marr, 2004; Cordazzo, 2005; Kujansivu and Lönnqvist, 2007; Keong Choong, 2008; Berezinets *et al.*, 2016). The prominence of IC has also been established in academic research in a more broad-spectrum setting – for instance, to explain the determinants of national competitiveness and prosperity (Vale *et al.*, 2016; Roos, 2017). Despite the debate on the concept of IC and its consequences continuously evolving (Dumay and Garanina, 2013), there is a common view in literature on the ability of intangible factors to generate a company's value and distinctive competitive advantages (Bontis, 1996; Petty and Guthrie, 2000; Marr *et al.*, 2003; Roos, 2017).

In the view of an increasing usefulness of intangible resources for companies and general economy, researchers have proposed several methodological frameworks and empirical investigations for evaluating IC elements and their economic effects (Marr *et al.*, 2003; Goebel, 2015).

Starting in the 2000s, a number of studies have examined the role of IC in the value-creating process, predominantly focusing on corporate performance (Riahi-Belkaoui, 2003;

Chen *et al.*, 2005; María Díez *et al.*, 2010; Clarke *et al.*, 2011; Dumay, 2014; Scafarto *et al.*, 2016; Roos, 2017). This study aims to extend current research by examining the impact of IC on company reputation and performance.

First, to the best of the authors' knowledge, little is known about the impact of IC and its elements on company reputation. This is of fundamental importance, because scholars have shown heightened attention in understanding the firm-level factors driving reputation (Highhouse *et al.*, 2009) and several arguments suggest intellectual assets play a central role (Harrison and Sullivan, 2000). For instance, a seminal work by Petty and Guthrie (2000) advocates that reputation is intangible in nature; however, it is the result of the judicious leverage of firms' intangible resources. In this respect, a number of authors have pointed out that IC and its elements are critical drivers for improving company reputation (Dolphin, 2004; Rindova *et al.*, 2005; Zabala *et al.*, 2005; Cravens and Oliver, 2006; Petkova *et al.*, 2008).

To support organizations in building a better reputation, business consultants and practitioners are beginning to pay greater attention to these argumentations, as exemplified by the following quote:

> "A strong, positive reputation translates into long-term value in an organization represented by confidence in brand equity, intellectual capital, sustained earnings and future growth". Deloitte (June, 2016).

Second, the paper contributes to prior research by investigating whether Italian companies that obtained reputational rating under authority scrutiny rely on their IC to achieve better financial performance.

To implement the empirical investigation, this study exploits a unique data set of 452 non-listed Italian companies that gained a reliable reputational assessment via the legality rating (LR) released by the Italian Competition Authority (ICA). More precisely, this study uses the LR as a proxy for company reputation and adopts a methodology based on the principles of the value added intellectual coefficient (VAIC), developed by Pulic (2000) to measure IC and its constituents (Kujansivu and Lönnqvist, 2007; Pew Tan *et al.*, 2007; Clarke *et al.*, 2011; Ghosh and Maji, 2015). According to prior literature, measures of financial performance are calculated on the basis of several accounting ratios (ROA, ROI, ROE and ATO).

The main results of the analysis reveal that human capital efficiency (VAHU) has a positive influence on the LR and, contrary to prediction incorporated in the hypothesis, the structural capital efficiency (STVA) is found to have an opposite effect. The findings also document a positive impact of VAIC, capital employed efficiency (VACA) and STVA on most of the measures of financial performance used in the analysis.

The contribution of this study to the literature is twofold. First, by focusing on the impact of IC on reputation, this empirical investigation extends studies that examine the ability of intangible factors to create value for organizations. In this respect, this article is also related to the evolving literature on the antecedents of corporate reputation (Brammer *et al.*, 2009). Second, this research contributes to improve general understanding of the relationship between IC and financial performance by providing the first empirical evidence for a sample of companies not yet explored in literature.

From a practical point of view, this research highlights the importance of promoting new and better management initiatives to sustain the value creation dynamics of IC (Grimaldi *et al.*, 2013). In particular, this paper offers fresh inputs for managerial practices in order to identify which intangible factors can be addressed to build or maintain a strong corporate reputation.

Finally, the results of this study may also be of interest to policymakers and investors, as they suggest that companies, which have obtained regulatory scrutiny of reputation, demonstrate the ability to leverage IC to enhance their profitability and competitiveness.

The remainder of this paper is organized as follows: Section 2 reviews the literature and offers a set of hypotheses. Section 3 illustrates the research methodology, with a description of the sample, data collection, variables and regression analysis. The results and robustness tests are reported in Section 4. Section 5 concludes the paper.

2. Literature review and hypothesis

Much of the literature emphasizes the potential of IC to improve a company's competitive position and value creation (Edvinsson and Malone, 1997; Sullivan, 2000; Firer, 2005; Berezinets *et al.*, 2016), also suggesting important benefits for overcoming the weaknesses of small and medium-sized companies (Will, 2012; Verbano and Crema, 2016; Jordão and Novas, 2017). The relevance of IC for increasing the innovation and competiveness of small and medium European companies has been the focus of several research projects, such as the "Intellectual Capital Statements for Europe" (InCaS), developed by academics and practitioners, in collaboration with the European Commission (Edvinsson, 2013)[1].

