Intellectual capital: the missing link in the corporate social responsibility–financial performance relationship

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Abstract

Purpose – The purpose of this paper is to propose and empirically test intellectual capital (IC) as a mediator in the corporate social responsibility (CSR) and financial performance (FP) relationship.
Design/methodology/approach – The empirical research was conducted on 345 European firms listed in the STOXX Europe 600 index. To evaluate the mediating effect of IC, we applied the four-step Baron and Kenny model, tested through an ordinary least squares regression analysis.
Findings – The findings highlighted a partial mediation of IC on the CSR–FP relationship, suggesting that the implementation of CSR strategies has a positive effect on the development of firms' IC, which in turn enhances firms' competitive advantage and superior long-term FPs.
Originality/value – We found a new mediator in the CSR–FP relationship and we contribute to a new line of research that aims to study environmental and sustainability aspects strictly interrelated with IC and performances (sustainable intellectual capital).

Keywords Intellectual capital, Financial performance, CSR, Sustainable intellectual capital, Intangibles
Paper type Research paper

Introduction

In the knowledge economy, information and knowledge allow companies to grow, improving business processes thanks to the development of a unique set of skills and competencies that ultimately enhance the company's financial performance (FP) (Ferraris *et al.*, 2018a, b). In the current scenario, intellectual capital (IC) can be defined as one of the main factors of competitive advantage for each kind of organisation (Jordão and de Almeida, 2017). Thus, IC is evolving fast, embracing new issues inherent to different strategic aspects of the company. In particular, based on the natural resource-based view (NRBV; Hart, 1995), firms' decisions related to corporate social responsibility (CSR) and the development of IC are interconnected. In this regard, recent studies have begun to explore the link between IC and CSR activities and their impact on firm's FP (Beretta *et al.*, 2019; Massaro *et al.*, 2018).

Interestingly, Chang and Chen (2012) underlined the existence of interconnections between IC and the environmental and social aspects within companies. In fact, the development of strategies related to environmental and social issues can improve the

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company's bulk of intangibles with the creation of a competitive advantage for the company (Nikolaou, 2019). Based on the NRBV of the firms (Hart, 1995), CSR and the social and environmental aspects may positively influence the development of IC (Chang and Chen, 2012; Wang and Sarkis, 2017). Unfortunately, the relationship between CSR and IC, which can lead to the development of "Sustainable IC" (SIC), is not much explored in literature. Consequently, SIC can be a unique intangible asset, creating an exciting new stream of research. Similarly, the role of intangibles in the specific relationship between CSR and FP is still in an embryonic state of study, due to the difficulty of measuring and evaluating these key resources within the company (Grewatsch and Kleindienst, 2017). The resulting effect is that the impact of CSR and IC on the firm's FP or their interconnections is still not clear in literature (Kim *et al.*, 2018). Margolis and Walsh (2003) also clearly underlined the relevance of developing more models that combine new variables to analyse the causal links between CSR and FP.

Therefore, based on these considerations, we aim to fill this gap by suggesting IC as a mediator in the CSR–FP relationship. In fact, we suggest that CSR strategies increase the firm's IC thus creating a new form of IC, "sustainable IC", which is closely linked to the environmental and social knowledge that the company must have to increase its competitive position (Chang and Chen, 2012). To reach the paper's objective, we propose and empirically test IC as a mediator in the CSR–FP relationship using Baron and Kenny's (1986) four-step approach on a sample of companies included in the STOXX600 list. The STOXX600 index incorporates the main listed companies from 17 European countries, covering 90% of the total capitalisation of Europe. We thus test our hypothesis on a representative and relevant sample of big companies in the European context that allow us to generalise our results. Our findings indicated a significant partial mediation of IC on CSR–FP.

Thus, our research contributes to IC literature by specifically improving the knowledge on the recent stream of literature that refers to IC and environmental and sustainable concerns (Beretta *et al.*, 2019). First, we developed a new theoretical model designed to evaluate the impact of CSR on the IC of the company and, consequently the effect on FPs. We argue that when a company is involved in sustainable practices it can increase knowledge and understanding of certain social or environmental issues by generating commitment from all stakeholders (Nikolaou, 2019). Second, we have expanded the boundaries of IC analysis by trying to understand how CSR strategies can influence its efficiency (measured by the Value-Added Intellectual Coefficient [VAIC]) leading to an increase in performance in the long run (Bejinaru, 2017). Third, this study emphasises the role of IC in understanding the performance implications of CSR and to better understand when IC and CSR are financially beneficial. In fact, we tested a new mediator in the common CSR–FP relationship, following the directions of Margolis and Walsh (2003) in which they suggested the need for new models and variables to understand the dynamics of this complex and controversial relationship.

As a practical implication, we suggest to companies to invest in several CSR strategies to improve their CSR indicators that are positively associated with higher levels of IC resources, which in turn positively affects the firm's FP. Managers should focus on the development of sustainable practices directed to the development of IC, which are skills that are difficult for competitors to replicate that allow the development of a sustainable competitive advantage. Ultimately, we also suggest some insights to scholars and practitioners considering the COVID-19 pandemic and how CSR and IC can be crucial in preventing risks associated with unexpected events accelerating the transaction process to a more sustainable economy.

This work is organised as follows: the first section includes a literature review and hypotheses development that delineate our conceptual model. After that, the research methodology adopted is explained, followed by the findings and a discussion of results. In the last section, the conclusions and future research lines are presented along with the limitations.

Literature review and hypotheses development

Intellectual capital: key concepts and measurements

According to the resource-based view (RBV), IC is defined as the sum of intangibles assets, knowledge and capabilities that can create competitive advantage and value for companies (Barney, 1991, 2001; Nazari and Herremans, 2007). In fact, the intangible nature of IC makes evaluation and imitation difficult for the firm's competitors (Ray *et al.*, 2004). Thanks to the ability to generate unique characteristics for the company, IC is one of the main assets to enhance the firm's performance (Mondal and Ghosh, 2012).

The development of the theoretical construct of IC can be divided into four phases of research (Bejinaru, 2017). In the first phase, in the 1980s and 1990s, the concept of IC was developed and a preliminary theoretical construct was developed by linking the benefits of IC to developing a sustainable competitive advantage for the firms (Ricceri, 2011). In the second phase, scholars evaluated methods to assess the impact of IC on the firm's FP and value creation (Petty and Guthrie, 2000). In general, it can be said that the first two phases led to the development of the theoretical construct, the identification of the components and their impact on the process of creating value and competitive advantage for the company. In the third stage, the aim of researchers was to understand the managerial implications of IC management (Edvinsson, 2013; Lopes and Serrasqueiro, 2017). In the fourth stage, we saw an expansion of the concept of IC including new aspects (e.g. environment, sustainability) and new study contexts (e.g. universities, emerging markets, etc.; Bejinaru, 2017).

Generally, IC can be divided into three components: human capital (HC), relational capital (RC) and structural capital (SC). HC is a key element that is able to enhance the firm's performance through the development of a competitive advantage and is managed around three elements: skills (e.g. leadership, communication), knowledge (e.g. education, experience) and behaviour (e.g. self-motivation, flexibility; Martín-de-Castro *et al.*, 2011). Many scholars have underlined that companies with employees that have high levels of education and training are able to make higher profits and greater financial results (Hsu and Wang, 2012; Martín-de-Castro *et al.*, 2011). RC can be defined as the relationships that are established over time with suppliers, customers and partners (Johnson, 1999). These relationships increase the firm's reputation and customers are more likely to support the company's business (Yarbrough *et al.*, 2011). The creation of these relationships with stakeholders over time leads to the consolidation of a competitive advantage by increasing the company's FP. Furthermore, SC refers to the non-human assets of a firm such as database, software, organisational culture, patents and technology (Jardon and Susana Martos, 2012). SC can be divided into organisational capital (OC) and technological capital (TC). OC includes all the intangible assets that characterise the structure of the firm and the business process (Martín-de-Castro *et al.*, 2011), while TC is linked with the R&D and all the processes related to the development of new products and services.

