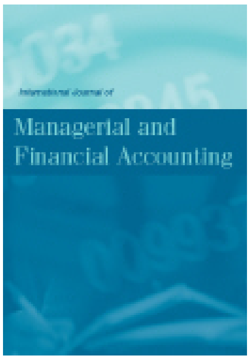

International Journal of Managerial and Financial Accounting

ISSN online: 1753-6723 - ISSN print: 1753-6715
https://www.inderscience.com/ijmfa

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DOI: 10.1504/IJMFA.2023.10047050

Article History:

Received:	25 September 2021
Accepted:	10 March 2022
Published online:	07 December 2022

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Abstract: This study explores the relationship between intellectual capital (IC) and future operating performance under the prism of different strategic orientations (i.e., prospectors versus defender) and explanations (i.e., investing versus signalling). Our data sample consists of 11,085 firm-year observations of US listed firms for the period 2000–2019. We employed organisational capital and R&D capital as measures of a firm's IC intensity. It seems that strategy affects the likelihood of a firm to be classified as a low or high IC intensive. Organisational capital improves future operating performance across firms with the same or with different strategic orientations. R&D capital affects primarily prospectors' future operating performance. Depending on the measure of IC intensity or operating performance, the positive relationship between IC and future operating performance can be explained because either the IC expenditures operate as investments that improve future performance or expectations for improved future operating performance trigger increased IC expenditures.

Keywords: strategy; intellectual capital; operating performance.

Reference to this paper should be made as follows: Naoum, V-C., Ntounis, D. and Vlismas, O. (2023) 'Strategy, intellectual capital and operating performance', *Int. J. Managerial and Financial Accounting*, Vol. 15, No. 1, pp.50–87.

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1 Introduction

This study analyses the relationship between intellectual capital (IC) and future operating performance under the prism of different strategic orientations and different explanations for the aforementioned relationship. Prior literature has documented a positive relationship between intangible assets and a firm's operating and market performance (e.g., Lev and Sougiannis, 1996; Bontis et al., 2000; Kamath, 2008; Lev et al., 2009; Pantzalis and Park, 2009; Eisfeldt and Papanikolaou, 2013; Francis et al., 2021). A plausible explanation for the positive relationship between operating performance and IC is that the latter is a valuable source of competitive advantage, which empowers firms to implement different strategic choices (Quinn, 1992; Cyert et al., 1993; Drucker, 1993; Nonaka, 1994; Nonaka and Takeuchi, 1995; Sveiby, 1997; Baklouti et al., 2010).

We examine to what extent different strategic orientations affect:

1 the likelihood of a firm to be classified as a high IC intensive

2 the relationship between IC and future operating performance.

We also explore whether the positive relationship between IC and future operating performance can be explained by the investing or the signalling hypothesis within groups of firms with similar or different strategic orientations (Lys et al., 2015). The investing explanation implies that IC expenditures are investments that improve future operating performance. However, the opposite direction of causality cannot be excluded; that is, increased future operating performance might trigger increased present IC expenditures.

We focus on the two extremes of Miles and Snow's (2003) strategic typology that is firms classified as either prospectors or defenders. Prospectors focus on the exploitation of new products and market opportunities, which allows them to exhibit robust economic growth. Aiming to shape a diverse product portfolio and to increase environmental uncertainty for the competition, prospectors finance R&D and marketing activities. In addition, a prospector tends to avoid long-term investments in a single technological process and implement a decentralised organisational structure with a low degree of mechanisation and routinisation. A defender aims to achieve incremental economic growth and to enhance its economic efficiency through market penetration and the production and distribution of closely related products and services. For a defender, finance, production, and engineering represent the critical business functions. To ensure economic efficiency, a centralised organisational structure is adopted, leading to routinisation and mechanisation associated with investment in a single core technology.

We conjecture that a prospector is more likely to exhibit higher IC intensity than a defender. The effective implementation of the strategic decision to operate in different markets and to support a diverse product portfolio requires enhanced innovation processes, marketing activities, extended organisational knowledge exchange, and generation of new ideas (Subramaniam and Youndt, 2005; Francis et al., 2021). On the other hand, defenders emphasise on achieving a minimum required short-term operating performance (Rajagopalan, 1997; Langfield-Smith, 2007). Thus, they are likely to focus on those intangible assets that enable them to achieve short-term operating efficiency, developing a less diverse portfolio of intangible assets than that of prospectors.

We also expect that high levels of IC are associated with improved future performance, regardless of a firm's strategic orientation. A firm's strategic orientation shapes the desired IC configuration. Once upon the desired IC configuration has been specified, the quantitative and qualitative characteristics of IC are the main determinants of its effects on operating performance. Prior research has documented that both prospectors and defenders perform equally well (Conant et al., 1990; Snow and Hrebiniak, 1980). It seems that strategy does not affect the positive relationship between IC and future operating performance, but instead, the ability of IC to serve as a strategic enabler and as a source of sustainable competitive advantage contributes on the economic effects of a specific strategic orientation.

Prior empirical evidence highlights the importance of the relationship of intellectual capital with future operating performance within the economic environment (Lev and Zarowin, 1998; Chan et al., 2001; Baklouti et al., 2010). Specifically, prior literature has adopted an investing explanation for the documented positive relationship between IC and future operating performance (Sougiannis, 1994; Lev and Sougiannis, 1996; Al-Horani et al., 2003; Eberhart et al., 2004; Hansson, 2004; Lajili and Zéghal, 2006; Eberhart et al., 2008; Pantzalis and Park, 2009; Baklouti et al., 2010; Ciftci and Cready, 2011; Ousama and Fatima, 2012; Wang et al., 2016). The investing explanation implies that IC expenditures are investments that improve future operating performance. However, the opposite direction of causality cannot be excluded; that is, increased future operating performance might trigger increased IC expenditures in the present. Optimism regarding future resource availability motivates managers to expand the level of expenditures, expecting that the increased level of current period's consumption, such as IC-related expenditures, will not undermine the organisational ability to maintain a minimum level of operating efficiency.

Our data sample consists of 11,085 firm-year observations of US listed firms for the period 2000–2019. We measure a firm's IC intensity using either organisational capital (Lev et al., 2009) or R&D capital (Lev and Sougiannis, 1996). Firms are classified as prospectors or defenders using the methodology proposed by Bentley et al. (2013). We employed two measures of operating performance: return on assets and cash flows from operations.

Our empirical results document that when organisational capital is employed as a measure of a firm's IC intensity, both prospectors and defenders are associated with increased likelihood to exhibit high IC intensity, but prospectors (defenders) are associated with decreased (increased) likelihood to exhibit low IC intensity. In the case of firms classified as high IC intensive according to R&D capital, prospectors are anchored with increased (decreased) likelihood to exhibit high (low) IC intensity and defenders are associated with decreased likelihood to exhibit high or low IC intensity.

In addition, it seems that the level of organisational capital is positively associated with future operating performance across firms with the same (i.e., prospectors or defenders) or with different (i.e., unrestricted data sample) strategic orientations. The level of R&D capital affects future operating performance in the case of prospectors. A plausible explanation is that R&D capital operates as a measure of a firm's IC intensity more efficiently in the case of prospectors. Further, it seems that in the case of the unrestricted data sample, increased levels of current IC-related expenditures improve future performance (investing explanation) and, at the same time, optimism regarding future resource availability motivates managers to expand current IC-related expenditures (signalling explanation). However, across firms with the same strategic orientation (i.e., prospectors or defenders), there is a variety of combinations concerning which type of explanation (investing and/or signalling) governs the relationship between different types of IC (organisational capital or R&D capital) and different measures of operating performance (return on assets or cash flows from operations).

Our study contributes to the literature in three dimensions. Firstly, we provide evidence that business strategy seems to affect the likelihood a firm to be classified as either high or low IC intensive. Further, our empirical findings indicate that IC is positively related with future operating performance, regardless of a firm's strategic orientation. Thirdly, the positive relationship between IC and future operating performance can be attributed to either value generating capabilities of IC (investing explanation) or optimistic managerial expectations regarding future operating performance (signalling explanation).

The managerial contribution of this study is that managers should consider the relationship between IC and strategy when they evaluate the economic efficiency of different IC and knowledge management practices. This will enable managers to establish a positive relationship between IC and future operating performance that relies on the value generating capabilities of IC, rather than on managerial optimism for future improved performance.

The reminder of the paper is organised as follows. Sections 2 and 3 present the literature review and the research hypotheses. Then, Section 4 presents the data selection process and the research methods. Finally, the empirical results and various robustness tests are presented. The last section consists of the discussion and conclusions of the study.

2 Literature review and hypothesis development

2.1 Intellectual capital

The term intellectual capital (IC) is subject to a plethora of definitions and its typology has been described with reference to several conceptual artefacts (Martín-de-Castro et al., 2011; Ousama and Fatima, 2012; Festa et al., 2021; Rossi et al., 2021). Though the diversity of proposed definitions (e.g., Brooking, 1996; Edvinsson and Malone, 1997; Subramaniam and Youndt, 2005), this study adopts the ontological proposition that a firm's IC refers to its organisational knowledge (i.e., incorporated within organisational structures, networks, human resources, etc.) and collective ability to translate such knowledge into action by leveraging organisational learning (Swart, 2006; Martín-de-Castro et al., 2011; Vlismas and Venieris, 2011).

Prior literature has developed various conceptual artifacts to analyse the IC ontology, such as human capital, structural capital, and customer or relational capital (Hsu and Fang, 2009; Lev et al., 2009; Baklouti et al., 2010; Martín-de-Castro et al., 2011; Chouaibi and Kouaib, 2015). Human capital refers to the explicit and tacit knowledge of people and their capabilities to create tangible and intangible assets (Edvinsson and Malone, 1997; Pantzalis and Park, 2009). This knowledge is derived through formal education, specific training, experience, and personal development (Wu et al., 2008). According to Alcouffee and Louzzani (2003) human capital is an important factor in determining a firm's performance.