While there is convergence on the ability of IC to generate company value, academic literature has provided several approaches to define and measure IC (Bianchi Martini *et al.*, 2016), frequently using different terms to explain similar notions (Brennan and Connell, 2000). Edvinsson and Sullivan (1996) define IC as knowledge (i.e. inventions, ideas, designs, computer programs, patents, trademarks, etc.) that can be converted into company value. Similarly, Kujansivu and Lönnqvist (2007) suggest that IC is constituted of all immaterial and non-physical assets, which are especially important in a knowledge-intensive industry. However, Hayton (2005) claims that IC is a bundle of organizational resources that is tangible and intangible in nature and can be leveraged to create value, while Jordão and Novas (2017) propose that IC is composed of intangible assets and the relationship between material and immaterial resources held by an organization. From an accounting perspective, authors claim that IC is the gap between the market value and book value of a company, thereby showing whether financial statements are able to totally recognize the IC value (Lev and Zarowin, 1999; Lev, 2001; Fincham and Roslender, 2003; Forte *et al.*, 2017).

The variety of definitions depends on the lack of a convergent approach to the categorization of the assets that may constitute IC (Hayton, 2005). This is because much of the academic research has generally categorized IC from two to four dimensions of intangible assets (Hayton, 2005; Dženopoljac *et al.*, 2017).

Therefore, we acknowledge that the concept and the categorization of IC is a difficult one to establish (Kujansivu and Lönnqvist, 2007). However, based on prior research, we identify three main categories of IC constituents, namely structural capital, human capital and relational capital (Edvinsson, 1997; Bontis, 1998; Roos *et al.*, 1997; Holton and Yamkovenko, 2008; Roos, 2017).

Structural capital is the business intellectual infrastructure of an organization, referring (but not limited) to the patents, trademarks, information system, database and organizational processes (Bontis, 2001; Nazari and Herremans, 2007). Drawing on this concept, a number of studies also suggest that structural capital can be divided into innovation capital and process capital (Edvinsson and Malone, 1997; Choo and Bontis, 2002; Scafarto *et al.*, 2016). Innovation capital is an organization's attitude toward extending innovation in products and services through R&D activities, while process capital denotes the procedures and techniques implemented to improve the business process and operational efficiency (Scafarto *et al.*, 2016).

Human capital includes a number of employee characteristics such as capacity, skills, education, knowledge, cultural value and corporate identity (Stewart and Ruckdeschel, 1998; McGregor *et al.*, 2004; Martín-de-Castro *et al.*, 2011), which influence the firm's creativity and receptivity of new ideas (Hayton, 2005). Bontis (1998) suggests

that human capital constitutes a wellspring of innovation and strategic elements for an organization, and Nazari and Herremans (2007) claim that it is a key driver for developing structural capital.

Compared to structural and human capital, relational capital represents the knowledge embedded in an organization to create strong external relationships (María Viedma Marti, 2001). Specifically, relational capital represents the best attitude of an organization to intercept the knowledge that flows from interaction with the external community, such as suppliers, customers, government, or the industry and association network (Bontis, 1998).

To determine IC assets, scholars have striven to propose several frameworks (Guthrie *et al.*, 2012; Dženopoljac *et al.*, 2016). Goebel (2015) identifies three main models on the basis of the information sources used by scholars.

The first approach, called the investment-based approach is based on accounting information encompassed in the financial statements and identifies certain employee-related costs as investments. The most popular example is the VAIC model of Pulic (2000) that is designed to determine the IC ability to contribute to company value creation via the measurement of its three main elements, namely VACA, VAHU and STVA (Kujansivu and Lönnqvist, 2007). As outlined by Pulic (2000), this model is also fundamental in controlling value creation efficiency, supporting managers in leveraging the company's IC potential. Despite some inherent weaknesses of VAIC (Iazzolino and Laise, 2013), many studies have used this model for its simple application, reliability and comparability (Firer and Williams, 2003; Andriessen, 2004; Chen *et al.*, 2005; Nazari and Herremans, 2007; Pew Tan *et al.*, 2007; Lange *et al.*, 2011; Maditinos *et al.*, 2011).

The second approach, called the component-based approach relies on the estimation of single IC components, aiming to determine an aggregate value of IC. However, this approach is limited in prior research due to the lack of complete information on the single IC components and because it fails to consider the interaction effects of IC elements on IC value (Mouritsen, 2009; Forte *et al.*, 2017).

The third approach, called the holistic market-based approach considers how the market incorporates the expectation of IC value by examining the market value and company book value (Stewart and Ruckdeschel, 1998; Sveiby, 1997). Studies in this stream of research view the positive economic effect of IC in terms of a higher market value relative to book value.