Even if the elements making up IC are clear, the greatest challenge is their measurement (Giacosa *et al.*, 2017). As underlined by Novas *et al.* (2017), there are no precise tools or techniques for measuring IC and its value within business. Generally, it is possible to identify different models to measure IC, some of them consider financial indicators while others use non-financial indicators (e.g. human capital efficiency, staff satisfaction) with the objective of measuring the value created by IC. Based on the market side, IC is generally evaluated based on expectations of future business results and innovation (Bontis, 2001; Cricelli *et al.*, 2013). However, one of the most common methods to measure IC is the VAIC model (Pulic, 2000, 2004). In particular, it allows for estimating size and efficiency of IC within the business. Despite criticisms highlighted by scholars (such as Iazzolino and Laise, 2013; Ståhle *et al.*, 2011), the VAIC is still the most used method to measure the efficiency of IC within the company (Bayraktaroglu *et al.*, 2019; Ginesti *et al.*, 2018).

CSR and financial performance

CSR can be defined as a firm's behaviour and actions aimed at creating numerous benefits for the various stakeholders of the company (Kim *et al.*, 2018). Despite the numbers of studies regarding the impact of CSR on FP, the link between them is still an open debate within academia (Carroll and Shabana, 2010; Grewatsch and Kleindienst, 2017; Kim *et al.*, 2018; Surroca *et al.*, 2010). In particular, Surroca *et al.* (2010) underlined three issues when evaluating this relationship: *measurement problems*, *misspecification of models* and *direction of causality*. The *measurement problems* relating to CSR are the result of few studies using suitable multidimensional variables to fully capture the extent of CSR. In fact, most studies tend to use one single item (as a proxy) referring only to one specific stakeholder, thus omitting relevant items related to other different relevant stakeholders involved. The *misspecification of models*, based on a contingency perspective (Grewatsch and Kleindienst, 2017), is the inability of the models to include all the variables while simultaneously explaining this relationship in every different context of analysis. Regarding the *direction of causality*, it considers different aspects. The basic assumption, based on RBV (Freeman, 1994; Wang and Sarkis, 2017), suggests that CSR increases the firm's intangible assets, enhances the relationship with stakeholders and leads to the development of a competitive advantage for the company, which finally enhances the firm's FP. Another well-established stream of literature suggests that the higher the firm's FP, the higher the investments on CSR strategies due to greater resources in the hands of managers (Waddock and Graves, 1997). Moreover, Kim *et al.* (2012) generally assume that there are two types of CSR investments: real or symbolic. In the first case, companies implement CSR strategies and develop a corporate culture focused on its principles based on social and environmental concerns. In the second case, firms are only engaged in symbolic CSR strategies to show investors a positive image, but this is not accompanied by real actions and related investments.

As underlined by Story and Neves (2015), CSR strategies can lead to positive or negative impacts on the firm's performance. In particular, this is due to the company's ability to capitalise on investments made in sustainability-related actions. This aspect is interconnected with the company's ability to correctly communicate to its stakeholders what the strategic choices related to CSR are. The stakeholder assesses the company exactly as it would with other people, so if a company invests in symbolic CSR but is often viewed negatively because of actions against individuals or the environment, CSR will not be able to improve the company's reputation and will only be seen as an action to mitigate the negative effects of such negative behaviour (Bauman and Skitka, 2012).

However, following a legitimacy perspective (Gray *et al.*, 1995), companies are determined to develop real CSR activities to develop a competitive advantage that enhances the firm's FP in the long term (McWilliams and Siegel, 2011). However, the development of corporate culture and managerial practices linked with CSR (e.g. development of sustainable products, new process with less natural impact) may increase the firm's costs with a negative impact on the firm's performance in the short term (Darnall and Edwards, 2006). Hence, when evaluating the impact of CSR on performance it is also necessary to consider the time span to see the results of investments in these strategies (Martín-de Castro *et al.*, 2016). In the long run, CSR may create legitimacy among employees and stakeholders that will further support the company's development and improve the company's performance. As noted by Martín De Castro *et al.* (2016), stakeholder engagement and the fulfilment of their expectations increase the company's competitive advantage with an increase in long-term performance. Thanks to the above considerations and given the increase in CSR issues within and outside companies, we assume that:

H1. In the long term, CSR positively impacts firms' FP.

The mediating role of intellectual capital on the CSR–FP relationship

Many studies have highlighted how environmental and social concerns have been implemented within business, e.g. innovation (Battisti *et al.*, 2019; Inigo and Albareda, 2019; Santoro *et al.*, 2019a, b), supply chain (Maloni and Brown, 2006), business model (Bresciani, 2017; Carayannis *et al.*, 2017; De Bernardi *et al.*, 2019; Franceschelli *et al.*, 2018) or marketing (Del Giudice and Maggioni, 2014; Santoro *et al.*, 2019a, b). However, many studies have argued that firms should invest in CSR strategies and outlined the benefits of such actions (e.g. Bresciani and Oliveira, 2007; Surroca *et al.*, 2010). Based on the RBV perspective, better firm performances are generally obtained by inimitable resources, which allow the development of a competitive advantage for companies in the long term (Barney, 1991; Meso and Smith, 2000). Inimitable resources can be defined as a heterogeneous group of unique resources that are irreplaceable except at the expense of the competitive advantage for the company (Barney, 2001). Among inimitable resources, IC and its components (human capital, relational capital, structural capital) have a key role in the development of competitive advantage and enhance the firm's FP (Mondal and Ghosh, 2012). Moreover, the development of social and environmental issues may be possible sources of competitive advantage (Nikolaou, 2019). In fact, Hart (1995) has already expanded the boundaries of RBV by developing the NRBV framework in which knowledge on environmental and social aspects can contribute to the development of intangibles within the company, which can generate better FP.

Considering the main components of IC, CSR can lead to a new concept of SIC that is related to the human, structural and relational aspects (Beretta *et al.*, 2019; López-Gamero *et al.*, 2009). Sustainable human capital (SHC) can create ethical principles and a corporate culture linked to corporate sustainable value. In fact, CSR strategies can positively influence the firm's human capital in different ways (Surroca *et al.*, 2010). First, firms that show a sensitivity to social and environmental issues attract better employees and also decrease the costs associated with employment (e.g. turnover, training costs; Albinger and Freeman, 2000). Second, CSR strategies lead to human resources practices (e.g. development of solutions related to the environment, reward related to CSR objectives, etc.) connected to social and environment commitment. Third, CSR improves the morale and working conditions of employees by creating an environment conducive to the development of new ideas related to sustainability (Vázquez-Carrasco and López-Pérez, 2013). Therefore, the correct implementation of CSR actions does not only increase the efficiency of human capital within the company but is manifested in better efficiency and effectiveness with positive implications for performance.

However, human capital alone is not enough to properly implement CSR strategies within a business. As suggested by Jardon and Dasilva (2017), firms need organisation culture and structure to implement such strategies; in this sense, sustainable structural capital helps to achieve higher sustainable performance within a business. In fact, CSR strategies can develop the firm's structural capital (SC) (Chen, 2007). In particular, all the components of SC (e.g. organisational capabilities, processes, organisational culture, company image, patents) can be developed by following sustainability principles. As underlined by Chen (2007), companies that adopt a green approach by influencing their structural capital also see an increase in their competitive advantage with an increase in performance.