Structural capital consists of non-human knowledge and information assets (Edvinsson and Malone, 1997; Ferreira and Martinez, 2011). It includes the technological systems and infrastructure for retaining, packaging, reinforcing, and transferring the knowledge that already exists in the organisation (Stewart, 1997; Cabrita and Bontis, 2008). Structural capital involves two major sub-categories: technological and organisational capital. Technological capital refers to the association between organisational knowledge and technical system operations, efficient production process, and future technological innovations, such as efforts in research and development, technological infrastructure, and intellectual and industrial property (Martín-de-Castro et al., 2011). Organisational capital represents unique structural and organisational designs and business processes, which creates a sustainable competitive advantage (Lev et al., 2009).

Relational capital represents the ability to absorb, exploit, and explore knowledge that exists in the business environment to create and sustain a position of competitive advantage (Bontis, 1998; Canibano et al., 2000; Martín-de-Castro et al., 2011). A firm's environmental relations can be analysed in terms of two dimensions: the first refers to the firm's relationships with its stakeholders (which include customers, suppliers, partners, competitors, and other business-related activities) and the second emphasises a firm's relationship with society in general (Swart, 2006).

2.2 Strategic management typologies

Strategy is an organisational process though which a firm shapes its long-term goals and determines the required course of action considering the entrepreneurial resource availability and the environmental conditions (Nag et al., 2007). Miles and Snow's (2003) strategic typology recognises four generic strategic orientations:

1. prospecting
2. defending
3. reacting
4. analysing.

The Miles and Snow's (2003) strategic typology is in accordance with other theoretical propositions (Bentley et al., 2013). For instance, prospectors (defenders) tend to present similar characteristics to Porter's (1980, 1985) product differentiation (cost leadership), and March's (1991) exploration (exploitation).

Prospectors focus on the exploitation of new products and market opportunities, which allows them to exhibit robust economic growth. Aiming to shape a diverse product portfolio and to increase environmental uncertainty for the competition, prospectors' budgets are primarily oriented toward R&D and marketing expenses. In addition, a prospector tends to avoid long-term investments in a single technological process, which increases the difficultness to exhibit economies of scales obtained by a narrow product portfolio. The coordination of a plethora of operations is manifested with a decentralised organisational structure with a low degree of mechanisation and routinisation. Prospecting firms rarely achieve maximum economic efficiency.

On the other hand, a defender aims to achieve incremental economic growth and enhance its economic efficiency through market penetration and the production and distribution of closely related products and services. Finance, production, and engineering represent the critical business functions of a firm classified as a defender. To ensure economic efficiency, a centralised organisational structure is adopted, leading to routinisation and mechanisation associated with an investment in a single core technology.

In this study, we will focus on firms classified as either prospectors or defenders; that is, firms with clear strategic orientation. The strategic position of a firm classified as an analyser combines characteristics of prospecting and defending business strategies. Finally, a reacting firm is characterised by a lack of clear strategic orientation; it adopts a passive strategic attitude by focusing on reacting to environmental challenges rather than influencing the competitive environment.

Focusing on the two extremes of Miles and Snow's strategic continuum enable us to implement effectively research designs that explore the effects of different strategic orientations on a variety of economic phenomena by managing the complexity of these phenomena and without undermining the research validity. Further, verified empirical evidence for firms with clear strategic orientation can be generalised in the case of an analyser since the latter has a strategic orientation that is a dynamic combination of a defender with a prospector. Unfortunately, the lack of coherent strategic orientation in the case of reacting firms rises methodological concerns as an appropriate research site. Finally prior empirical studies in the field of accounting (e.g., Bentley et al., 2013; Ballas and Demirakos, 2018; Ballas et al., 2020) focused only on firms classified as either prospectors or defenders.

2.3 Intellectual capital and strategy

IC is a critical source of competitive advantage within the context of contemporary knowledge economy, and it shapes a firm's ability to implement different strategic choices (Quinn, 1992; Cyert et al., 1993; Drucker, 1993; Nonaka, 1994; Nonaka and Takeuchi, 1995; Sveiby, 1997). Yet, there is limited large scale quantitative empirical evidence regarding the effects of different strategic orientations on a firm's IC intensity.

We conjecture that a firm classified as prospector is more likely to exhibit higher levels of IC intensity than a firm classified as defender. Prospectors aim to achieve and sustain competitiveness by emphasising the exploration and exploitation of new products and services, investing considerable resources on activities associated with marketing and R&D activities. Similarly, firms with a high level of IC are more social and human capital-oriented, which are mainly associated with enhanced innovation processes, organisational knowledge exchange, and generation of new ideas (Subramaniam and Youndt, 2005; Francis et al., 2021). Thus, prospectors are expected to exhibit a high level of IC because innovation procedures are mainly related to high levels of human and organisational capital (Pantzalis and Park, 2009; Lev et al., 2009). In addition, the exploitation of new products and market opportunities relies on marketing and advertising activities, which are related to the development and utilisation of relational (i.e., costumer oriented) capital (Van der Meer-Kooistra and Zijlstra, 2001; Ahearne et al., 2005; Fornell et al., 2006; Sussan, 2012; Bianchi Martini et al., 2016; Corvino et al., 2019).

Defenders emphasise maximisation of the efficiency of the production and distribution of goods and services within the context of a cost leadership strategy that minimises operating risk. That is, defenders emphasise achieving a minimum required short-term operating performance by utilising a single core technology and a highly centralised organisational structure (Rajagopalan, 1997; Langfield-Smith, 2007). They are likely to focus on those intangible assets that enable them to achieve short-term operating efficiency, narrowing their interests toward developing a less diverse portfolio of intangible assets than that of prospectors. As a result, ceteris paribus, a defender is expected to invest considerably less resources than a prospector in the development of IC thought advertising, marketing, and R&D activities.

Based on the above analysis, we explore empirically the following hypothesis:

H1 A firm classified as a prospector is likely to exhibit high IC intensity.

2.4 The effects of strategy on the relationship between IC and operating performance

We expect that the positive relationship between IC and operating performance is manifested regardless of a firm's strategic orientation. Prior literature has documented a positive relationship between intangible assets and a firm's operating and market performance (Lev and Sougiannis, 1996; Bontis et al., 2000; Kamath, 2008; Lev et al., 2009; Pantzalis and Park, 2009; Baklouti et al., 2010; Eisfeldt and Papanikolaou, 2013; Li et al., 2018; Francis et al., 2021). Within the context of the resource-based view of strategy (Powell, 2001), IC is expected to enhance a firm's operating performance because it is perceived as a strategic enabler (Cohen et al., 2014).

A firm's strategic orientation shapes the organisational requirements for the desired IC configuration that increases the likelihood of effective implementation of strategy. Once upon the desired IC configuration has been specified, the quantitative and qualitative characteristics of IC are the main determinants of its effects on future operating performance. In addition, a firm's IC is a significant contributor to its competitive advantage and the effects of a strategy on operating performance depend on the organisational ability to maintain a durable competitive advantage in the long term in various ways, such as by investing continuously in the development of intangible assets. To the extent that no firm can sustain a durable competitive advantage indefinitely, the average level of performance across the population of firms with different strategic orientations is mean reversed. Prior research has documented that both prospectors and defenders perform equally well (Conant et al., 1990; Snow and Hrebiniak, 1980). It seems that strategy does not affect the positive relationship between IC and future operating performance, but rather the ability of IC to serve as a strategic enabler and as a source of sustainable competitive advantage contributes to the operating efficiency of a strategy. Thus, firms with higher IC intensity are expected to exhibit superior future performance.

H2 A high IC intensive firm is expected to exhibit superior future operating performance than a low IC intensive firms, regardless of their strategic orientation.

2.5 Investing versus signalling explanation of the relationship between IC and operating performance

Most of the IC-related literature is anchored with an investing explanation of the documented positive relationship between IC and future performance (Sougiannis, 1994; Lev and Sougiannis, 1996; Al-Horani et al., 2003; Eberhart et al., 2004; Hansson, 2004; Lajili and Zéghal, 2006; Eberhart et al., 2008; Pantzalis and Park, 2009; Baklouti et al., 2010; Ciftci and Cready, 2011; Wang et al., 2016). The investing explanation implies that IC expenditures are investments that improve future operating performance. However, the opposite direction of causality cannot be excluded; that is, increased future operating performance might trigger increased IC expenditures in the present.

The positive relationship between IC and future operating performance might be explained by adopting a signalling explanation. Ceteris paribus, a firm that predicts to have more slack in operational resources in the future (i.e., due to increased operating performance) is more likely to undertake special projects in the present (Fazzari et al., 1988), such as IC development projects. Optimism regarding future resource availability motivates managers to expand the level of expenditures, expecting that the increased level of current period's consumption will not undermine the organisational ability to maintain a minimum level of operating efficiency. As a result, increased optimism regarding future resource availability will be reflected in decisions to increase current IC-related expenditures. In this case, the level of current IC expenditures conveys information regarding future operating performance.

There is no direct empirical evidence in favour of the signalling explanation of the positive relationship between IC and future operating performance. Similar empirical evidence has been provided within the context of the debate regarding the direction of causality between corporate social responsibility activities and future operating performance. For instance, Lys et al. (2015) provided evidence that corporate social responsibility expenditures do not improve future financial performance, but rather firms undertake corporate social responsibility expenditures in the current period when they anticipate stronger future financial performance.

In the absence of direct empirical explanation for the effects of managerial expectations of improved future operating performance on current IC expenditures, we will attempt to examine the empirical validity of the alternative (investing versus signalling) explanations for the positive relationship between IC and future operating performance by testing the following hypotheses:

H3a Current IC-related expenditure improves future operating performance (investing hypothesis).

H3b Expectations of improved future operating performance lead firms to increase current investments in IC (signalling hypothesis).