Since no accepted measure of IC has been established in literature (Goebel, 2015), and consistent with a number of past and recent empirical studies (Firer and Williams, 2003; Chen *et al.*, 2005; Nazari and Herremans, 2007; Maditinos *et al.*, 2011), this study employs a methodology based on the Pulic's (2000) model to investigate the impact of IC on the reputation and performance of Italian companies.

2.1 Hypothesis development

Corporate reputation is an important area of study, attracting attention from scholars from different fields of research (Highhouse *et al.*, 2009). However, to the best of the authors' knowledge, there is no empirical investigation that employs a methodology based on the principles of VAIC model to analyze the influence of IC on company reputation. This study attempts to fill this gap in the literature.

Although there are several definitions and measures of corporate reputation (Gotsi and Wilson, 2001; Money and Hillenbrand, 2006), most studies rely on the explanation proposed by Fombrun (see Fombrun, 1996 for a complete review), that defines reputation as a perceptual representation of company's past actions and future orientation that identifies the firm's overall appeal when compared with other main rivals. An interpretation of this definition is that reputation is the result of past management actions that are collectively assessed over time by stakeholders (Brammer and Pavelin, 2006; Soleimani *et al.*, 2014; Ghosh, 2017). This implies that efforts made by firms to achieve a good reputation depend

on the extent to which management's initiatives are perceived by stakeholders to be responsible in leveraging their specific tangible and intangible assets (Hall, 1993; Dowling, 2001; Roberts and Dowling, 2002). As suggested by Gray and Balmer (1998), the reputation significantly affects the willingness of stakeholders to maintain a relationship with the company; thereby, if they perceive a bad corporate reputation, it is likely to be that the company's profitability will decrease. Therefore, neglecting the importance of corporate reputation is of particular concern for the ability of a company to compete in the market (Dolphin, 2004; Pfarrer *et al.*, 2010).

Investigating antecedents and consequences of corporate reputation is a relevant issue in academic literature (Walsh and Wiedmann, 2004; Ghosh, 2017).

Prior research suggests that a positive reputation can endow a firm with a variety of benefits, including better access to resources (Haleblian *et al.*, 2017), a reduction of transaction costs with external parties, improving the attractiveness for talented applicants and promoting relationships with new stakeholders (Hayton, 2005; Walker, 2010).

Convincing arguments about the antecedents of reputation have been proposed by scholars even to sustain that intangible assets are critical factors able to affect corporate reputation significantly (Harrison and Sullivan, 2000; Petty and Guthrie, 2000; Dolphin, 2004; Zabala *et al.*, 2005; Petkova *et al.*, 2008; Helm, 2011). Consistent with this, a recent research by Abeysekera (2017) sheds light on the relevance of website communication of intangible resources to inform stakeholders on the future corporate-growth reputation of small firms.

A range of studies considered the potential link between intangible assets and corporate reputation. Rindova *et al.* (2005) suggest that the knowledge assets are important attributes of the quality dimension of organizational reputation and, thereby, they call future research for analyzing better these elements. Cravens and Oliver (2006) claim that human capital is an intangible asset difficult to imitate that can play a central role in the overall positioning of corporate reputation, while Petkova *et al.* (2008) advocate that investments in intangible factors are important actions that may help companies accumulate reputation. Highhouse *et al.* (2009) detect that investments in human capital are, among others, a signal of corporate attributes that influences the stakeholders' impressions of organizations and, therefore, the general corporate reputation assessment.

Given to this theoretical emphasis on the importance of intangible resources for corporate reputation, this study contributes to the current literature, focusing on the link between elements of IC and company reputation. In doing so, we also respond to the calls of scholars claiming that there is a need to expand cross-disciplinary aspects of IC going beyond traditionally IC models and reporting (Edvinsson, 2013; Zambon, 2016).

On the basis of these argumentations, we propose the following set of research hypotheses:

H1. Companies with greater VAIC have higher corporate reputation.

H1a. Companies with greater VACA have higher corporate reputation.

H1b. Companies with greater VAHU have higher corporate reputation.

H1c. Companies with greater STVA have higher corporate reputation.

The VAIC model has been employed in numerous empirical investigations to analyze the relationships between IC, market value and financial performance (Dženopoljac *et al.*, 2017). Scholars have expressed criticisms of the capability of VAIC to effectively measure IC's contribution to value creation (Stahle *et al.*, 2011; Goebel, 2015). Prior research identifies some of the weaknesses of VAIC in the focus on historical data, which rely on past strategy, the low ability to determine the synergy effects between tangible and intangible resources and the absence of identification of relational capital components (Ståhle *et al.*, 2011;

Iazzolino and Laise, 2013; Dženopoljac *et al.*, 2017). Conversely, benefits of VAIC are related to the use of verifiable and objective financial data, which unlike other measurement models of IC facilitate the cross-sectional comparisons and replication studies (Pulic, 2000; Firer and Williams, 2003; Chen *et al.*, 2005; Maditinos *et al.*, 2011).