Moreover, relational capital (RC) can be influenced by CSR activities thanks to the expectations that stakeholders have on social and environmental issues (Cillo *et al.*, 2019). All of these issues should be managed by proper green human resource management so as to obtain a competitive advantage over time (Yong *et al.*, 2019). As found by Huang and Kung (2011), environmental and social aspects managed by green human resource management increase corporate culture and image. These improve the organisational commitment to sustainable issues, increasing employee skills and knowledge (Mehralian *et al.*, 2018). In the

last few years, there has been an increase in awareness of sustainability issues by stakeholders and sustainability practices have shown the ability to create stakeholder engagement over time (Scuotto *et al.*, 2019). Considering internal and external relations with stakeholders, they can be improved when the company exhibits a commitment to sustainability issues (Alkemade and Suurs, 2012). According to consumer environmental awareness trends and stringent international environmental protection regulations, companies that actively implement environmental management tools and green innovation tools can increase the firm's intangibles, in particular the relationship with stakeholders (Nikolaou, 2019; Surroca *et al.*, 2010). The management of social and environmental resources may help firms to reach stakeholder's expectations, develop internal and external relations with their stakeholders and improve individual and organisation knowledge (Torres *et al.*, 2018).

Therefore, companies that invest in CSR strategies can apply relatively high prices for green products, and also improve their corporate image, improve their production efficiency and develop ecological products with a positive impact on the competitive advantages of the company which generates higher FP in the long run.

These considerations led us to develop the following hypothesis:

H2. Corporate social responsibility (CSR) positively impacts the level of IC, which in turn positively influences the firm's FP. Therefore, IC mediates the CSR–FP relationship.

Methodology

Sample

Our study is based on industrial and service companies reported in the STOXX Europe 600 index. The index comprises the 600 largest European companies in terms of capitalisation and accounts for 90% of total European capitalisation. It is derived from the STOXX Europe Total Market Index (TMI), which includes all European listed companies, and it is a sub-index of the STOXX Global 1800 Index, which includes larger companies from developed countries. Data regarding FP were collected for 2018, while data for CSR were collected from 2017 to be able to catch the effect of CSR strategies on firm's performance given the time it takes to see the effects. Seventeen European countries are included in the index: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Switzerland, Sweden and the UK. As the STOXX600 includes all the major listed companies in Europe, the sample is representative of the economic reality of the study context. Based on market cap, the top 10 components of the index are Nestlè, Roche Holding, Novartis, AstraZeneca, ASML Holding, SAP, Novo Nordisk, Sanofi, LVMH and GlaxoSmithKline.

The data about CSR, FP and IC have been extrapolated from Thomson Reuters Datastream widely used in management and financial research (e.g. Akbas *et al.*, 2018; Zaghini, 2014). Our sample does not include banks and insurance companies due to a different application of accounting standards that does not allow for an accurate comparison of financial statements (Doni *et al.*, 2019). Furthermore, we excluded companies whose data about CSR, FP and IC were not available and our final sample includes 345 European firms with an average market capitalisation of 17 billion dollars, revenues of 16 billion dollars and around 53,000 employees.

Variables used in the study

Following previous studies (Kim *et al.*, 2018; Surroca *et al.*, 2010; Wang and Sarkis, 2017), we used Tobin's (1969) Q-ratio as measure of *Financial Performance* (dependent variable). This is calculated as the sum of equity market value and liabilities market value, divided by the book

value of total asset. Tobin's Q is usually used to assess the relationship between CSR and FP due to its ability to capture the CSR strategies' outcomes and investments in intangible assets (Kim *et al.*, 2018; Surroca *et al.*, 2010). Tobin's Q data were collected for 2018.

Data on *CSR* are based on environmental, social and governance (ESG) scores, which are generally considered to be one of the most understandable approaches to evaluate the firm's CSR (Nollet *et al.*, 2016). In particular, as suggested by Wang and Sarkis (2017), ESG scores provide a proper measure to evaluate CSR activities within business as well as their impact on environment and society. In particular, ESG scores are generally considered to be the output of investments in sustainable practices; even if they do not provide an in-depth understanding of the strategies adopted, they are an excellent benchmark for understanding the results achieved through CSR strategies (Nirino *et al.*, 2019). ESG data were collected from Thomson Reuters Datastream (Akbas *et al.*, 2018). To understand the effect of CSR strategies on performance and the effects they can have on long-term performance (Surroca *et al.*, 2010), we collected the data for 2017, i.e. the year before the performance data. Overall, the ESG total scores take in account all the information on environmental, social and governance activities, discerning the CSR governance process and its environmental and social outcomes. Each score has a minimum value of 0 and a maximum value of 100. In particular, the CSR governance score takes into account 104 indicators about management (e.g. board size, gender diversity), shareholders (e.g. golden parachute, insider dealing) and CSR strategy (e.g. stakeholder engagement, CSR sustainability committee). The CSR environmental score considers 88 indicators related to resource use (e.g. total energy use, total water use), emissions (e.g. total CO2 emissions, biodiversity impact reduction) and innovation (e.g. product impact minimisation, animal testing). The CSR social score is based on 101 parameters concerning the workforce (e.g. health and safety policy, net employment creation), human rights (e.g. human rights policy, policy child labour), community (e.g. fair competition, donations) and product responsibility (e.g. data privacy, ISO9000).

All constituents have different weights to create the final score. Regarding the CSR governance, the management indicator accounts for 19% of the total score, while shareholders and CSR strategy account for 7% and 4.5% of the total score, respectively. Then, the total weight of the governance score is equal to 30.5%. Regarding the environmental score, the resource use and innovation parameters account for 11%, while the emissions indicator accounts for 12% of the total score. The weight of the environmental score is 34%. Finally, for the social score, the workforce indicator weighs 16% of the total ESG score, while community accounts for 8%, product responsibility for 7% and human rights 4.5%. Overall, the social score weighs 35.5% of the total score.

To evaluate the IC within the company, we adopted the VAIC model, widely used in previous studies (e.g. Ginesti *et al.*, 2018; Yalama and Coskun, 2007). The VAIC model assesses the efficiency of IC by companies by analysing financial statements (Pulic, 2000, 2004). All the constituents' data for the VAIC have been extrapolated by Thomson Reuters which reports year by year the main budget indicators necessary to evaluate the VAIC. Despite some issues, Andriessen (2004) suggested the VAIC is the best measure for statistical analysis. In particular, it produces an objective and reproducible analysis, which is fundamental to ensure the results are valid and scientifically correct (Andriessen, 2004). Thus, to assess the IC, we calculated the firm's value added (VA), which is the sum of the operating profit (OP), employees' costs (EC), amortisation and depreciation (A&D), interest expense (IE), taxes and dividend payout. The VAIC is determined as the sum of human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency coefficient (CEE) in which HCE is the ratio between VA and total salary and labour expenses. SCE is the ratio between structural capital (SC), calculated as VA-HC, and VA, while CEE is the ratio between VA and net asset of the company.

To understand the commitment of companies to social and environmental problems, we considered whether the companies published a sustainability report in 2017. We have included a dummy variable equal to 1 when company published a sustainability report and 0 otherwise (Oliveira *et al.*, 2010; Pedrini, 2007).

Finally, we also included several *control variables*. First, we included firm risk through the adoption of the firm's leverage (debt to asset) and companies Beta. Previous studies have suggested that both measures can affect the relationship between CSP and FP (Opler and Titman, 1994; Surroca *et al.*, 2010). We also control for the firm's size including the total assets and total employees. In particular, we adopted the natural logarithm for both measurements, to reduce the standard deviation generated by the extreme size of some companies (Wang and Sarkis, 2017). Moreover, we control for liquidity levels, which can influence corporate governance decisions about CSR strategies and the firm's profitability (Li *et al.*, 2012). As a proxy of the firm's liquidity, we used the firm's current ratio, determined as the ratio between current assets and current liabilities. Finally, we have controlled for the industry in which the company operates; in particular, we used a dummy variable equal to 1 for manufacturing businesses and 0 for service companies (Santoro *et al.*, 2018)

Research model

We adopted the four-step Baron and Kenny (1986) approach to test the mediating effect of IC on the relationship between CSR and the firm's FP that is widely used and accepted in mainstream literature (e.g. Surroca *et al.*, 2010; Wang and Sarkis, 2017).