3 Methods

3.1 Measures of IC Intensity

Mouritsen (2006) recognised two central IC research streams: IC1 – ostensive and IC2 – performative. The IC1-ostensive research stream adopts a positivistic view for exploring the relationships between IC, strategy, and performance. As this, the IC1 – ostensive research stream focused on the development research instruments for measuring the level of a firm's IC to trace its impact on various economic phenomena, and to formulate generalised theories. The IC2 – performative research stream recognises that a firm's IC is idiosyncratically defined within firm's organisational context and environmental contingencies. For this reason, IC2 – performative research stream focuses on qualitative information and opposes any possibility of developing research instruments or variables for quantifying the level of a firm's IC.

This study is anchored within the IC1 – ostensive epistemological approach. The research motivation of this study is to explore the relation of IC with future operating performance under the prism of different strategic orientations (i.e., prospectors versus defender) and explanations (i.e., investing versus signalling). Adopting the IC1 – ostensive epistemological approach enable us to facilitate prior research experience concerning a variety of economic variables for measuring IC and tracing its implications on a firm's accounting figures. Prior literature has developed various financial statement analysis-based proxies for ranking firms according to their IC intensity (e.g., Lev and Sougiannis, 1996; Lev et al., 2009; Pantzalis and Park, 2009; Demerjian et al., 2012). These financial statement analysis-based proxies might not provide an accurate and universal solution to the valuation problem of IC (Venieris et al., 2015), but they can serve as reliable research instruments for classifying firms according to IC intensity, thereby facilitating quantitative research designs.

Another critical reason for employing financial statement analysis-based proxies for IC is that, despite the centrality of IC in the value creation process of contemporary organisations, there is an undeniable lack of information to the external economic agents (Bukh, 2003; Zambon and Guenther, 2011). In fact, firms provide information for IC to their external environment, mainly, on voluntary basis and this information is heterogenous with low degree of standardisation which does not facilitate the comparability between firms and the implementation of research designs with large samples of firms. Even within the context of performative theory, there is a diversity of proposed approaches for IC reporting such as:

1 integration of the available IC information with traditional financial reporting (Abeysekera, 2006; Bozzolan et al., 2003)

2 extra-financial disclosure using IC reports or statements (Mouritsen et al., 2001)

3 other documents of extra-financial disclosure (Oliveira et al., 2010).

We employed two measures of IC intensity: R&D capital and organisational capital. We focus on these dimensions of IC as they are incorporated within a firm's organisational structure and they are difficult to be transferred or copied by other organisations. These dimensions of IC are more representative of a firm's long-term commitment on the development of IC, and they are not affected substantially by transitory environmental or firm specific conditions. According to Lev et al. (2009) organisational capital provides firms with capabilities encompassed in business processes cannot be completely codified and transferred to other organisations or imitated by them. In a similar way, a firm maintains a relatively high level of control concerning R&D capital. On the contrary, literature does not consider human capital as an organisational 'property' (Castanias and Helfat, 2001; Coff and Kryscynski, 2011; Ganco et al., 2015) because employees can leave their employers at any time taking with them their valued human capital. Finally, to the best of authors knowledge, IC related literature has not exhibited financial statement analysis-based proxies as in this case of other dimensions of IC.

The R&D capital $(RDOC_{i,t}^{j})$ of firm *i* classified in *j* industry sector for fiscal year *t* is the level of annual R&D expenses capitalised and amortised over the last five years, which are then scaled by total assets (e.g., Lev and Sougiannis, 1996). In addition, we employed the operating value of organisation capital $(OC_{i,t}^{j})$ of firm *i* classified in *j* industry sector for fiscal year *t*, following a methodology proposed by Lev et al. (2009).

The economic value of $OC_{i,t}^{j}$ is the level of abnormal earnings $(AbEarn_{i,t}^{j})$ of firm *i* classified in *j* industry in year *t,* capitalised and amortised over a five-year period and then scaled by total assets. The level of abnormal earnings is the sum of abnormal sales and abnormal costs containments. The abnormal sales of firm *i* classified in *j* industry in year *t* $(AbREV_{i,t}^{j})$ is the difference between actual revenues and predicted revenues without firm-specific organisation capital. The predicted value of sales revenue is modelled as a function of physical capital $(PPENT_{i,t}^{j})$ and labour $(EMPL_{i,t}^{j})$.

$$SALES_{i,t}^{j} = a_{0,i,t}^{j} EMPL_{i,t}^{j\,a_{2,i,t}^{j}} PPENT_{i,t}^{j\,a_{3,i,t}^{j}} e_{i,t}^{j} \tag{1a}$$

The estimated values of the coefficients $a_{2,i,t}^{j}$ and $a_{3,i,t}^{j}$ of equation (1a) are derived by the estimation of the following regression model of equation (1b):

$$\begin{aligned}
&\log\left(SALES_{i,t}^{j} / SALES_{i,t-1}^{j}\right) \\
&\quad = a_{0,i,t}^{j} + a_{1,i,t}^{j} \log\left(SG\&A_AMOR_{i,t}^{j} / SGA_AMOR_{i,t-1}^{j}\right) \\
&\quad + a_{2,i,t}^{j} \log\left(EMPL_{i,t}^{j} / EMPL_{i,t-1}^{j}\right) \\
&\quad + a_{3,i,t}^{j} \log\left(PPENT_{i,t}^{j} / PPENT_{i,t-1}^{j}\right) + \log\left(e_{i,t}^{j} / e_{i,t-1}^{j}\right)
\end{aligned} \tag{1b}$$

where $SG\&A\_AMOR_{i,t}^{j}$ refers to the level of annual SG&A expenses capitalised and amortised over the previous three years of firm *i* classified in *j* industry in year *t*. The regression model of equation (1b) is estimated annually and across different sectors. The level of abnormal costs containments $(AbEX_{i,t}^{j})$ of firm *i* classified in *j* industry in year *t* is the difference between actual operating costs and the predicted operating costs according to the average efficiency without organisation capital. The level of predicted operating costs is computed similarly, with abnormal sales $(AbREV_{i,t}^{j})$ replacing the dependent variable in equation (1b), with operating costs $(EX_{i,t}^{j})$ of firm *i* classified in *j* industry in year *t*.

3.2 Strategy measure

We identify a firm's strategic orientation by adopting the STRATEGY variable proposed by Bentley et al. (2013) and broadly employed in the accounting and financial literature (Ballas and Demirakos, 2018; Ballas et al., 2020). The STRATEGY variable is a financial statement analysis-based research instrument which enables us to utilise a large data sample of firms and, as this, it is consistent with the overall methodological approach of this study, compared to other strategic typologies which have been mostly captured through surveys, questionnaires and interviews. Further, the STRATEGY variable relies on the theoretical grounds of Miles and Snow's (1978, 2003) strategy typology which is considered as seminal work in the strategy literature (Hambrick, 2003). Finally, the STRATEGY variable has a broader orientation, compared to other strategic typologies, as it considers how firms adapt to market and technological changes (Langfield-Smith, 2007; Ballas and Demirakos, 2018).

The STRATEGY variable is derived by sophisticated financial statement analysis based on the calculation of six different financial ratios for each firm-year, using a rolling average over the prior five years. The selected financial ratios depict the firm's ability to:

1 search for new products (ratio of R&D to sales)

2 produce and distribute products (ratio of number of employees to sales)

3 identify investment opportunities (one year percentage modifications in total sales)

4 exploit new products and services (ratio of SG&A to sales)

5 retain organisation stability (standard deviation of the total number of employees)

6 maintain high capital intensity (ratio of net PPE to total assets).

Each firm receives a score from 1 to 5 for each financial ratio, depending on the quintile of the distribution of the financial ratio to which it belongs (except capital intensity, which is a reversed score). The value of the STRATEGY variable ranges from 6 to 30. Following Bentley et al. (2013), in the current study, firms are classified as:

1 defenders (STRATEGY ranges from 6 to 12)

2 analysers (STRATEGY ranges from 13 to 23)

3 prospectors (STRATEGY ranges from 24 to 30).

3.3 Models

We examine the relationship between the level of IC and strategic orientation by estimating the following logit models:

$$IC\_IN_{i,t}^{j} = b_0 + b_1 PROSP_{i,t}^{j} + e_{i,t}^{j} \quad (2a)$$

$$IC\_IN_{i,t}^{j} = b_0 + b_1 DEFEND_{i,t}^{j} + e_{i,t}^{j} \quad (2b)$$

$$IC\_IN_{i,t}^{j} = b_0 + b_1 PROSP_{i,t}^{j} + c_1 ROA_{i,t}^{j} + c_2 MTB_{i,t}^{j} + c_3 FLV_{i,t}^{j} + c_4 SIZE_{i,t}^{j} + e_{i,t}^{j} \quad (2c)$$

$$IC\_IN_{i,t}^{j} = b_0 + b_1 DEFEND_{i,t}^{j} + c_1 ROA_{i,t}^{j} + c_2 MTB_{i,t}^{j} + c_3 FLV_{i,t}^{j} + c_4 SIZE_{i,t}^{j} + e_{i,t}^{j} \quad (2d)$$

$$IC\_IN_{i,t}^{j} = b_0 + c_1 ROA_{i,t}^{j} + c_2 MTB_{i,t}^{j} + c_3 FLV_{i,t}^{j} + c_4 SIZE_{i,t}^{j} + e_{i,t}^{j} \quad (2e)$$

where $IC\_IN_{i,t}^{j}$ is a binary variable receiving the value of 1 if the firm *i* classified in *j* industry in year *t* is characterised as high or low IC intensive, otherwise 0. The level of IC is measured employing either R&D capital or organisational capital (Lev and Sougiannis, 1996; Lev et al., 2009). Following Venieris et al. (2015), for each firm in our data sample, we obtain the median value of IC $(MIC\_IN_{i,t}^{j})$. A firm considered as high (low) IC intensive if classified within the highest (lowest) quantile of $MIC\_IN_{i,t}^{j}$ [1]. The variable $IC\_IN_{i,t}^{j}$ is equal to $HighOC_{i,t}^{j}$, $LowOC_{i,t}^{j}$, $LowRDOC_{i,t}^{j}$. or $LowRDOC_{i,t}^{j}$. The $HighOC_{i,t}^{j}$ $(LowOC_{i,t}^{j})$ is a binary variable receiving the value of 1 if the firm *i* classified in *j* industry in year *t* is a high (low) IC intensive; that is, the firm is classified within the highest (lowest) quantile of the median values of organisational capital across the population of the firms of our data sample. The variable $HighRDOC_{i,t}^{j}$ $(LowRDOC_{i,t}^{j})$ is a binary variable receiving the value of 1 if the firm *i* classified in *j* industry in year *t* is a high (low) IC intensive; that is, the firm is classified in the highest (lowest) quantile of the median values of R&D capital across the population of the firms of our data sample. In addition, the dummy variable $PROSP_{i,t}^{j}$ $(DEFEND_{i,t}^{j})$ equals to 1 if the firm classified as a prospector (defender) according to the STRATEGY variable, otherwise 0. The basic logit models of equations (2a) and (2b) are extended with the inclusion of various control variables to capture the effects of operating efficiency (return on assets – $ROA_{i,t}^{j}$), firm size (natural log of total assets – $SIZE_{i,t}^{j}$), growth dynamics (market to book ratio – $MTB_{i,t}^{j}$), and capital structure (financial leverage – $FLV_{i,t}^{j}$) on the likelihood a firm to invest resources on the development of IC and, thus, to be classified as IC intensive.