Despite the existence of these contrasting views, a significant amount of IC research has employed the VAIC model. On the one hand, prior empirical studies indicate that the association between IC elements and corporate performance are generally limited or mixed and, thereby, offer unsatisfactory outcomes (Firer and Williams, 2003; Puntillo, 2009; Maditinos *et al.*, 2011; Dženopoljac *et al.*, 2016). On the other hand, scholars assert that the VAIC model is able to capture the impact of IC in the value creation process (Pew Tan *et al.*, 2007; Gan and Saleh, 2010; Maditinos *et al.*, 2011). In particular, prior studies encompassing several geographical areas have shown a positive association between IC and financial performance. Empirical validity of a positive impact of IC on performance has been found for Taiwanese listed companies, Indian firms of knowledge-based sectors, UK companies and a wide sample of non-financial listed European firms (Chen *et al.*, 2005; Zeghal and Maaloul, 2010; Ghosh and Maji, 2015; Sardo and Serrasqueiro, 2017). Among these studies, the analysis of the Italian context is not yet fully developed; albeit, this geographical area is of increasing interest among academics (Celenza and Rossi, 2014; Iazzolino and Laise, 2016).

Since research on IC and performance is continuing to evolve in the academic debate (Dženopoljac *et al.*, 2017) and only a few studies focus on the Italian context (Celenza and Rossi, 2014; Forte *et al.*, 2017), the second objective of the paper is to contribute to this stream of literature by analyzing a sample of companies not yet explored. In particular, this study extends the research focuses on the Italian context (Celenza and Rossi, 2014; Iazzolino and Laise, 2016), by exploring a novel sample of companies and adopting an inference statistical analysis. Based on research that tries to establish a positive relationship between IC and corporate performance, we developed the following four hypotheses:

H2. There is a positive association between VAIC and corporate performance.

H2a. There is a positive association between VACA and corporate performance.

H2b. There is a positive association between VAHU and corporate performance.

H2c. There is a positive association between STVA and corporate performance.

3. Research methodology
3.1 Sample and data
We begin the sample selection process by analyzing Italian non-listed companies with a limited legal form (Società per Azioni – SpA) that have for the fiscal year 2016 the LR issued by the ICA[2]. To obtain firm-level variables, this study used the AIDA *Bureau van Dijk* database. After excluding companies for which there were unavailable data or insufficient information for each of the variables listed in Table I, the final sample consists of 452 companies for the fiscal year 2016. Appendix A reports the main information about sample selection and composition.

3.2 Variables description
3.2.1 Dependent variable. Corporate reputation. Corporate reputation is a multifaceted concept linked to various dimensions that, from a practical point of view, are fairly complex to measure (Wartick, 2002; Deephouse and Carter, 2005; Money and Hillenbrand, 2006). This complexity has been overcome by scholars using different proxies for reputation, mainly

Variable	Description
LR	Rating released by the Italian Competition Authority (www.agcm.it)
SIZE	Natural logarithm of total sales
LOSS	Indicator variable equal to 1 (one) if a firm's net income is less than zero in the fiscal year and 0 (zero) otherwise
LEV	Total long-term debt divided by total assets
BVD_IND	Indicator variable equal to 1 (one) if BvD (*Bureau Van Dijk*) independence indicator is A−, A, o A+, and 0 (zero) otherwise. For BVD_IND = 1, there is no shareholder with more than 25% direct or total ownership
INF_QUAL	Indicator variable equals to 1 (one) if a firm has adopted IFRS standards and 0 (zero) otherwise
VACA	Value Added (VA) divided by unit of physical capital
VAHU	VA divided by total salary and wage costs (HC)
STVA	VA less HC divided by VA
VAIC	Sum of VACA plus VAHU plus STVA
ROA	Net income to total assets
ROE	Net income to total shareholders' equity
ROI	Operating income to total assets
ATO	Total revenue to total assets

Table I.
Variables description

focused on large corporations and in the US context (Brammer *et al.*, 2009), such as the rankings incorporated in *Fortune*'s Most Admired Companies (Walker, 2010; Haleblian *et al.*, 2017).

This research uses as a novel proxy of corporate reputation the LR, which is not limited to large corporations and is mainly consistent with the regulatory stakeholder perspective (Deephouse and Carter, 2005). The LR is a relatively new, important and reliable assessment of reputation, with particularly reference to the legal component of corporate social responsibility (Carroll, 1999), required in Italy by companies, most of them are small-medium sized, and released by the ICA since 2013; it is not affected by the most controversial aspects of the solicited rating agencies (see Fulghieri *et al.*, 2013). The process to obtain this rating consists of the strict evaluation by the ICA of several firm elements, among others, analysis of illegal and fraudulent activities adopted by the CEO and board members; analysis of anti-trust and consumer code violations; analysis of the transparency of internal and external procedures; compliance with tax law; the adoption of regular labor contracts and anticorruption code; compliance with environmental rules; and social responsibility actions. The rating is assigned over a period of two years and is renewable upon the company's request after successful scrutiny by the ICA. In the case of a loss of all or one of the requirements necessary to obtain the LR, the ICA will revoke it or may reduce its score. As an additional element of transparency and reliability, the list of companies to which the LR has been assigned, suspended or revoked is continuously updated and published on the ICA website.