The first step is to test if the causal variable (CSR) affects the dependent variable (FP; Model 1). The second step is to test the relationship between the mediator variable (IC) and the dependent variable (FP), looking for a significant effect. In step three, the relationship between CSR (causal variable) and IC (mediator) is verified. In the last step, the relationship between the causal variable (CSR) and the dependent variable (FP) should be controlled by the mediator variable (IC); the relationship is fully mediated if the connection between CSR and FP becomes non-significant as suggested by Baron and Kenny (1986) and there is a partial mediation if the effect of CSR on FP is reduced and still significant. In detail:

(1) Step 1: Causal effect between CSR and FP

Model 1:

$$\mathrm{FP}_t = a + \beta_1 \mathrm{CSR}_{t-1} + \beta_2 \mathrm{LEV}_t + \beta_3 \mathrm{SIZE}_t + \beta_4 \mathrm{RISK}_t + \beta_5 \mathrm{EMPLO}_t + \beta_6 \mathrm{LIQ}_t + \beta_7 \mathrm{SUST} + \beta_8 \mathrm{IDUSTRY}_t + e$$

(2) Step 2: Direct effect of IC on FP

Model 2:

$$\mathrm{FP}_t = a + \beta_1 \mathrm{IC}_t + \beta_2 \mathrm{LEV}_t + \beta_3 \mathrm{SIZE}_t + \beta_4 \mathrm{RISK}_t + \beta_5 \mathrm{EMPLO}_t + \beta_6 \mathrm{LIQ}_t + \beta_7 \mathrm{SUST} + \beta_8 \mathrm{IDUSTRY}_t + e$$

(3) Step 3: Effect of CSR on IC

Model 3:

$$\mathrm{IC}_t = a + \beta_1 \mathrm{CSR}_{t-1} + \beta_2 \mathrm{LEV}_t + \beta_3 \mathrm{SIZE}_t + \beta_4 \mathrm{RISK}_t + \beta_5 \mathrm{EMPLO}_t + \beta_6 \mathrm{LIQ}_t + \beta_7 \mathrm{SUST} + \beta_8 \mathrm{IDUSTRY}_t + e$$

(4) Step 4: Mediation effect including IC and CSR as independent variables

Model 4:

$$FP_t = a + \beta_1 CSR_{t-1} + \beta_2 IC_t + \beta_3 LEV_t + \beta_4 SIZE_t + \beta_5 RISK_t + \beta_6 EMPLO_t + \beta_7 LIQ_t + \beta_8 SUST + \beta_9 IDUSTRY_t + e$$

To assess the mediator effect, we tested the significance between FP, CSR and IC. In the first three models, the relationship between FP, CSR and IC must be significant, otherwise the model does not allow for understanding the mediating effect. Furthermore, in the fourth model, the impact of the mediator variable must be significant and positive, so we compare the value of β_1 in the first model with the level of β_1 in the last model. The overall value of β_1 in the fourth model must be lower than the first one. Moreover, if in model 4, the significance of β_1 decreases in comparison to model 1, it is possible to assume a total or partial mediation of IC on the relationship between CSR and FP.

Table 1 show the variables definitions and detail.

Findings

Table 2 provides the descriptive statistics and correlation matrix of our variables. Tobin's Q mean value is 1.66 with a standard deviation of 1.25, with a minimum value of 0.94 and maximum of 13.43. The CSR measure has an average value of 66.86 and a standard deviation equal to 13.09, with a minimum value of 33.67 and maximum of 95.89. The average value of IC, measured through the VAIC model, is 3.40 for all observations and a standard deviation of 1.92; the minimum value is equal to 1.25 and maximum of 12.27. Moreover, we conducted a Pearson's correlation which indicated that our variables are not highly correlated, avoiding any multicollinearity problem. As shown in Table 2, Tobin's Q is positive and significantly correlated with CSR, level of liquidity and is negatively correlated with assets and employees.

Type	Variable	Description	Source
Dependent variable	Tobin's Q	Sum of market capitalization plus the book value of total liabilities, divided by book value of total asset.	Kim *et al.* (2018), Surroca *et al.* (2010)
Independent	CSR	Defined as Environmental, Social and Governance score	Wang and Sarkis (2017)
Mediator	IC	Calculated through the VAIC model	Yalama and Coskun (2007), Ginesti *et al.* (2018)
Control variable	SUST	1 = Sustainability report; 0 = no sustainability report	Oliveira *et al.* (2010), Pedrini (2007)
Control variable	EMPLO	Natural logarithm of total employees	Wang and Sarkis (2017)
Control variable	Size	Natural logarithm of total asset	Wang and Sarkis (2017)
Control variable	LIQ	Calculated as the ratio of current asset and current liabilities	Li *et al.* (2012)
Control variable	LEV	Leverage ratio, calculated as financial debt divided to total equity	Surroca *et al.* (2010)
Control variable	Beta	Beta levered for each firms	Opler and Titman (1994)
Control variable	Industry	1 = Manufacturing; 0 = services	Santoro *et al.* (2018)

Table 1. Variables used in the study

Table 2.
Descriptive statistics and Pearson's correlation matrix

	Mean	ST.DV	Min	Max	TobinQ	CSR	IC	SUST	INDUSTRY	EMPLO	ASSET	LIQ	LEV	Beta
Tobin Q	1.66	1.25	0.94	13.43	1	0.0145**	0.035	0,2145	0.032	−0.335**	−0.573**	−0.296**	−0.93	−0.34
CSR	66.86	13.09	33.67	95.89		1	0.68**	0.5145**	0.3155**	−0.353**	−0.454**	−0.095	0.032	0.075
IC	3.40	1.92	1.25	12.27			1	0.1145*	0.016	−0.405**	0.079	0.027	−0.004	−0.143**
SUST	0.72	0.52	0	1				1	0.1385*	0.099	0.172*	−0.0248	−0.035	0.05
INDUSTRY	0.63	0.48	0	1					1	0.189*	0.137*	0.058	0.121*	0.556**
EMPLO	9.77	1.68	3.52	13.39						1	0.600**	−0.246**	0.080	0.212**
SIZE	22.93	1.37	19.41	26.85							1	−0.244**	0.59	0.033
LIQ	1.54	1.15	0.24	16.7								1	−0.128*	0.027
LEV	0.97	2.36	0	4.3									1	
Beta	0.88	0.34	−0.017	2.044										1

Note(s): *Correlation is significant at the 0.05 level (2-tailed)
**Correlation is significant at the 0.01 level (2-tailed)

CSR is positive and significantly correlated with Tobin's Q, IC, sustainability reports, number of employees and assets. IC is significantly and negatively correlated with employees and beta and positively correlated with CSR and sustainability reports. Moreover, we provide the variance inflation factors (VIF) to analyse the possibility of problems of multicollinearity in more detail. The VIF ranged from 1.121 to 2.481, less than the threshold of 10 generally accepted in literature (Hair, 1995). The results of the mediation effect of IC in the relationship between CSR and FP are presented in Table 2.

The results of the four-step Baron and Kenny (1986) approach allowed us to investigate the mediator effect of IC on the CSR and FP relationship. As shown in Table 3, the CSR positively and significantly affects ($b = 0.181$; $p < 0.01$) the firm's FP. This result is in line with previous research, which suggest the positive impact of CSR strategies on FP (e.g. Aguinis and Glavas, 2012; Wang and Sarkis, 2017). Therefore, Hypothesis 1 can be confirmed; this result suggests that a company's CSR activities positively impact the firm's performance.