Within the context of empirical testing of H2, we encapsulate whether the intensity of IC is associated with future operating performance using the following specifications:

$$\Delta ROA_{i,t+1}^{j} = b_0 + b_1 IC\_IN_{i,t}^{j} + c_1 \Delta ROA_{i,t}^{j} + c_2 ROA_{i,t-1}^{j} + e_{i,t}^{j} \quad (3a)$$

$$\Delta CFOS_{i,t+1}^{j} = b_0 + b_1 IC\_IN_{i,t}^{j} + c_1 \Delta CFOS_{i,t}^{j} + c_2 CFOS_{i,t-1}^{j} + e_{i,t}^{j} \quad (3b)$$

Future operating performance is measured employing either the change in return on assets in year $t + 1$ ($\Delta ROA_{i,t+1}^{j}$) or the change in operating cash flow scaled by total assets in year $t + 1$ ($\Delta CFOS_{i,t+1}^{j}$). $ROA_{i,t}^{j}$ is the most used performance measure in the accounting literature, as it captures firms' long-term performance and the level of $CFOS_{i,t}^{j}$ detects earnings management initiatives (Dechow, 1994; Sloan, 1996; Lys et al., 2015). The regression models of equations (3a) and (3b) are estimated by setting as main independent variable the $IC\_IN_{i,t}^{j}$ equal to $HighOC_{i,t}^{j}$, $LowOC_{i,t}^{j}$, $HighRDOC_{i,t}^{j}$, or $LowRDOC_{i,t}^{j}$. Additional explanatory variables, such as lag or change in current performance measures ($ROA_{i,t-1}^{j}, CFOS_{i,t-1}^{j}, \Delta ROA_{i,t}^{j}, \Delta CFOS_{i,t}^{j}$), are included in equation (3) to control the average reversion of the dependent variable (Lys et al., 2015). In supplementary analysis, we estimate the regression models of equations (3a) and (3b) by replacing the independent variable $IC\_IN_{i,t}^{j}$ with either the variable $OC_{i,t}^{j}$ or the variable $RDOC_{i,t}^{j}$.

We adopt the approach proposed by Lys et al. (2015) to separate the investing from the signalling component of IC for each firm within our sample and to examine Hypotheses H3a and H3b. For this reason, we estimate the following regression model of equation (4).

$$\begin{aligned} IC_{i,t}^{j} = {} & b_0 + c_1 FLV_{i,t}^{j} + c_2 SIZE_{i,t}^{j} + c_3 MTB_{i,t}^{j} + c_4 CFO_{i,t}^{j} + c_5 CASH_{i,t}^{j} \\ & + PMR_{i,t-1}^{1} + e_{i,t}^{j} \end{aligned} \quad (4)$$

The regression model of equation (4) is estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009; Lys et al., 2015). Following prior literature (Lys et al., 2015), we include a number of control variables in the econometric specification of equation (4): the financial leverage ($FLV_{i,t}^{j}$) and the market to book ratio ($MTB_{i,t}^{j}$) as more growth-oriented firms with higher risk engage in more IC expenditures; the firm size ($SIZE_{i,t}^{j}$), as larger firms invest a considerable amount of resources in activities related to IC; the level of cash scaled by total assets ($CASH_{i,t}^{j}$), the level of cash flow from operation scaled by total assets ($CFOS_{i,t}^{j}$), and the return on assets to capture firm performance split into asset turnover ($ATO_{i,t}^{j}$) and profit margin ratio ($PMR_{i,t}^{j}$), as external demand give rise to IC expenditures (Lev and Sougiannis, 1996; Pantzalis and Park, 2009).

Separating the optimal and the residual level of IC activities, we examine validity of the investing and signalling explanations for the positive association between IC and future operating performance, using the following models:

$$\Delta ROA^{j}_{i,t+1} = b_0 + b_1 OPTIMAL^{j}_{i,t} + b_2 RESIDUAL^{j}_{i,t} + c_1 \Delta ROA^{j}_{i,t-1} + c_2 ROA^{j}_{i,t-1} + c_3 DDPS^{j}_{i,t-1} + e^{j}_{i,t} \quad (5a)$$

$$\Delta CFOS^{j}_{i,t+1} = b_0 + b_1 OPTIMAL^{j}_{i,t} + b_2 RESIDUAL^{j}_{i,t} + c_1 \Delta CFOS^{j}_{i,t} + c_2 CFOS^{j}_{i,t-1} + c_3 DDPS^{j}_{i,t-1} + e^{j}_{i,t} \quad (5b)$$

Besides the lag or change in current performance measures implemented in equations (3a) and (3b), we include in equations (5a) and (5b) the annual change in dividend per share $(DDPS^{j}_{i,t})$ (Lys et al., 2015). According to the investment hypothesis, future operating performance is positively associated with an optimal level of IC activities ($b_1 > 0$) as compared to the signalling hypothesis in which future operating performance is positively associated with the deviation level of IC activities ($b_2 > 0$).

3.4 Data selection, descriptive statistics and means difference analysis

Our initial data sample consists of 251,680 firm-year observations of US-listed firms (2000–2019) obtained from the Thomson Reuters Datastream database. To remove comparability problems, we exclude financial firms (SIC codes 6000–6999). Consistent with Bentley et al. (2013), we discard inconsistent observations (i.e., negative assets and sales, missing historical SIC codes, etc.). Consistent with the proposed methodology for the calculation of the operating value of organisational capital (Lev et al., 2009), we discard firms with sales and total assets lower than \$5 million (Lev et al., 2009; Venieris et al., 2015). The final data sample after the calculation of organisational capital is 11,085 firm-year observations. The calculation of R&D capital and STRATEGY causes further reduction of our data sample. The data selection process and the descriptive statistics are outlined in Table 1 (Panel A, B).

Table 1 Selection of data sample, descriptive statistics and mean differences tests

Panel A: Data selection process		
	Obs. eliminated	*Obs. remaining*
Initial valid Thomson Reuters firm-year observations between 2000 and 2019 (Financial Industries with SIC codes 6000-99 removed)	-	251,680
Elimination of firms with missing historical SIC codes	87,060	164,620
Elimination of firms with sales and total assets lower than \$5 million	57,609	107,011
Final data sample after the calculation of the organisational capital	95,916	11,085

Table 1 Selection of data sample, descriptive statistics and mean differences tests (continued)

Panel B: Descriptive statistics						
	Num. of obs.	*Mean*	*Median*	*St. dev.*	*Min*	*Max*
STRATEGY	5,763	17.987	18	3.768	7	30
$RD^j_{i,t}$	6,058	693,313.05	118,405.5	1,818,526	0	3.593e+07
$OC^j_{i,t}$	11,085	0.21	0.177	0.179	–2.112	2.687
$RDOC^j_{i,t}$	11,085	0.036	0.000	0.087	0	3.028
$FLJ^j_{i,t}$	11,085	0.323	0.309	0.198	0	2.56
$ROA^j_{i,t}$	11,085	5.667	5.420	9.469	–301.85	157.560
$ATO^j_{i,t}$	11,085	1.017	0.674	1.173	0	32.304
$MTB^j_{i,t}$	11,085	1.392	1.072	1.078	–0.516	15.237
$GrPr^j_{i,t}$	11,085	0.306	0.244	0.206	–0.510	1.513
$SG\&AR^j_{i,t}$	11,085	0.564	0.187	11.867	0	1,056.192
$CFOR^j_{i,t}$	11,710	–0.093	0.125	9.373	–732.452	11.896
$RDR^j_{i,t}$	6,058	0.446	0.019	12.106	0	859.630

Panel C: Two sample t-tests for mean difference between prospectors and defenders			
	Defenders	*Prospectors*	*p-value*
$OC^j_{i,t}$	0.251	0.259	0.599
$MOC^j_{i,t}$	0.205	0.227	0.000
$RDOC^j_{i,t}$	0.026	0.106	0.000
$MRDOC^j_{i,t}$	0.025	0.062	0.000
$FLV^j_{i,t}$	0.375	0.244	0.000
$ROA^j_{i,t}$	5.433	7.491	0.000
$ATO^j_{i,t}$	1.203	0.817	0.000
$MTB^j_{i,t}$	1.211	1.897	0.000
$GrPr^j_{i,t}$	0.258	0.380	0.000
$SG\&AR^j_{i,t}$	0.098	0.324	0.000
$CFOR^j_{i,t}$	0.126	0.187	0.000
$RDR^j_{i,t}$	0.012	0.086	0.000

We perform two-sample t-tests to assess the difference in means of various financial indicators between firms classified either as prospectors or defenders (Table 1 – panel C). The mean values of both asset turnover and financial leverage are higher for firms classified as defenders than for firms classified as prospectors, which is broadly comparable to the results presented by Bentley et al. (2013). This empirical evidence verifies the theoretical proposition that defenders, compared to prospectors, focus on achieving increased levels of operating efficiency leading, at the same time, to lower needs for financing. The mean values of the SG&A expenses and R&D expenses scaled by sales revenue $(SG\&AR_{i,t}^{j}; RDR_{i,t}^{j})$ are higher for firms classified as prospectors. This verifies the theoretical prediction that prospectors attempt to maintain their industry leadership via product innovation and marketing activities. Furthermore, prospectors seem to be more growth oriented, exhibiting a higher mean market-to-book value than that of defenders.