Companies with the higher LR scores are rated as three stars (the top rating), while companies with lower LR scores are rated as one star (the lowest rating). To determine corporate reputation as a dependent variable, we convert LR scores to numeric marks from 1 to 7 (see Appendix B).

Corporate performance. To analyze the relationship between VAIC and corporate performance, we use four of the most popular accounting ratios employed in prior IC literature (Chen *et al.*, 2005; Maditinos *et al.*, 2011; Ghosh and Maji, 2015; Dženopoljac *et al.*, 2016), being the return on assets (ROA), return on equity (ROE), return on investment (ROI) and asset to turnover (ATO).

3.2.2 Independent variables. Following the above-mentioned research, this study is based on the principles of the VAIC model to measure IC's contribution to the company reputation and performance[3].

The IC independent variables are as follows:

(1) VACA, measured as value added (VA)/unit of physical capital (CA);

(2) VAHU, measured as VA/total salary and wage costs (HC);

(3) STVA, measured as (VA–HC)/VA; and

(4) VAIC, measured as VACA+VAHU+STVA.

Control variables. To test the research hypotheses, this study considers a set of control variables which are commonly used in literature to explore the topic of IC, corporate reputation and rating agency. More precisely, we control for the firm's size (SIZE) and leverage (LEV), which are the most popular variables used by scholars to explain the effect of IC on performance (Ghosh and Maji, 2015; Dženopoljac et al., 2016; Scafarto et al., 2016) and to analyze corporate reputation (Fombrun and Shanley, 1990; Ghosh, 2017; Odriozola and Baraibar Diez, 2017). As additional control variables, this study considers the firm's loss (LOSS), ownership concentration (BVD_IND) and financial information quality (INF_QUAL), which are considered in literature as important attributes of a firm's credibility and rating decision process (Adams et al., 2011; Chan et al., 2013; Bonsall and Miller, 2017; Ghosh, 2017; Jaggi and Tang, 2017).

3.3 Regression models
To examine the impact of elements of VAIC on corporate reputation and financial performance, according to prior research, this study implements several OLS regression models.

In the first step, models (1) and (2) analyze the impact of VAIC and its constituents on the company reputation:

$$LR = \beta_0 + \beta_1 VAIC + \beta_2 B\_SIZE + \beta_3 LEV + \beta_4 LOSS + \beta_5 BVD\_IND + \beta_6 INF\_QUAL + \varepsilon.$$

(1)

$$LR = \beta_0 + \beta_1 VACA + \beta_2 VAHU + \beta_3 STVA + \beta_4 B\_SIZE + \beta_5 LEV + \beta_6 LOSS$$
$$+ \beta_7 BVD\_IND + \beta_8 INF\_QUAL + \varepsilon.$$

(2)

In the second step, we run OLS regressions (from model 3 to model 10) to examine the relationship between VAIC and its constituents on measures of financial performance:

$$ROA = \beta_0 + \beta_1 VAIC + \varepsilon,$$

(3)

$$ROA = \beta_0 + \beta_1 VACA + \beta_2 VAHU + \beta_3 STVA + \varepsilon,$$

(4)

$$ROE = \beta_0 + \beta_1 VAIC + \varepsilon,$$

(5)

$$ROE = \beta_0 + \beta_1 VACA + \beta_2 VAHU + \beta_3 STVA + \varepsilon,$$

(6)

$$ROI = \beta_0 + \beta_1 VAIC + \varepsilon,$$

(7)

$$ROI = \beta_0 + \beta_1 VACA + \beta_2 VAHU + \beta_3 STVA + \varepsilon,$$

(8)

$$ATO = \beta_0 + \beta_1 VAIC + \varepsilon,$$

(9)

$$ATO = \beta_0 + \beta_1 VACA + \beta_2 VAHU + \beta_3 STVA + \varepsilon.$$

(10)

4. Results

Table II presents the descriptive statistics for the 452 observations used in the regression models. The mean of LR is 3.46, which is approximately half way between scores of one star and three stars, suggesting that our sample of Italian companies has a moderate level of reputational rating. The sample contains firms with an average size of 9.99 and firms with an average of leverage of 0.12. Furthermore, our sample includes companies with a low level of financial information quality (INF_QUAL) and high ownership concentration (BVD_IND), possibly indicating that many of those are small family businesses. The mean of VAIC is 94.44, while for the components of IC, it can be observed that VACA contributes more to generate the overall value of IC efficiency, possibly also due to its calculation criterion.

Tables III and IV show the results of the correlation matrix for the variables used in the two stages of analysis.