Considering the control variables, in the first model only the asset ($b = -0.531$; $p < 0.01$) and the level of liquidity ($b = 0.226$; $p < 0.01$) significantly affected the firm's FP. In particular, an higher level of liquidity suggests that companies are able to invest more in CSR activities with a positive impact on the firm's FP. Regarding the second model, we tested the impact of IC on FP and discovered a positive and significant ($b = 0.140$; $p < 0.05$) relationship between IC and FP. This result is supported by previous studies (e.g. Ginesti *et al.*, 2018; Kamukama *et al.*, 2011; Yalama and Coskun, 2007; Zéghal and Maaloul, 2010), reinforcing the idea that a high level of IC efficiency enhances the firm's competitive advantage and performance. In the second model, as with the first one, asset ($b = -0.535$; $p < 0.01$) and liquidity ($b = 0.214$; $p < 0.01$) affect the firm's FP. In the third model, the relationship between CSR and IC was tested. As suggested by Baron and Kenny (1986), this must be positive and significant. Our results show a positive and significant impact of CSR on IC ($b = 0.175$; $p < 0.002$). This means that companies with several investments in CSR strategies can increase their intangible asset efficiency with a positive effect on the firm's IC. Finally, the last model allows us to understand if the IC mediates the relationship between CSR and FP. In fact, the overall value of β_1 is diminished, moving from 0.181 to 0.121. Moreover, to have full or partial mediation, the significance of CSR in the fourth model had to be lower than the first one. As reported in Table 2, there was a decrease in CSR significance between the first ($b = 0.181$; $p < 0.01$) and the fourth model ($b = 0.121$; $p = 0.011$). Thus, Hypothesis 2 is partially confirmed.

	Model 1 (Tobin Q) Estimate (p value)	Model 2 (Tobin Q) Estimate (p value)	Model 3 (IC) Estimate (p value)	Model 4 (Tobin Q) Estimate (p value)
CSR	0.181*** (0.000)		0.175*** (0.000)	0.121** (0.011)
IC		0.140** (0.015)		0.112** (0.038)
SUST	0.088 (0.438)	0.098 (0.377)	0.091 (0.238)	0.077 (0.211)
INDUSTRY	0.082 (0.673)	0.093 (0.543)	0.182 (0.440)	0.097 (0.381)
EMPLO	0.011 (0.886)	0.128* (0.074)	−0.814*** (0.000)	0.094 (0.203)
ASSET	−0.531*** (0.000)	−0.535*** (0.000)	0.380*** (0.000)	−0.590*** (0.000)
LIQ	0.226*** (0.002)	0.214*** (0.000)	−0.044 (0.615)	0.187*** (0.003)
LEV	−0.050 (0.248)	−0.053 (0.226)	0.022 (0.609)	−0.053 (0.225)
Beta	0.034 (0.443)	0.040 (0.376)	−0.061 (0.170)	0.041 (0.360)
Observation	346	346	346	346
R-Squared	0.352	0.354	0.349	0.375
Adjusted R^2	0.348	0.343	0.342	0.361

Note(s): p-values in parentheses: $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

Table 3. Mediation effect of IC on the relationship among CSR and firm's financial performance

Discussion and implications

In the past, firms have implemented a transformation in their business, investing more in CSR activities, not only to reach their profit targets but also to meet the needs of the environment and the societies in which they operate (Kim and Kim, 2014). Despite the high number of studies on the relationship between CSR and FP, only a few have tested potential mediators in an attempt to explain the ambiguous connection between the two variables (e.g. Kim *et al.*, 2018; Saeidi *et al.*, 2015; Surroca *et al.*, 2010). According to Surroca *et al.* (2010), intangible assets have a key role in relation to both CSR and related effects on competitive advantage and consequently on FPs. In addition, there is an increase in interest within the IC literature with regard to topics related to the environment, society and SIC, but it is rarely connected to the firm's measures of performance.

Hence, in this study we explored the relationship between CSR and FP through the analysis of the role of IC as a mediator. The results of our analysis suggest a partial mediation effect of IC on FP and CSR. A partial mediation implies that the mediator (IC) affects the dependent variable; however, it also suggests that there is a partial direct relationship between CSR and FP (Baron and Kenny, 1986). This result suggests that decisions related to CSR have an impact on FP, confirming the results from previous studies (e.g. Bird *et al.*, 2007; Margolis *et al.*, 2009). Moreover, we found that the impact of CSR on IC helps us gain an understanding of how CSR decisions effect the company's IC. Thus, CSR can increase knowledge about the environment and sustainability with a direct impact on IC and, following the RBV perspective, these aspects increase the competitive advantage of a company in the long run (Chen, 2007). In particular, this is relevant because in the current market scenario, environmental and social concerns have become a key element in the firm's strategic decisions and are related to the firm's sustainable objectives (Del Giudice *et al.*, 2017). In fact, as highlighted by Rayner and Morgan (2018), environmental knowledge has a positive effect on the human capital of the firms by increasing employees' motivation and skills. These results suggest that CSR strategies enhance the firm's performance, but IC plays a primary role in this relationship. In fact, following RBV, CSR can generate a higher level of IC by developing a unique set of skills related to the environment and sustainable knowledge; this generates better FPs over time.

Based on these considerations, our study contributes in several ways. First, considering the four phases of analysis of IC (Bejinaru, 2017), we tested a new model in which CSR concepts positively influence the IC of the company. Based on our results, if the company adopts an attitude aimed at increasing knowledge on sustainability issues, it may be able to increase performance in the long term. In addition, if the company is able to invest in CSR strategies, thus showing a real commitment on certain social and environmental issues, the stakeholders will be more likely to be faithful to the company (Nikolaou, 2019).

Second, we broadened the concept of IC by empirically testing how other intangibles (e.g. new knowledge related to CSR strategies) can influence it positively, thus creating positive interdependencies. In particular, the overall firm IC may potentially benefit from CSR strategies in various ways. First, considering the human side of HC, companies that adopt sustainability principles attract better employees and decrease HR-related costs (Albinger and Freeman, 2000), increasing the efficiency of IC. Moreover, sustainable practices positively influence organisational processes, capabilities and culture (structural capital), thus creating new patents and innovations (Dezi *et al.*, 2019; Jardon and Dasilva, 2017). Furthermore, CSR improves the firm's relations with internal and external stakeholders, who are more willing to believe in the future of the business, which also affects the efficiency of IC.

Third, we contribute to CSR literature and stakeholder theory (Freeman, 1994). Our study suggests IC is an additional resource that should be considered when assessing the relationship between CSR and FP, due to the fact that CSR develops the IC within businesses with a benefit for the firm's stakeholders. A company that is actually involved in

sustainability-related activities are able to create a positive image that increases the possibility of being supported by all stakeholders. Moreover, we underlined the role of IC in understanding the performance implications of CSR and to better understand when IC and CSR are financially beneficial.

From a practical point of view, CSR strategies increase IC efficiency within businesses, enhancing firm's performance. In particular, environmental and social concerns are part of an employee's knowledge which can develop the firm's competitive advantage. Thus, employees feel they are contributing to the company's results but also to the well-being of the environment and future generations. Managers should focus on the development of sustainable practices that positively influence the firm's IC, which are skills that are difficult for competitors to replicate and allow the development of a sustainable competitive advantage.

Furthermore, from a managerial point of view, it is good to remember how unexpected events (Black swan) can negatively influence and lead to the collapse of consolidated industrial realities (e.g. Hertz). The COVID-19 pandemic accelerated the debate on the transaction to a market economy more focused on sustainability issues; in this context, the innovation process plays a key role. We believe that companies that will be able to implement these concepts concretely will potentially have numerous benefits including a positive impact on IC and competitive advantage, which will allow firms not only to take less risks during unexpected events but, above all, have support from key stakeholders who will see similar core values within the company. In particular, aspects linked to innovation and the development of intellectual property places companies in an advantageous position compared to their competitors (Chesbrough, 2020). However, from an ethical and sustainable point of view, states and the scientific community are pushing public and private companies to share the fruits of their research for a higher purpose. Having to share their intellectual property could have a negative impact on the performance of companies in the short term, but they would see an increase in their image linked to CSR strategies.