4 Analysis of the results

4.1 Intangibles resources and strategic profile

Table 2 exhibits the estimation results of the basic logit models of equations (2a) and (2b). In the case of firms classified as high IC intensive according to their median value of organisational capital, both prospectors and defenders are associated with increased likelihood to exhibit high IC intensity. However, the fact that a firm is classified as prospector decreases the likelihood to exhibit low IC intensity, whereas if a firm is classified as defender increases the likelihood to exhibit low IC intensity. In the case of firms classified as high IC intensive according to their median value of R&D capital, prospectors are anchored with increased (decreased) likelihood to exhibit high (low) IC intensity. Defenders demonstrate decreased likelihood to exhibit high or low IC intensity.

Similar empirical evidence for the effects of strategy on the likelihood a firm to be classified as a low or a high IC intensive is provided by the estimation results of the extended models of equations (2c) and (2d), which include other significant contributing factors to the likelihood a firm to be classified as IC intensive. That is, the empirical findings provide strong support to the first hypothesis. In addition, the estimated values of the coefficients indicate that higher levels of operating efficiency (return on assets – $ROA_{i,t}^{j}$), firm size (the natural log of total assets – $SIZE_{i,t}^{j}$), and growth dynamics (market to book ratio – $MTB_{i,t}^{j}$) increase the likelihood a firm to be classified as a high IC intensive. The estimated values of the coefficients on the control variables hold the same direction, even if the dummy variable of strategy is not included.

The mean difference tests between prospectors and defenders (Table 1) indicate that prospectors exhibit significantly higher mean values than defenders of median organisational capital, R&D capital, and median R&D capital. Thus, a prospector is likely to be classified as a high IC intensive firm and tends to exhibit higher IC intensity than a defender.

Table 2 Intellectual capital intensity and strategic orientation (logit models)

Panel A: Organisation capital intensity and strategic orientation										
	Coefficient estimates (z-stat)									
	$HighOC^j_{i,t}$					$LowOC^j_{i,t}$				
	Basic 1	*Basic 2*	*Ext 1*	*Ext 2*	*Ext 3*	*Basic 1*	*Basic 2*	*Ext 1*	*Ext 2*	*Ext 3*
b_0: constant	-1.258^{c}	-1.223^{c}	-4.410^{c}	-4.985^{c}	-4.599^{c}	-1.486^{c}	-1.560^{c}	-4.806^{c}	-4.713^{c}	-4.645^{c}
	(−38.22)	(−37.44)	(−8.67)	(−9.62)	(−9.05)	(−42.19)	(−43.17)	(−7.91)	(−7.83)	(−7.72)
b_1: $PROSP^j_{i,t}$	0.759^{c}		0.632^{c}			-1.005^{c}		-0.741^{c}		
	(7.05)		(5.54)			(−5.28)		(−3.68)		
b_1: $DEFEND^j_{i,t}$		0.344^{c}		0.598^{c}			0.284^{b}		0.103	
		(3.09)		(4.84)			(2.31)		(0.75)	
c_1: $ROA^j_{i,t}$			0.0193^{c}	0.0177^{c}	0.0179^{c}			-0.00884^{b}	-0.00858^{b}	-0.00851^{b}
			(3.54)	(3.33)	(3.35)			(−1.98)	(−1.97)	(−1.97)
c_2: $MTB^j_{i,t}$			0.350^{c}	0.381^{c}	0.368^{c}			-0.460^{c}	-0.479^{c}	-0.481^{c}
			(8.92)	(9.46)	(9.23)			(−6.13)	(−6.38)	(−6.44)
c_3: $FLV^j_{i,t}$			1.101^{c}	0.922^{c}	1.013^{c}			2.813^{c}	2.862^{c}	2.876^{c}
			(5.44)	(4.57)	(5.05)			(13.06)	(13.29)	(13.43)
c_4: $SIZE^j_{i,t}$			0.128^{c}	0.164^{b}	0.143^{c}			0.183^{c}	0.175^{c}	0.171^{c}
			(4.24)	(5.38)	(4.76)			(5.12)	(4.95)	(4.84)
Number of obs.	5,763	5,763	5,175	5,175	5,175	5,763	5,763	5,175	5,175	5,175
Pseudo R-squared	0.00745	0.00146	0.0530	0.0517	0.0479	0.00674	0.000952	0.0781	0.0748	0.0747

Notes: This table illustrates the estimation results of the following logit models: basic 1: $IC\_IN^j_{i,t} = b_0 + b_1 PROSP^j_{i,t} + e^j_{i,t}$, basic 2: $IC\_IN^j_{i,t} = b_0 + b_1 DEFEND^j_{i,t} + e^j_{i,t}$, ext 1: $IC\_IN^j_{i,t} = b_0 + b_1 PROSP^j_{i,t} + c_1 ROA^j_{i,t} + c_2 MTB^j_{i,t} + c_4 SIZE^j_{i,t} + e^j_{i,t}$, ext 2: $IC\_IN^j_{i,t} = b_0 + b_1 DEFEND^j_{i,t} + c_1 ROA^j_{i,t} + c_2 MTB^j_{i,t} + c_3 FLV^j_{i,t} + c_4 SIZE^j_{i,t} + e^j_{i,t}$, ext 3: $IC\_IN^j_{i,t} = b_0 + b_1 DEFEND^j_{i,t} + c_1 ROA^j_{i,t} + c_2 MTB^j_{i,t} + c_3 FLV^j_{i,t} + c_4 SIZE^j_{i,t} + e^j_{i,t}$. The dependent variable $IC\_IN^j_{i,t}$ equals to $HighOC^j_{i,t}$, $HighRDOC^j_{i,t}$, $LowOC^j_{i,t}$ or $LowRDOC^j_{i,t}$. The models are estimated by using firm-clustered standard errors to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. ^{a,b,c} indicate 10%, 5% and 1% levels of significance, respectively.

Table 2 Intellectual capital intensity and strategic orientation (logit models) (continued)

Panel B: R&D Capital intensity and strategic orientation										
	Coefficient estimates (z-stat)									
	$HighRDOC^j_{i,t}$					$LowRDOC^j_{i,t}$				
	Basic 1	*Basic 2*	*Ext 1*	*Ext 2*	*Ext 3*	*Basic 1*	*Basic 2*	*Ext 1*	*Ext 2*	*Ext 3*
b_0: constant	–2.434^c	–2.170^c	–9.630^c	–9.429^c	–9.897^c	–0.551^c	–0.592^c	1.351^c	1.652^c	1.490^c
	(–48.50)	(–48.08)	(–13.67)	(–13.64)	(–14.33)	(–19.43)	(–20.71)	(2.64)	(3.19)	(2.91)
b_1: $PROSP^j_{i,t}$	1.533^c		1.306^c			–0.632^c		–0.457^c		
	(12.72)		(9.76)			(–5.23)		(–3.63)		
b_1: $DEFEND^j_{i,t}$		–3.187^c		–2.468^c			0.0129		–0.273^b	
		(–4.49)		(–3.45)			(0.12)		(–2.34)	
c_1: $ROA^j_{i,t}$			0.00249	0.000706	0.000121			0.00155	0.0212	0.00198
			(0.36)	(0.12)	(0.02)			(0.47)	(0.63)	(0.59)
c_2: $MTB^j_{i,t}$			0.475^c	0.485^c	0.499^c			–0.200^c	–0.219^c	–0.213^c
			(10.83)	(11.05)	(11.35)			(–5.67)	(–6.12)	(–6.00)
c_3: $FLV^j_{i,t}$			–0.436^b	–0.524^b	–0.653^c			0.582^c	0.665^c	0.625^c
			(–1.99)	(–2.40)	(–3.04)			(3.59)	(4.09)	(3.86)
c_4: $SIZE^j_{i,t}$			0.386^c	0.389^c	0.415^c			–0.110^c	–0.129^c	–0.120^c
			(9.52)	(9.72)	(10.41)			(3.55)	(–4.13)	(–3.88)
Number of obs.	5,763	5,763	5,175	5,175	5,175	5,763	5,763	5,175	5,175	5,175
Pseudo R-squared	0.0372	0.0199	0.115	0.0971	0.0877	0.00399	2.01^c–06	0.0146	0.0133	0.0125

Notes: This table illustrates the estimation results of the following logit models: basic 1: $IC\_IN^j_{i,t} = b_0 + b_1 PROSP^j_{i,t} + e^j_{i,t}$, basic 2: $IC\_IN^j_{i,t} = b_0 + b_1 DEFEND^j_{i,t} + e^j_{i,t}$, ext 1: $IC\_IN^j_{i,t} = b_0 + b_1 PROSP^j_{i,t} + c_1 ROA^j_{i,t} + c_2 MTB^j_{i,t} + c_4 SIZE^j_{i,t} + e^j_{i,t}$, ext 2: $IC\_IN^j_{i,t} = b_0 + b_1 DEFEND^j_{i,t} + c_1 ROA^j_{i,t} + c_2 MTB^j_{i,t} + c_3 FLV^j_{i,t} + c_4 SIZE^j_{i,t} + e^j_{i,t}$, ext 3: $IC\_IN^j_{i,t} = b_0 + b_1 DEFEND^j_{i,t} + c_1 ROA^j_{i,t} + c_2 MTB^j_{i,t} + c_3 FLV^j_{i,t} + c_4 SIZE^j_{i,t} + e^j_{i,t}$. The dependent variable $IC\_IN^j_{i,t}$ equals to $HighOC^j_{i,t}$, $HighRDOC^j_{i,t}$, $LowOC^j_{i,t}$ or $LowRDOC^j_{i,t}$. The models are estimated by using firm-clustered standard errors to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