Table III shows that LR is negatively correlated with STVA suggesting that firms with higher reputation are more likely to have a lower level of structural capital efficiency.

Variables	n	Mean	Median	SD
LR	452	3.46	3.00	1.73
IC variables				
VACA	452	92.29	70.61	106.35
VAHU	452	1.81	1.48	1.50
STVA	452	0.33	0.32	0.23
VAIC	452	94.44	72.63	107.48
Control variables				
SIZE	452	9.99	9.92	1.17
LEV	452	0.12	0.10	0.12
LOSS	452	0.10	0.00	0.30
INF_QUAL	452	0.02	0.00	0.13
BVD_IND	452	0.09	0.00	0.28
Financial performance				
ROA	452	0.03	0.02	0.04
ROI	452	0.08	0.07	0.08
ROE	452	0.07	0.06	0.15
ATO	452	0.99	0.91	0.58

Note: Refer to Table I for the description of the variables

Table II.
Descriptive statistics

	LR	VACA	VAHU	STVA	VAIC	SIZE	LEV	LOSS	INF_QUAL	BVD_IND
LR										
VACA	0.084									
VAHU	0.041	0.692*								
STVA	−0.138*	0.385*	0.590*							
VAIC	0.084	0.999*	0.700*	0.392*						
SIZE	0.212*	0.217*	0.054	0.151*	0.215*					
LEV	0.028	0.072	0.177*	0.094*	0.074	−0.068				
LOSS	0.015	−0.069	−0.057	−0.297*	−0.070	−0.048	0.097*			
INF_QUAL	0.197*	−0.001	−0.007	−0.006	−0.001	0.268*	0.140*	0.066		
BVD_IND	−0.051	0.017	0.042	0.062	0.018	−0.034	0.021	−0.051	−0.041	

Notes: Refer to Table I for the description of the variables. $*p < 0.05$

Table III.
Correlation matrix for
the relationship
between IC and LR

Furthermore, LR is positively correlated with SIZE and INF_QUAL, implying that larger companies and those that embrace a more transparent financial disclosure policy are more likely to build a higher reputation.

Table IV shows, as expected, that the VAIC is positively correlated with ROA, ROI and ROE, supporting arguments that firms with better overall IC efficiency are more likely to increase their financial performance. In addition, the results reported in Table IV reveal that the single constituents of IC, VAHU and STVA are positively associated with ROA, ROE and ROI, while they are negatively associated with ATO. VACA is positively associated with ROA, ROE and ROI.

The results of the regression models are presented in Tables V and VI.

Table V reports the results for the estimated models regarding the effects of VAIC and its elements on the LR. The adjusted R^2 increases from 0.06 in model (1) to 0.11 in model (2), suggesting that in the case of corporate reputation, the three components of VAIC continue to show greater explanatory power (Chen *et al.*, 2005; Clarke *et al.*, 2011). The results from model (1) fail to support the predictions incorporated in *H1*, revealing that VAIC does not affect the level of LR. Conversely, the results from model (2) show a significant and positive association between VAHU and LR ($p < 0.01$), confirming what has been predicted in *H1b*. Regarding the other components of IC, model (2) reveals that VACA has no impact on the

	VACA	VAHU	STVA	VAIC	ROA	ROE	ROI	ATO
VACA								
VAHU	0.692*							
STVA	0.385*	0.590*						
VAIC	0.999*	0.700*	0.392*					
ROA	0.179*	0.185*	0.502*	0.181*				
ROE	0.140*	0.143*	0.470*	0.142*	0.711*			
ROI	0.166*	0.159*	0.461*	0.168*	0.823*	0.723*		
ATO	0.018	−0.151*	−0.093*	0.015	0.154*	0.143*	0.202*	

Notes: Refer to Table I for the description of the variables. *$p < 0.05$

Table IV.
Correlation matrix for the relationship between IC and financial performance

	Dependent variable: LR (Model (1))	Dependent variable: LR (Model (2))
Constant	0.96 (1.31)	0.79 (1.10)
IC variables		
VACA (*H1a*)		0.00 (0.33)
VAHU (*H1b*)		0.22** (2.62)
STVA (*H1c*)		−2.32*** (−5.24)
VAIC (*H1*)	0.00 (1.05)	
Control variables		
SIZE	0.24** (3.29)	0.30*** (4.16)
LEV	0.20 (0.30)	0.33 (0.49)
LOSS	0.07 (0.29)	−0.39 (−1.43)
INF_QUAL	1.95** (3.08)	1.86** (3.01)
BVD_IND	−0.24 (−0.86)	−0.19 (−0.69)
n	452	452
R^2_Adj	0.06	0.11

Notes: Student *t* in parenthesis; Refer to Table I for the description of the variables. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table V.
Regression results for the relationship between IC and LR