Limitations and future research lines

It must be noted that this study has some limitations. First, we have not considered IC in its individual components (human, structural and relational). Future studies may assess how each component of IC is influenced by CSR activities. We have considered that CSR influences each component, but it is not clear that this is the case. Understanding these dynamics in more detail would increase not only the theoretical contributions related to phase 4 of IC but also the managerial contributions which will allow important ideas to follow.

Second, we adopted the standard VAIC model to evaluate IC efficiency. However, we believe future studies should develop new methods to assess SIC. Indeed, the methodology followed by Ardito and Dangelico (2018), in which they run a content analysis through the firm's sustainability report, could help to evaluate the company's involvement in sustainability issues related to key elements of IC.

Third, our sample considered only large listed firms. It would be interesting to understand how sustainability aspects impact IC and performance in SMEs. As underlined by Del Giudice *et al.* (2017), SMEs and large companies have a different stock of financial resources and therefore have different investments in CSR and sustainability with different impacts on the company's IC.

Furthermore, different terminologies are being adopted regarding IC and sustainability (e.g. SIC, green intellectual capital). The development of a theoretical construct that is more directed and linked to the "green" or "sustainable" aspects of IC should incorporate and clarify every necessary aspect. For example, what are the differences between sustainable and green intellectual capital? Can they be calculated differently? If so, how? We believe that future studies should answer these questions and our research can be a springboard for them.

References

Aguinis, H. and Glavas, A. (2012), "What we know and don't know about corporate social responsibility: a review and research agenda", *Journal of Management*, Vol. 38 No. 4, pp. 932-968.

Akbas, F., Markov, S., Subasi, M. and Weisbrod, E. (2018), "Determinants and consequences of information processing delay: evidence from the Thomson Reuters institutional brokers' estimate system", *Journal of Financial Economics*, Vol. 127 No. 2, pp. 366-388.

Albinger, H.S. and Freeman, S.J. (2000), "Corporate social performance and attractiveness as an employer to different job seeking populations", *Journal of Business Ethics*, Vol. 28 No. 3, pp. 243-253.

Alkemade, F. and Suurs, R.A.A. (2012), "Patterns of expectations for emerging sustainable technologies", *Technological Forecasting and Social Change*, Vol. 79 No. 3, pp. 448-456.

Andriessen, D. (2004), *Making Sense of Intellectual Capital: Designing a Method for the Valuation of Intangibles*, Elsevier, Amsterdam.

Ardito, L. and Dangelico, R.M. (2018), "Firm environmental performance under scrutiny: the role of strategic and organizational orientations: firm environmental performance under scrutiny", *Corporate Social Responsibility and Environmental Management*, Vol. 25 No. 4, pp. 426-440.

Barney, J. (1991), "Special theory forum the resource-based model of the firm: origins, implications, and prospects", *Journal of Management*, Vol. 17 No. 1, pp. 97-98.

Barney, J.B. (2001), "Resource-based theories of competitive advantage: a ten-year retrospective on the resource-based view", *Journal of Management*, Vol. 27 No. 6, pp. 643-650.

Baron, R.M. and Kenny, D.A. (1986), "The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations", *Journal of Personality and Social Psychology*, Vol. 51 No. 6, pp. 1173-1182.

Battisti, E., Miglietta, N., Nirino, N. and Villasalero Diaz, M. (2019), "Value creation, innovation practice, and competitive advantage: evidence from the FTSE MIB index", *European Journal of Innovation Management*, Vol. 23 No. 2, pp. 273-290.

Bauman, C.W. and Skitka, L.J. (2012), "Corporate social responsibility as a source of employee satisfaction", *Research in Organizational Behavior*, Vol. 32, pp. 63-86.

Bayraktaroglu, A.E., Calisir, F. and Baskak, M. (2019), "Intellectual capital and firm performance: an extended VAIC model", *Journal of Intellectual Capital*, Vol. 20 No. 3, pp. 406-425.

Bejinaru, R. (2017), "Knowledge strategies aiming to improve the intellectual capital of universities", *Management and Marketing*, Vol. 12 No. 3, pp. 500-523.

Beretta, V., Demartini, C. and Trucco, S. (2019), "Does environmental, social and governance performance influence intellectual capital disclosure tone in integrated reporting?", *Journal of Intellectual Capital*, Vol. 20 No. 1, pp. 100-124.

Bird, R., Hall, D.A., Momentè, F. and Reggiani, F. (2007), "What corporate social responsibility activities are valued by the market?", *Journal of Business Ethics*, Vol. 76 No. 2, pp. 189-206.

Bontis, N. (2001), "Assessing knowledge assets: a review of the models used to measure intellectual capital", *International Journal of Management Reviews*, Vol. 3 No. 1, pp. 41-60.

Bresciani, S. (2017), "Open, networked and dynamic innovation in the food and beverage industry", *British Food Journal*, Vol. 119 No. 11, pp. 2290-2293.

Bresciani, S. and Oliveira, N. (2007), "Corporate environmental strategy: a must in the new millennium", *International Journal of Business Environment*, Vol. 1 No. 4, p. 488.

Carayannis, E.G., Grigoroudis, E., Del Giudice, M., Della Peruta, M.R. and Sindakis, S. (2017), "An exploration of contemporary organizational artifacts and routines in a sustainable excellence context", *Journal of Knowledge Management*, Vol. 21 No. 1, pp. 35-56.

Carroll, A.B. and Shabana, K.M. (2010), "The business case for corporate social responsibility: a review of concepts, research and practice", *International Journal of Management Reviews*, Vol. 12 No. 1, pp. 85-105.

Chang, C. and Chen, Y. (2012), "The determinants of green intellectual capital", *Management Decision*, Vol. 50 No. 1, pp. 74-94.

Chen, Y.S. (2007), "The positive effect of green intellectual capital on competitive advantages of firms", *Journal of Business Ethics*, Vol. 77 No. 3, pp. 271-286.

Chesbrough, H. (2020), "To recover faster from Covid-19, open up: managerial implications from an open innovation perspective", *Industrial Marketing Management*, Vol. 88, pp. 410-413.

Cillo, V., Petruzzelli, A.M., Ardito, L. and Del Giudice, M. (2019), "Understanding sustainable innovation: a systematic literature review", *Corporate Social Responsibility and Environmental Management*, Vol. 26 No. 5, pp. 1012-1025.

Cricelli, L., Greco, M. and Grimaldi, M. (2013), "The assessment of the intellectual capital impact on the value creation process: a decision support framework for top management", *International Journal of Management and Decision Making*, Vol. 12 No. 2, p. 146.

Darnall, N. and Edwards, D. (2006), "Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure", *Strategic Management Journal*, Vol. 27 No. 4, pp. 301-320.

De Bernardi, P., Bertello, A. and Venuti, F. (2019), "Online and on-site interactions within alternative food networks: sustainability impact of knowledge-sharing practices", *Sustainability*, Vol. 11 No. 5, p. 1457.

Del Giudice, M. and Maggioni, V. (2014), "Managerial practices and operative directions of knowledge management within inter-firm networks: a global view", *Journal of Knowledge Management*, Vol. 18 No. 5, pp. 841-846.

Del Giudice, M., Khan, Z., De Silva, M., Scuotto, V., Caputo, F. and Carayannis, E. (2017), "The microlevel actions undertaken by owner-managers in improving the sustainability practices of cultural and creative small and medium enterprises: a United Kingdom-Italy comparison", *Journal of Organizational Behavior*, Vol. 38 No. 9, pp. 1396-1414.