Table 3 Subsequent operating performance and intellectual capital intensity

	Coefficient estimates (t-stat)							
	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$
b_0: constant	2.979[c]	0.0208[c]	3.648[c]	0.0234[c]	3.086[c]	0.0209[c]	3.801[c]	0.0224[c]
	(12.29)	(15.02)	(11.84)	(14.07)	(12.27)	(15.05)	(11.57)	(13.40)
b_1: $HighOC^j_{i,t}$	1.581[c]	0.00161						
	(5.08)	(1.15)						
b_1: $LowOC^j_{i,t}$			–1.159[c]	–0.00452[c]				
			(–5.81)	(–4.36)				
b_1: $HighRDOC^j_{i,t}$					1.772[c]	0.00297		
					(3.57)	(1.22)		
b_1: $LowRDOC^j_{i,t}$							–1.038[c]	–0.00218[b]
							(–4.95)	(–2.08)
c_1: $\Delta ROA^j_{i,t}$	–0.719[c]		–0.719[c]		–0.716[c]		–0.717[c]	
	(–16.18)		(–16.17)		(–16.15)		(–16.19)	
c_2: $ROA^j_{i,t-1}$	–0.543[c]		–0.542[c]		–0.535[c]		–0.537[c]	
	(–11.84)		(–11.88)		(–11.76)		(–11.83)	
c_1: $\Delta CFOS^j_{i,t}$		–0.476[c]		–0.479[c]		–0.476[c]		–0.476[c]
		(–14.56)		(–14.65)		(–14.57)		(–14.59)
c_2: $CFOS^j_{i,t-1}$		–0.217[c]		–0.225[c]		–0.218[c]		–0.218[c]
		(–14.36)		(–14.43)		(–14.30)		(–14.43)
Number of obs.	8,680	8,802	8,680	8,802	8,680	8,802	8,680	8,802
R-squared	0.352	0.214	0.352	0.216	0.351	0.214	0.352	0.214

Notes: This table presents the results of the regression analysis of the following models: $\Delta ROA^j_{i,t+1} = b_0 + b_1 IC\_IN^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t-1} + e^j_{i,t}$ and $\Delta CFOS^j_{i,t+1} = b_0 + b_1 IC\_IN^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + e^j_{i,t}$. The independent variable $IC\_IN^j_{i,t}$ equals to $HighOC^j_{i,t}$, $HighRDOC^j_{i,t}$, $LowOC^j_{i,t}$ or $LowRDOC^j_{i,t}$. The models are estimated by using firm-clustered standard errors to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

Table 4 Future financial performance and intellectual capital

Panel A: Subsequent operating performance and organisation capital						
	Coefficient estimates (t-stat)					
	Full sample	*Prospectors*	*Defenders*	*Full sample*	*Prospectors*	*Defenders*
	$\Delta ROA^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$
b_0: constant	0.993[c]	0.963	1.179[b]	0.0207[c]	0.0289[c]	0.0312[c]
	(5.54)	(1.47)	(2.00)	(15.81)	(6.11)	(3.90)
b_1: $OC^j_{i,t}$	15.84[c]	15.11[c]	11.86[c]	0.0614[c]	0.0353[a]	0.0960[c]
	(10.35)	(4.29)	(5.27)	(8.66)	(1.79)	(3.67)
c_1: $\Delta ROA^j_{i,t}$	–0.855[c]	–0.683[c]	–0.797[c]			
	(–17.44)	(–9.31)	(–10.21)			
c_2: $ROA^j_{i,t}$	–0.793[c]	–0.639[c]	–0.714[c]			
	(–14.35)	(–7.77)	(–7.23)			
c_1: $\Delta CFOS^j_{i,t}$				–0.551[c]	–0.468[c]	–0.889[c]
				(–15.60)	(–8.50)	(–6.37)
c_2: $CFOS^j_{i,t-1}$				–0.361[c]	–0.318[c]	–0.589[c]
				(–14.57)	(–6.09)	(–4.78)
Number of obs.	8,680	365	325	8,802	368	325
R-squared	0.425	0.296	0.477	0.249	0.259	0.640

Notes: This table presents the results of the regression analysis stem from the following models: $\Delta ROA^j_{i,t+1} = b_0 + b_1 IC^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t-1} + e^j_{i,t}$ and $\Delta CFOS^j_{i,t+1} = b_0 + b_1 IC^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + e^j_{i,t}$. The independent variable $IC^j_{i,t}$ represented by $OC^j_{i,t}$ or $RDOC^j_{i,t-1}$. The models are estimated for a full sample and for firms classified as either prospectors or defenders. The models are estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

Table 4 Future financial performance and intellectual capital (continued)

Panel B: Subsequent operating performance and R&D capital						
	Coefficient estimates (t-stat)					
	Full sample	*Prospectors*	*Defenders*	*Full sample*	*Prospectors*	*Defenders*
	$\Delta ROA^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta CFOS^j_{i,t-1}$	$\Delta CFOS^j_{i,t+1}$
b_0: constant	2.916[c]	2.127[c]	2.407[c]	0.0216[c]	0.0290[c]	0.0291[b]
	(10.87)	(3.36)	(3.07)	(14.76)	(6.32)	(2.60)
b_1: $OC^j_{i,t}$	9.707[c]	9.616[a]	–2.300	0.0451[c]	0.00540	0.0390
	(3.39)	(1.98)	(–0.37)	(3.15)	(0.20)	(0.65)
c_1: $\Delta ROA^j_{i,t}$	–0.739[c]	–0.543[c]	–0.620[c]			
	(–16.82)	(–5.82)	(–7.84)			
c_2: $ROA^j_{i,t}$	–0.554[c]	–0.397[c]	–0.390[c]			
	(–11.96)	(–7.21)	(–3.44)			
c_1: $\Delta CFOS^j_{i,t}$				–0.489[c]	–0.427[c]	–0.808[c]
				(–14.88)	(–8.10)	(–5.15)
c_2: $CFOS^j_{i,t-1}$				–0.241[c]	–0.245[c]	–0.336[c]
				(–14.91)	(–5.37)	(–3.03)
Number of obs.	8,680	365	325	8,802	368	325
R-squared	0.379	0.261	0.413	0.228	0.251	0.595

Notes: This table presents the results of the regression analysis stem from the following models: $\Delta ROA^j_{i,t+1} = b_0 + b_1 IC^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t-1} + e^j_{i,t}$ and $\Delta CFOS^j_{i,t+1} = b_0 + b_1 IC^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + e^j_{i,t}$. The independent variable $IC^j_{i,t}$ represented by $OC^j_{i,t}$ or $RDOC^j_{i,t-1}$. The models are estimated for a full sample and for firms classified as either prospectors or defenders. The models are estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

4.2 Intellectual capital and future operating performance

Table 3 exhibits the estimation results of the regression models of equations (3a) and (3b). The regression models are estimated using year and industry fixed effects and clustering by firm standard errors for autocorrelation and heteroscedasticity (Petersen, 2009). It seems that firms classified as high IC intensive (based on the median value of organisation capital and R&D capital) exhibit increased future return on assets and firms classified as low IC intensive exhibit decreased future return on assets and cash flows from operations. Finally, lags or changes in current performance measures are negatively associated with the dependent variable due to mean reversion in return on assets and in cash flows from operation, consistent with Lys et al. (2015).

To examine the relationship between IC and future operating performance among firms with different or the same strategic orientation, we estimate the regression models of equations (3a) and (3b) for the full sample of firms and the data sample that includes firm-year observations for firms pursuing either a prospecting or a defending strategy. In addition, we replaced the independent variable $IC\_IN_{i,t}^{j}$ with either $OC_{i,t}^{j}$ or $RDOC_{i,t}^{j}$. The estimated value of the coefficient b1 of the variable $OC_{i,t}^{j}$ (Table 4 – panel A) is positive and significant indicating that there is a positive relationship between the level of organisational capital and future return on assets or future cash flows from operations. In addition, it seems that the positive effects of organisational capital on future performance is manifested across firms with different or the same strategic orientation.

The empirical evidence reported in Panel B of Table 4 indicates that R&D capital improves both future return on assets and future cash flows from operations in the case of the full sample. Among firms classified as prospectors, R&D capital improves only future return on assets. In all other cases, the estimated value of coefficient b_1 is not significantly different from zero. A possible explanation is that R&D capital is a more specific measure of the intensity of IC that focuses on industrial innovation than organisational capital. The level of industrial innovation is a critical organisational activity for the development of prospectors' core competence. This is an indirect evidence that why IC is a strategic enabler. The positive relationship between organisational capital and future operating performance indicates that both prospectors and defenders utilise IC to create future economic value. However, specific forms of IC, such as the R&D capital, are more suitable for firms with a specific strategic orientation. Based on the above analysis, the second hypothesis is not rejected.

4.3 Investing and signalling IC activities and future operating performance

In this section, we analyse the relationship between operating performance and investing and the signalling component of IC. Following Lys et al. (2015), we define the fitted values of the regression model of equation (4) as the investing $(OPTIMAL_{i,t}^{j})$ level of organisational capital or R&D capital. In addition, we define the residual values of the regression model of equation (4) as the signalling $(RESIDUAL_{i,t}^{j})$ component of organisational capital or R&D capital. Tables 5 and 6 (panel A) exhibit the estimation results of the regression model of equation (4) for the full sample of firms and the data sample that includes firm-year observations for firms pursuing either a prospecting or a defending strategy. The estimated models of Tables 5 and 6 exhibit high explanatory power, consistent with prior literature (Lys et al., 2015).