	Dependent variable: ROA (Model 3)	Dependent variable: ROA (Model 4)	Dependent variable: ROE (Model 5)	Dependent variable: ROE (Model 6)	Dependent variable: ROI (Model 7)	Dependent variable: ROI (Model 8)	Dependent variable: ATO (Model 9)	Dependent variable: ATO (Model 10)
Constant	0.02*** (8.40)	0.00 (0.03)	0.05*** (5.22)	−0.02* (−2.25)	0.07*** (13.59)	0.03*** (5.01)	0.99*** (27.39)	1.10*** (22.81)
VACA (H2a)		0.00* (2.24)		0.00 (1.87)		0.00* (2.35)		0.00*** (3.67)
VAHU (H2b)		−0.01*** (−4.07)		−0.03*** (−4.36)		−0.01*** (−4.14)		−0.12*** (−4.31)
STVA (H2c)		0.10*** (12.20)		0.39*** (11.78)		0.20*** (11.14)		0.00 (0.04)
VAIC (H2)	0.00*** (3.90)		0.00** (3.03)		0.00*** (3.62)		0.00 (0.32)	
R^2_Adj	0.03	0.27	0.03	0.25	0.03	0.24	−0.00	0.04
n	452	452	452	452	452	452	452	452

Notes: Student t in parenthesis; Refer to Table I for the description of the variables. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

Table VI.
Regression results for the relationship between IC and financial performance

LR, while STVA has a significant and negative impact on the LR ($p < 0.001$). These latter results fail to support the predictions in *H1a* and *H1c*, respectively.

Drawing from these results, the present paper supports prior studies that consider human capital as a beneficial source for firms' value creation (Chen *et al.*, 2005; Highhouse *et al.*, 2009; Sardo and Serrasqueiro, 2017). More precisely, it can be argued that companies that do better in terms of actions to improve the value efficiency of human capital are more likely to accumulate strong reputation and credibility with stakeholders. Thus, we expect that increasing investment in the development abilities and knowledge of human capital is an important signal of the commitment of companies to meet stakeholders' expectations (Cravens and Oliver, 2006).

With regard to the control variables, the results from models (1) and (2) indicate that SIZE is significantly and positively associated ($p < 0.01$ and $p < 0.001$ respectively) with the LR. These findings are in line with literature, suggesting that larger firms have a better reputation since they have great visibility and are more able to implement fruitful communication strategies (Brammer and Pavelin, 2006). In the same vein, the INF_QUAL is significantly and positively associated with the LR ($p < 0.01$ in both models (1) and (2)), confirming that the adoption of a high-quality accounting standard is associated with several benefits for companies, such as better credibility with investors and stakeholders (Kim and Shi, 2012; Fox *et al.*, 2013). The results for other control variables show no significant association with the LR.

Table VI presents the results considering the impact of VAIC and its elements on the company's performance. As in Clarke *et al.* (2011), Table VI shows that, across all models, the adjusted R^2 increases when VAIC is allocated in its three main components. Specifically, results in Table VI reveal that VAIC is significantly and positively associated with ROA ($p < 0.001$), ROE ($p < 0.01$) and ROI ($p < 0.001$), while there is no significant association with ATO. In sum, the expected effect of VAIC on company performance posited in *H2* is confirmed in three out of four models, suggesting that this result is substantially robust.

Turning to the single elements of VAIC, Table VI shows mixed results. The VACA and STVA are significantly and positively associated with measures of financial performance in three out of four models, confirming that companies with higher values for physical capital and structural capital perform better (Chen *et al.*, 2005; Zeghal and Maaloul, 2010; Dženopoljac *et al.*, 2016). Conversely, as in prior empirical studies (Firer and Williams, 2003; Celenza and Rossi, 2014), the significant negative relationships between VAHU and all four measures of performance suggest that firms with greater human capital efficiency appear to be less profitable. Based on the empirical findings this paper supports *H2a* and *H2c*, while *H2b* is rejected.

Albeit the lack of coherent results for the impact of VAHU and STVA has been debated in literature, our results may derive from the first attempt to capturing the impact of IC on two distinctive dimensions of value creation, namely company reputation and corporate performance. That is, the value of human resources is more important in supporting company reputation, while firms seeking to improve profitability put more effort in utilizing the structural capital. Overall, future studies are needed to offer a deeper understanding of the impact of these IC constituents.

4.1 Robustness analysis

To increase the robustness of the results, this research implemented additional tests. First, it tested for multicollinearity using the variance inflation factor and tolerance. The results of these two tests (untabulated) do not show any evident problem of multicollinearity.

Second, drawing on the arguments in the work of Haleblian *et al.* (2017), we created an alternative calculation of LR that distinguishes high-reputation companies from others. Thus, we constructed a binary index of LR coded as one (1) if the company is rated from high score (**++) to highest score (***) and zero (0) otherwise.

Using this alternative calculation of LR, we run logistic models with all prior independent variables used in models (1) and (2). As shown in Table VII, the results of models (11) and (12) are substantially in line with those reported in Table V.