Dezi, L., Ferraris, A., Papa, A. and Vrontis, D. (2019), "The role of external embeddedness and knowledge management as antecedents of ambidexterity and performances in Italian SMEs", *IEEE Transactions on Engineering Management*. doi: 10.1109/TEM.2019.2916378.

Doni, F., Larsen, M., Bianchi Martini, S. and Corvino, A. (2019), "Exploring integrated reporting in the banking industry: the multiple capitals approach", *Journal of Intellectual Capital*, Vol. 20 No. 1, pp. 165-188.

Edvinsson, L. (2013), "IC 21: reflections from 21 yrs of IC practice and theory", *Journal of Intellectual Capital*, Vol. 14 No. 1, pp. 163-172.

Ferraris, A., Santoro, G. and Scuotto, V. (2018a), "Dual relational embeddedness and knowledge transfer in European multinational corporations and subsidiaries", *Journal of Knowledge Management*, Vol. 24 No. 3, pp. 519-533.

Ferreira, J., Mueller, J. and Papa, A. (2018b), "Strategic knowledge management: theory, practice and future challenges", *Journal of Knowledge Management*, Vol. 24 No. 2, pp. 121-126.

Franceschelli, M.V., Santoro, G. and Candelo, E. (2018), "Business model innovation for sustainability: a food start-up case study", *British Food Journal*, Vol. 120 No. 10, pp. 2483-2494.

Freeman, R.E. (1994), "The politics of stakeholder theory: some future directions", *Business Ethics Quarterly*, Vol. 4 No. 4, pp. 409-421.

Giacosa, E., Ferraris, A. and Bresciani, S. (2017), "Exploring voluntary external disclosure of intellectual capital in listed companies: an integrated intellectual capital disclosure conceptual model", *Journal of Intellectual Capital*, Vol. 18 No. 1, pp. 149-169.

Ginesti, G., Caldarelli, A. and Zampella, A. (2018), "Exploring the impact of intellectual capital on company reputation and performance", *Journal of Intellectual Capital*, Vol. 19 No. 5, pp. 915-934.

Gray, R., Kouhy, R. and Lavers, S. (1995), "Constructing a research database of social and environmental reporting by UK companies", *Accounting, Auditing and Accountability Journal*, Vol. 8 No. 2, pp. 78-101.

Grewatsch, S. and Kleindienst, I. (2017), "When does it pay to be good? Moderators and mediators in the corporate sustainability–corporate financial performance relationship: a critical review", *Journal of Business Ethics*, Vol. 145 No. 2, pp. 383-416.

Hair, J.F. (Ed.) (1995), *Multivariate Data Analysis with Readings*, 4th ed., Prentice Hall, Englewood Cliffs, NJ.

Hart, S.L. (1995), "A natural-resource-based view of the firm", *Academy of Management Review*, Vol. 20 No. 4, pp. 986-1014.

Hsu, L.C. and Wang, C.H. (2012), "Clarifying the effect of intellectual capital on performance: the mediating role of dynamic capability", *British Journal of Management*, Vol. 23 No. 2, pp. 179-205.

Huang, C. and Kung, F. (2011), "Environmental consciousness and intellectual capital management: evidence from Taiwan's manufacturing industry", *Management Decision*, Vol. 49 No. 9, pp. 1405-1425.

Iazzolino, G. and Laise, D. (2013), "Value added intellectual coefficient (VAIC): a methodological and critical review", *Journal of Intellectual Capital*, Vol. 14 No. 4, pp. 547-563.

Inigo, E.A. and Albareda, L. (2019), "Sustainability oriented innovation dynamics: levels of dynamic capabilities and their path-dependent and self-reinforcing logics", *Technological Forecasting and Social Change*, Vol. 139, pp. 334-351.

Jardon, C.M. and Dasilva, A. (2017), "Intellectual capital and environmental concern in subsistence small businesses", *Management of Environmental Quality: An International Journal*, Vol. 28 No. 2, pp. 214-230.

Jardon, C.M. and Susana Martos, M. (2012), "Intellectual capital as competitive advantage in emerging clusters in Latin America", *Journal of Intellectual Capital*, Vol. 13 No. 4, pp. 462-481.

Johnson, W.H.A. (1999), "An integrative taxonomy of intellectual capital: measuring the stock and flow of intellectual capital components in the firm", *International Journal of Technology Management*, Vol. 18 Nos 5-6-7-8, p. 562.

Jordão, R.V.D. and de Almeida, V.R. (2017), "Performance measurement, intellectual capital and financial sustainability", *Journal of Intellectual Capital*, Vol. 18 No. 3, pp. 643-666.

Kamukama, N., Ahiauzu, A. and Ntayi, J.M. (2011), "Competitive advantage: mediator of intellectual capital and performance", *Journal of Intellectual Capital*, Vol. 12 No. 1, pp. 152-164.

Kim, M. and Kim, Y. (2014), "Corporate social responsibility and shareholder value of restaurant firms", *International Journal of Hospitality Management*, Vol. 40, pp. 120-129.

Kim, Y., Park, M.S. and Wier, B. (2012), "Is earnings quality associated with corporate social responsibility?", *The Accounting Review*, Vol. 87 No. 3, pp. 761-796.

Kim, K.H., Kim, M. and Qian, C. (2018), "Effects of corporate social responsibility on corporate financial performance: a competitive-action perspective", *Journal of Management*, Vol. 44 No. 3, pp. 1097-1118.

Li, W.X., Chen, C.C.S. and French, J.J. (2012), "The relationship between liquidity, corporate governance, and firm valuation: evidence from Russia", *Emerging Markets Review*, Vol. 13 No. 4, pp. 465-477.

López-Gamero, M.D., Molina-Azorín, J.F. and Claver-Cortés, E. (2009), "The whole relationship between environmental variables and firm performance: competitive advantage and firm resources as mediator variables", *Journal of Environmental Management*, Vol. 90 No. 10, pp. 3110-3121.

Lopes, I.T. and Serrasqueiro, R.M. (2017), "Editorial for the special issue on linking theory and practice in intellectual capital", *Electronic Journal of Knowledge Management*, Vol. 15 No. 3, pp. 145-146.

Maloni, M.J. and Brown, M.E. (2006), "Corporate social responsibility in the supply chain: an application in the food industry", *Journal of Business Ethics*, Vol. 68 No. 1, pp. 35-52.

Margolis, J.D. and Walsh, J.P. (2003), "Misery loves companies: rethinking social initiatives by business", *Administrative Science Quarterly*, Vol. 48 No. 2, p. 268.

Margolis, J.D., Elfenbein, H.A. and Walsh, J.P. (2009), "Does it pay to be good . . . and does it matter? A meta-analysis of the relationship between corporate social and financial performance", *SSRN Electronic Journal*. doi: 10.2139/ssrn.1866371.

Martín-de Castro, G., Amores-Salvadó, J. and Navas-López, J.E. (2016), "Environmental management systems and firm performance: improving firm environmental policy through stakeholder engagement", *Corporate Social Responsibility and Environmental Management*, Vol. 23 No. 4, pp. 243-256.

Martín-de-Castro, G., Delgado-Verde, M., López-Sáez, P. and Navas-López, J.E. (2011), "Towards 'an intellectual capital-based view of the firm': origins and nature", *Journal of Business Ethics*, Vol. 98 No. 4, pp. 649-662.

Massaro, M., Dumay, J., Garlatti, A. and Dal Mas, F. (2018), "Practitioners' views on intellectual capital and sustainability: from a performance-based to a worth-based perspective", *Journal of Intellectual Capital*, Vol. 19 No. 2, pp. 367-386.