Tables 5 and 6 (panel B) exhibit the estimation results of the regression models of equations (5a) and (5b). When organisational capital is employed as a financial proxy for IC intensity (Table 5 – panel B), we find that in the case of unrestricted data sample, both the optimal and the residual level of IC activities are positively associated with future operating performance, represented by either future change in return on assets or in cash flows from operations ($b_1 > 0$; $b_2 > 0$). Thus, in the case of unrestricted sample, both the investing and the signalling explanation of the positive relationship between IC and operating performance hold. An increased level of current IC-related expenditures improves future performance and, at the same time, optimism for future resource availability motivates managers to expand current IC-related expenditures, expecting that there is no or limited effects on the organisational ability to maintain a minimum level of operating efficiency. Among firms classified as prospectors, the optimal level of IC expenditures is uncorrelated with future change in cash flows from operations, which implies that the signalling hypothesis dominate ($b_1 = 0$; $b_2 > 0$). Finally, defenders present an insignificant relationship between the residual component of IC and future change in return on assets, consistent with the investment hypothesis (b1>0; b2=0).

When R&D capital is employed as a financial proxy for the IC intensity (Table 6 – panel B), in the case of unrestricted data sample, both the optimal and the residual level of R&D activities are positively associated with future change in cash flows from operations, consistent with both the investing and signalling hypotheses. However, the residual component of R&D capital is uncorrelated with future change in return on assets, consistent with the investment hypothesis ($b_1 > 0$; $b_2 = 0$). Among firms classified as prospectors, only the residual component of R&D capital is negatively correlated with change in future change in cash flows from operations. Thus, high levels of R&D expenditures in the present provide signals for reduced cash flows from operations in the future but have no effect on future change in return on assets. A possible explanation is that variations in the level of R&D expenditures do not cause significant differences in operating performance among firms classified as prospectors. If a prospector competes with firms with the same strategic orientation, the focus may be not only on intensity, but also on the qualitative characteristics of R&D activities, which are critical for the development of competitive advantage. On the other hand, in the case of a defender that competes with firms with the same strategic orientation, achieving a minimum return on investment on R&D activities enables the defender to differentiate strategically and to increase future operating performance.

Table 5 Future financial performance and organisation capital (signalling and investing hypothesis)

Panel A: Environmental and firm-specific determinants of organisation capital			
	Coefficient estimates (t-stat)		
	Full sample	*Prospectors*	*Defenders*
	$OC_{i,t}^{j}$	$OC_{i,t}^{j}$	$OC_{i,t}^{j}$
b_0: constant	–0.335[c]	–0.270	–0.248
	(–5.28)	(–1.32)	(–0.70)
c_1: $FLV_{i,t}^{j}$	0.0595[b]	0.208[c]	–0.0430
	(2.16)	(3.50)	(–0.58)
c_2: $SIZE_{i,t}^{j}$	0.0200[c]	0.0100	0.00793
	(5.59)	(0.89)	(0.384)
c_3: $MTB_{i,t}^{j}$	0.0289[c]	0.000271	0.204[c]
	(5.42)	(0.02)	(6.12)
c_4: $CFOS_{i,t}^{j}$	1.481[c]	1.975[c]	0.498[b]
	(16.72)	(7.88)	(2.00)
c_5: $CASH_{i,t}^{j}$	0.110[a]	–0.234[a]	0.656
	(1.77)	(–1.68)	(1.60)
c_6: $ATO_{i,t}^{j}$	0.0189[c]	0.0984[c]	0.0312
	(3.32)	(2.75)	(1.48)
c_7: $PMR_{i,t}^{j}$	0.00384	0.112[a]	0.0593
	(1.02)	(1.72)	(0.73)
Number of obs.	8,076	330	296
R-squared	0.529	0.696	0.724

Notes: Panel A presents the results of the regression analysis of the following model: $OC_{i,t}^{j} = b_0 + c_1 FLV_{i,t}^{j} + c_2 SIZE_{i,t}^{j} + c_3 MTB_{i,t}^{j} + c_4 CFOS_{i,t}^{j} + c_5 CASH_{i,t}^{j} + c_6 ATO_{i,t-1}^{j} + c_7 PMR_{i,t-1}^{j} + e_{i,t}^{j}$. Panel B presents the results of the regression analysis of the following models: $\Delta ROA_{i,t+1}^{j} = b_0 + b_1 OPTIMAL_{i,t}^{j} + b_2 RESIDUA_{i,t} + c_1 \Delta ROA_{i,t}^{j} + c_2 ROA_{i,t-1}^{j} + c_3 DDPS_{i,t-1}^{j} + e_{i,t}^{j}$ and $\Delta CFOS_{i,t+1}^{j} = b_0 + b_1 OPTIMAL_{i,t}^{j} + b_2 RESIDUAL_{i,t}^{j} + c_1 \Delta CFOS_{i,t}^{j} + c_2 CFOS_{i,t-1}^{j} + c_3 DDPS_{i,t-1}^{j} + e_{i,t}^{j}$. Explanatory variables $OPTIMAL_{i,t}^{j}$ and $RESIDUAL_{i,t}^{j}$ represent the fitted and residual values of the estimated regression models of Panel A. The models are estimated for the full data sample and for data samples consisting of firms classified as either prospectors or defenders. The models are estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

Table 5 Future financial performance and organisation capital (signalling and investing hypothesis) (continued)

Panel B: Future operating performance and organisation capital						
	Coefficient estimates (t-stat)					
	Full sample		*Prospectors*		*Defenders*	
	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$
b_0: constant	−1.272[c]	0.00939[c]	0.914	0.0346[b]	0.330	−0.248
	(−4.12)	(3.98)	(0.68)	(2.38)	(0.25)	(−0.70)
b_1: $OPTIMAL^j_{i,t}$	23.54[c]	0.245[c]	17.87[c]	0.0650	15.11[c]	0.0518[c]
	(16.06)	(9.08)	(3.53)	(1.08)	(5.04)	(3.10)
b_2: $RESIDUAL^j_{i,t}$	7.072[c]	0.0449[c]	10.45[b]	0.0859[b]	3.499	0.0359[b]
	(5.62)	(5.34)	(2.28)	(2.30)	(1.11)	(2.26)
c_1: $\Delta ROA^j_{i,t}$	−0.747[c]		−0.805[c]		−0.704[c]	
	(−21.00)		(−10.85)		(−4.31)	
c_2: $ROA^j_{i,t-1}$	−0.715[c]		−0.722[c]		−0.660[c]	
	(−20.69)		(−7.04)		(−4.73)	
c_1: $\Delta CFOS^j_{i,t}$		−0.859[c]		−0.592[c]		−0.451[c]
		(−16.78)		(−3.70)		(−8.62)
c_2: $CFOS^j_{i,t-1}$		−0.676[c]		−0.437[c]		−0.249[c]
		(−13.09)		(−2.97)		(−4.43)
c_3: $DDPS^j_{i,t}$	0.196	0.000708	0.132	−0.00155	−0.150	0.000799
	(1.01)	(0.58)	(0.13)	(−0.15)	(−0.185)	(0.18)
Number of obs.	4,537	4,552	198	198	186	186
R-squared	0.347	0.259	0.555	0.316	0.352	0.251

Notes: Panel A presents the results of the regression analysis of the following model: $OC^j_{i,t} = b_0 + c_1 FLV^j_{i,t} + c_2 SIZE^j_{i,t} + c_3 MTB^j_{i,t} + c_4 CFOS^j_{i,t} + c_5 CASH^j_{i,t} + c_6 ATO^j_{i,t-1} + c_7 PMR^j_{i,t-1} + e^j_{i,t}$. Panel B presents the results of the regression analysis of the following models: $\Delta ROA^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t} + b_2 RESIDUA_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t-1} + c_3 DDPS^j_{i,t-1} + e^j_{i,t}$ and $\Delta CFOS^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t} + b_2 RESIDUAL^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + c_3 DDPS^j_{i,t-1} + e^j_{i,t}$. Explanatory variables $OPTIMAL^j_{i,t}$ and $RESIDUAL^j_{i,t}$ represent the fitted and residual values of the estimated regression models of Panel A. The models are estimated for the full data sample and for data samples consisting of firms classified as either prospectors or defenders. The models are estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

Table 6 Future financial performance and R&D capital (charity, signalling and investing hypothesis)

Panel A: Environmental and firm-specific determinants of R&D capital			
	Coefficient estimates (t-stat)		
	Full Sample	*Prospectors*	*Defenders*
	$RDOC^j_{i,t}$	$RDOC^j_{i,t}$	$RDOC^j_{i,t}$
b_0: constant	–0.0612[a]	–0.126	0.0745
	(–1.76)	(–0.73)	(0.87)
c_1: $FLV^j_{i,t}$	–0.0107	–0.0311	–0.0298
	(–1.04)	(–0.50)	(–1.03)
c_2: $SIZE^j_{i,t}$	0.00494[b]	0.00935	–0.00306
	(2.45)	(0.97)	(–0.61)
c_3 $MTB^j_{i,t}$	0.00653[b]	0.0181[b]	0.0149
	(2.43)	(2.07)	(1.56)
c_4: $CFOS^j_{i,t}$	0.0729	0.136	–0.0313
	(1.33)	(1.04)	(–0.82)
c_5: $CASH^j_{i,t}$	0.123[c]	0.476[c]	–0.123
	(3.84)	(4.42)	(–1.45)
c_6: $ATO^j_{i,t}$	–6.00[e]–05	–0.00109	0.00696
	(–0.04)	(–0.07)	(1.01)
c_7: $PMR^j_{i,t}$	0.000324	0.00127	–0.0401
	(1.33)	(0.02)	(–1.25)
Number of obs.	8,076	330	296
R-squared	0.476	0.594	0.293

Notes: Panel A presents the results of the regression analysis stem from the following model: $RDOC^j_{i,t} = b_0 + c_1 FLV^j_{i,t} + c_2 SIZE^j_{i,t} + c_3 MTB^j_{i,t} + c_4 CFOS^j_{i,t} + c_5 CASH^j_{i,t}$ $c_6 ATO^j_{i,t-1} + c_7 PMR^j_{i,t-1} + e^j_{i,t}$. Panel B presents the results of the regression analysis stem from the following models: $\Delta ROA^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t}$ $+ b_2 RESIDUAL^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t-1} + c_3 DDPS^j_{i,t-1} + e^j_{i,t}$ and $\Delta CFOS^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t} + b_2 RESIDUAL^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + c_3 DDPS^j_{i,t-1}$ $+ e^j_{i,t}$. Explanatory variables $OPTIMAL^j_{i,t}$ and $RESIDUAL^j_{i,t}$ represent the fitted and residual values of the estimated regression models of panel A. The models are estimated for the full data sample and for data samples consisting of firms classified as either prospectors or defenders. The models are estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