	Dependent variable: LR (Model (11))	Dependent variable: LR (Model (12))
Constant	−7.76*** (−5.76)	−8.53*** (−6.06)
IC variables		
VACA (*H1a*)		−0.00 (−0.91)
VAHU (*H1b*)		0.39** (2.68)
STVA (*H1c*)		−2.30** (−2.98)
VAIC (*H1*)	0.00 (0.61)	
Control variables		
SIZE	0.56*** (4.39)	0.67*** (4.99)
LEV	1.24 (1.10)	0.93 (0.77)
LOSS	0.06 (0.13)	−0.46 (−0.86)
INF_QUAL	1.03 (1.26)	0.95 (1.17)
BVD_IND	−0.05 (−0.10)	−0.02 (−0.03)
n	452	452
Pseudo R^2	0.09	0.12

Notes: z in parenthesis. Refer to Table I for the description of the variables. $*p < 0.05$; $**p < 0.01$; $***p < 0.001$

Table VII.
Logistic regression
results for the
relationship between
IC and LR

5. Conclusions

Despite the relevance of IC in creating companies' value, and competitive advantage being continuously under the scrutiny of academics, prior empirical studies have overlooked the relationship between IC and corporate reputation. This topic is relevant, as scholars and recent consultants-based publications (Harrison and Sullivan, 2000; Petty and Guthrie, 2000; Deloitte, 2016) advocate that among firm-level factors driving reputation, IC has a fundamental value.

This paper aims to fill this gap in literature by offering the first empirical attempt to investigate the effect of IC on company reputation. Moreover, the present research contributes to understanding the causal relationship between IC elements and the performance of a sample of 452 Italian no-listed companies that have obtained a public reputational assessment.

Adopting a methodological approach based on the Pulic's (2000) model and measuring corporate reputation via LR released from the ICA, the findings document a positive influence of VAHU on the LR, while the STVA was found to have an opposite effect. Additionally, empirical data fail to support a positive impact of VACA and VAIC on the company reputation. These results are robust to an alternative calculation of LR and regression analysis. A plausible interpretation of these findings is that companies with higher reputation scores are able to translate the knowledge, expertise and cultural principles of their employees into dynamic value activities for stakeholders that inspire confidence and generate robust reputation over time.

Since these findings suggest that companies interested in achieving a good reputation should increase their attention to human capital assets, a strategy of assessment of employees' knowledge, skills, experience and cultural approach to customers should be a key factor of IC management practices. This is coherent with prior research suggesting that human capital is the primary interface with stakeholders and it is the key link through which reputation is created.

The result of the second step of analysis show that VAIC, VACA and STVA are significantly and positively associated with most measures of financial performance, suggesting that firms that take care of their reputation are likely to make an efficient use of IC assets. All these results are consistent with a large body of literature that

considers the strategic importance of leveraging IC for creating companies' value and performance (Edvinsson and Malone, 1997; Sullivan, 2000; Zeghal and Maaloul, 2010).

This research may be of interest to policymakers and investors, as it helps to evaluate how and under what circumstances efficient use of IC assets may generate value for the competitiveness of companies, and thus benefits for stakeholders' expectations. From a practical point of view, this study offers novel insights for managerial practices in order to identify which factors are important for building a better reputation, credibility and profitability. Specifically, the results suggest that companies have to be aware of the prominent role of the components of IC for the reputation and performance; because without a deeper understanding and control of these factors, managers are more likely to engage in myopic behaviors. This is important since a strong monitoring of IC is the foundation of the efficacy of the management's decision-making processes in the current knowledge era. Thus, we expect that companies with lower reputation and profitability put more and more effort to extract value from the managing the constituents of IC.

This study has several limitations. First, the results are focused on one country and may be affected by the choice of one measure of corporate reputation. Second, the results of this study must be interpreted carefully, considering the well-known limitations that affect the VAIC model.

A possible future development of this study could analyze the relationship between IC and corporate reputation using a sample of firms domiciled in different European countries. In general, this study calls for further studies to measure the impact of IC on company reputation with different methodological frameworks and empirical analysis. This could be important to complement the results of the present study and offer novel streams of research.

Notes

1. For more details about the InCaS project see www.incas-europe.org

2. This analysis is performed by using the list of companies (updated in October 2017) with LR rating, as attributed or renewed, in progress of validity for the 2016. This list is available on the ICA website.

3. Since, in literature, there are several developments of the Pulic's VAIC model, this study uses a slightly modified version of the Pulic's model for the calculation of the IC components.

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Appendix A

Initial sample of non-listed companies with LR	569
minus: companies without data or sufficient information for the analysis	117
Final sample	452
of which:	
Small and medium firms[a]	341
Large firms	111
Notes: [a]Definition of SME based on the EU recommendation 2003/361	

Table AI.
Sample selection
and composition

934

Table AII.
LR mapping

Appendix B

Score description (authors' definition)	LR	Mapping
Lowest score	*	1
Lower score	*+	2
Down medium score	*++	3
Medium score	**	4
Upper medium score	**+	5
High score	**++	6
Highest score	***	7

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