McWilliams, A. and Siegel, D.S. (2011), "Creating and capturing value: strategic corporate social responsibility, resource-based theory, and sustainable competitive advantage", *Journal of Management*, Vol. 37 No. 5, pp. 1480-1495.

Mehralian, G., Nazari, J.A. and Ghasemzadeh, P. (2018), "The effects of knowledge creation process on organizational performance using the BSC approach: the mediating role of intellectual capital", *Journal of Knowledge Management*, Vol. 22 No. 4, pp. 802-823.

Meso, P. and Smith, R. (2000), "A resource-based view of organizational knowledge management systems", *Journal of Knowledge Management*, Vol. 4 No. 3, pp. 224-234.

Mondal, A. and Ghosh, S.K. (2012), "Intellectual capital and financial performance of Indian banks", *Journal of Intellectual Capital*, Vol. 13 No. 4, pp. 515-530.

Nazari, J.A. and Herremans, I.M. (2007), "Extended VAIC model: measuring intellectual capital components", *Journal of Intellectual Capital*, Vol. 8 No. 4, pp. 595-609.

Nikolaou, I.E. (2019), "A framework to explicate the relationship between CSER and financial performance: an intellectual capital-based approach and knowledge-based view of firm", *Journal of the Knowledge Economy*, Vol. 10 No. 4, pp. 1427-1446.

Nirino, N., Miglietta, N. and Salvi, A. (2019), "The impact of corporate social responsibility on firms' financial performance, evidence from the food and beverage industry", *British Food Journal*, Vol. 122 No. 1, pp. 1-13.

Nollet, J., Filis, G. and Mitrokostas, E. (2016), "Corporate social responsibility and financial performance: a non-linear and disaggregated approach", *Economic Modelling*, Vol. 52, pp. 400-407.

Novas, J.C., Alvesdo, M.C.G. and Sousa, A. (2017), "The role of management accounting systems in the development of intellectual capital", *Journal of Intellectual Capital*, Vol. 18 No. 2, pp. 286-315.

Oliveira, L., Lima Rodrigues, L. and Craig, R. (2010), "Intellectual capital reporting in sustainability reports", *Journal of Intellectual Capital*, Vol. 11 No. 4, pp. 575-594.

Opler, T.C. and Titman, S. (1994), "Financial distress and corporate performance", *The Journal of Finance*, Vol. 49 No. 3, pp. 1015-1040.

Pedrini, M. (2007), "Human capital convergences in intellectual capital and sustainability reports", *Journal of Intellectual Capital*, Vol. 8 No. 2, pp. 346-366.

Petty, R. and Guthrie, J. (2000), "Intellectual capital literature review: measurement, reporting and management", *Journal of Intellectual Capital*, Vol. 1 No. 2, pp. 155-176.

Pulic, A. (2000), "VAIC - an accounting tool for IC management", *International Journal of Technology Management*, Vol. 20 Nos 5-8, pp. 702-714.

Pulic, A. (2004), "Intellectual capital - does it create or destroy value?", *Measuring Business Excellence*, Vol. 8 No. 1, pp. 62-68.

Ray, G., Barney, J.B. and Muhanna, W.A. (2004), "Capabilities, business processes, and competitive advantage: choosing the dependent variable in empirical tests of the resource-based view", *Strategic Management Journal*, Vol. 25 No. 1, pp. 23-37.

Rayner, J. and Morgan, D. (2018), "An empirical study of 'green' workplace behaviours: ability, motivation and opportunity", *Asia Pacific Journal of Human Resources*, Vol. 56 No. 1, pp. 56-78.

Ricceri, F. (2011), *Intellectual Capital and Knowledge Management: Strategic Management of Knowledge Resources*, Routledge, London.

Saeidi, S.P., Sofian, S., Saeidi, P., Saeidi, S.P. and Saaeidi, S.A. (2015), "How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction", *Journal of Business Research*, Vol. 68 No. 2, pp. 341-350.

Santoro, G., Bertoldi, B., Giachino, C. and Candelo, E. (2018), "Exploring the relationship between entrepreneurial resilience and success: the moderating role of stakeholders' engagement", *Journal of Business Research*. doi: 10.1016/j.jbusres.2018.11.052.

Santoro, G., Bresciani, S., Bertoldi, B. and Liu, Y. (2019a), "Cause-related marketing, brand loyalty and corporate social responsibility: a cross-country analysis of Italian and Japanese consumers", *International Marketing Review*. doi: 10.1108/IMR-11-2018-0310.

Santoro, G., Thrassou, A., Bresciani, S. and Giudice, M.D. (2019b), "Do knowledge management and dynamic capabilities affect ambidextrous entrepreneurial intensity and firms' performance?", *IEEE Transactions on Engineering Management*, pp. 1-9, doi: 10.1109/TEM.2019.2907874.

Scuotto, V., Alexeis, G.P., Cillo, V. and Giacosa, E. (2019), "Do stakeholder capabilities promote sustainable business innovation in small and medium-sized enterprises? Evidence from Italy", *Journal of Business Research*. doi: 10.1016/j.jbusres.2019.06.025.

Ståhle, P., Ståhle, S. and Aho, S. (2011), "Value added intellectual coefficient (VAIC): a critical analysis", *Journal of Intellectual Capital*, Vol. 12 No. 4, pp. 531-551.

Story, J. and Neves, P. (2015), "When corporate social responsibility (CSR) increases performance: exploring the role of intrinsic and extrinsic CSR attribution", *Business Ethics: A European Review*, Vol. 24 No. 2, pp. 111-124.

Surroca, J., Tribó, J.A. and Waddock, S. (2010), "Corporate responsibility and financial performance: the role of intangible resources", *Strategic Management Journal*, Vol. 31 No. 5, pp. 463-490.

Tobin, J. (1969), "A general equilibrium approach to monetary theory", *Journal of Money, Credit and Banking*, Vol. 1 No. 1, p. 15.

Torres, A.I., Ferraz, S.S. and Santos-Rodrigues, H. (2018), "The impact of knowledge management factors in organizational sustainable competitive advantage", *Journal of Intellectual Capital*, Vol. 19 No. 2, pp. 453-472.

Vázquez-Carrasco, R. and López-Pérez, M.E. (2013), "Small and medium-sized enterprises and corporate social responsibility: a systematic review of the literature", *Quality and Quantity*, Vol. 47 No. 6, pp. 3205-3218.

Waddock, S.A. and Graves, S.B. (1997), "The corporate social performance-financial performance link", *Strategic Management Journal*, Vol. 18 No. 4, pp. 303-311.

Wang, Z. and Sarkis, J. (2017), "Corporate social responsibility governance, outcomes, and financial performance", *Journal of Cleaner Production*, Vol. 162, pp. 1607-1616.

Yalama, A. and Coskun, M. (2007), "Intellectual capital performance of quoted banks on the Istanbul stock exchange market", *Journal of Intellectual Capital*, Vol. 8 No. 2, pp. 256-271.

Yarbrough, L., Morgan, N.A. and Vorhies, D.W. (2011), "The impact of product market strategy-organizational culture fit on business performance", *Journal of the Academy of Marketing Science*, Vol. 39 No. 4, pp. 555-573.

Yong, J.Y., Yusliza, M.Y., Ramayah, T. and Fawehinmi, O. (2019), "Nexus between green intellectual capital and green human resource management", *Journal of Cleaner Production*, Vol. 215, pp. 364-374.

Zaghini, A. (2014), "Bank bonds: size, systemic relevance and the sovereign", *International Finance*, Vol. 17 No. 2, pp. 161-184.

Zéghal, D. and Maaloul, A. (2010), "Analysing value added as an indicator of intellectual capital and its consequences on company performance", *Journal of Intellectual Capital*, Vol. 11 No. 1, pp. 39-60.

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