Table 6 Future financial performance and R&D capital (charity, signalling and investing hypothesis)

	Panel B: Future operating performance and R&D capital					
	Coefficient estimates (t-stat)					
	Full sample		*Prospectors*		*Defenders*	
	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t-1}$	$\Delta CFOS^j_{i,t+1}$
b_0: constant	−1.853^c	0.00844^c	2.730	0.0398^c	0.244	0.00247
	(−5.25)	(3.27)	(1.39)	(3.13)	(0.17)	(0.30)
b_1: $OPTIMAL^j_{i,t}$	125.3^c	0.542^c	23.83	0.00501	52.34^a	0.0851
	(12.44)	(6.74)	(1.50)	(0.06)	(1.94)	(0.62)
b_2: $RESIDUAL^j_{i,t}$	2.581	0.0394^b	−8.766	−0.103^a	23.40^a	−0.147
	(1.27)	(2.57)	(−1.21)	(−1.83)	(1.85)	(−1.48)
c_1: $\Delta ROA^j_{i,t}$	−0.659^c		−0.720^c		−0.483^b	
	(−18.28)		(−11.97)		(−2.52)	
c_2: $ROA^j_{i,t-1}$	−0.541^c		−0.569^c		−0.184	
	(−16.01)		(−6.12)		(−1.61)	
c_1: $\Delta CFOS^j_{i,t}$		−0.540^c		−0.537^c		−0.345^c
		(−21.31)		(−6.94)		(−6.29)
c_2: $CFOS^j_{i,t-1}$		−0.315^c		−0.304^c		−0.0796
		(−13.74)		(−3.62)		(−1.19)
c_3: $DDPS^j_{i,t}$	0.0162	0.000106	−0.362	−0.00414	−0.504	−0.000694
	(0.09)	(0.09)	(−0.31)	(−0.42)	(−0.57)	(0.18)
Number of obs.	4,537	4,552	198	198	186	186
R-squared	0.311	0.232	0.518	0.304	0.270	0.225

Notes: Panel A presents the results of the regression analysis stem from the following model: $RDOC^j_{i,t} = b_0 + c_1 FLV^j_{i,t} + c_2 SIZE^j_{i,t} + c_3 MTB^j_{i,t} + c_4 CFOS^j_{i,t} + c_5 CASH^j_{i,t}$ $c_6 ATO^j_{i,t-1} + c_7 PMR^j_{i,t-1} + e^j_{i,t}$. Panel B presents the results of the regression analysis stem from the following models: $\Delta ROA^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t}$ $+ b_2 RESIDUAL^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t-1} + c_3 DDPS^j_{i,t-1} + e^j_{i,t}$ and $\Delta CFOS^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t} + b_2 RESIDUAL^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + c_3 DDPS^j_{i,t-1}$ $+ e^j_{i,t}$. Explanatory variables $OPTIMAL^j_{i,t}$ and $RESIDUAL^j_{i,t}$ represent the fitted and residual values of the estimated regression models of panel A. The models are estimated for the full data sample and for data samples consisting of firms classified as either prospectors or defenders. The models are estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

Table 7 Changes on the strategic positioning and the relation of future financial performance with intellectual capital

Panel A: Prospectors and prospectors that changed their strategic orientation				
	Coefficient estimates (t-stat)			
	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$
b_0: constant	0.220	0.0257[c]	2.805[c]	0.0247[c]
	(0.24)	(5.91)	(2.95)	(5.76)
b_1: $OC^j_{i,t}$	23.97[c]	0.0369		
	(3.51)	(1.58)		
b_2: $OC^j_{i,t}DID^j_{i,t}$	3.047	0.0140		
	(–1.58)	(1.47)		
b_1: $RDOC^j_{i,t}$			13.21[b]	0.0377
			(2.44)	(1.44)
b_2: $RDOC^j_{i,t}DID^j_{i,t}$			7.629	0.0498[b]
			(1.68)	(2.55)
c_1: $\Delta ROA^j_{i,t}$	–0.893[c]		–0.755[c]	
	(–8.54)		(–8.39)	
c_2: $ROA^j_{i,t\ 1}$	–0.861[c]		–0.581[c]	
	(4.96)		(4.16)	
c_1: $\Delta CFOS^j_{i,t}$		–0.401[c]		–0.364[c]
		(–5.61)		(–6.10)
c_2: $CFOS^j_{i,t-1}$		–0.313[c]		–0.247[c]
		(–4.73)		(–6.44)
Number of obs.	389	392	389	392
R-squared	0.475	0.208	0.423	0.201

Notes: Panel A (B) presents the results of the regression analysis of the following models for firms classified as prospectors in the whole-time horizon of the research design and firms initially classified as prospectors but changed their strategic orientation at a certain time point:

Panel A: $\Delta ROA^j_{i,t+1} = b_0 + b_1 IC^j_{i,t} + b_2 IC^j_{i,t} DID^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t-1} + e^j_{i,t}$ and $\Delta CFOS^j_{i,t+1} = b_0 + b_1 IC^j_{i,t} + b_2 IC^j_{i,t} DID^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + e^j_{i,t}$.

The independent variable $IC^j_{i,t}$ represented by $OC^j_{i,t}$ or $RDOC^j_{i,t}$.

Panel B: $\Delta ROA^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t} + b_2 OPTIMAL^j_{i,t} DID^j_{i,t} + b_3 RESIDUAL^j_{i,t} + b_4 RESIDUAL^j_{i,t} DID^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t} + c_3 DDP^j_{i,t-1} + e^j_{i,t}$ and

$\Delta CFOS^j_{i,t-1} = b_0 + b_1 OPTIMAL^j_{i,t} + b_2 OPTIMAL^j_{i,t} DID^j_{i,t} + b_3 RESIDUAL^j_{i,t} + b_3 RESIDUAL^j_{i,t} DID^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + c_3 DDPS^j_{i,t-1} + e^j_{i,t}$.

Explanatory variables $OPTIMAL^j_{i,t}$ and $RESIDUAL^j_{i,t}$ represent the fitted and the residual values of the estimated regression models presented in Table 5 (panel A) and Table 6 (panel A).

Variable $DID^j_{i,t}$ is dummy variable which equals 1 for the time period after the change on the strategic positioning has occurred. The models are estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

Table 7 Changes on the strategic positioning and the relation of future financial performance with intellectual capital (continued)

Panel B: Prospectors and prospectors that changed their strategic orientation (signaling and investment hypothesis included)

	Coefficient estimates (t-stat)			
	$OC^j_{i,t}$		$RDOC^j_{i,t}$	
	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$	$\Delta ROA^j_{i,t+1}$	$\Delta CFOS^j_{i,t+1}$
b_0: constant	–0.291	0.0225	0.0834	0.0345^c
	(–0.34)	(1.23)	(0.04)	(3.31)
$b1$: $OPTIMAL^j_{i,t}$	29.25^c	0.391^b	105.6^b	0.725^b
	(4.28)	(2.25)	(2.28)	(2.58)
b_2: $OPTIMAL^j_{i,t}DID^j_{i,t}$	–1.900	–0.0418^a	8.666	–0.0473
	(–0.64)	(–1.83)	(0.44)	(–0.27)
b_3: $RESIDUAL^j_{i,t}$	8.530	0.0384	9.821	0.0208
	(1.68)	(1.02)	(0.86)	(0.20)
b_4: $RESIDUAL^j_{i,t}DID^j_{i,t}$	–8.084^a	0.0574	–7.546	0.0621
	(–1.80)	(1.11)	(–0.55)	(0.61)
c_1: $\Delta ROA^j_{i,t}$	–0.754^c		–0.688^c	
	(–15.22)		(–20.60)	
c_2: $ROA^j_{i,t-1}$	–0.651^c		–0.496^c	
	(–9.59)		(–8.87)	
c_1: $\Delta CFOS^j_{i,t}$		–1.014^c		–0.482^c
		(–2.86)		(–5.40)
c_2: $CFOS^j_{i,t-1}$		–0.994^c		–0.447^c
		(–3.11)		(–3.89)
c_3: $DDPS^j_{i,t}$	–2.034^a	–0.00779	–1.440	–0.0166^b
	(–2.04)	(–1.09)	(–1.17)	(–2.40)
Number of obs.	206	206	206	206
R-squared	0.604	0.386	0.557	0.349

Notes: Panel A (B) presents the results of the regression analysis of the following models for firms classified as prospectors in the whole-time horizon of the research design and firms initially classified as prospectors but changed their strategic orientation at a certain time point:

Panel A: $\Delta ROA^j_{i,t+1} = b_0 + b_1 IC^j_{i,t} + b_2 IC^j_{i,t} DID^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t-1} + e^j_{i,t}$ and $\Delta CFOS^j_{i,t+1} = b_0 + b_1 IC^j_{i,t} + b_2 IC^j_{i,t} DID^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + e^j_{i,t}$.

The independent variable $IC^j_{i,t}$ represented by $OC^j_{i,t}$ or $RDOC^j_{i,t}$.

Panel B: $\Delta ROA^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t} + b_2 OPTIMAL^j_{i,t} DID^j_{i,t} + b_3 RESIDUAL^j_{i,t} + b_4 RESIDUAL^j_{i,t} DID^j_{i,t} + c_1 \Delta ROA^j_{i,t} + c_2 ROA^j_{i,t} + c_3 DDP^j_{i,t-1} + e^j_{i,t}$ and

$\Delta CFOS^j_{i,t+1} = b_0 + b_1 OPTIMAL^j_{i,t} + b_2 OPTIMAL^j_{i,t} DID^j_{i,t} + b_3 RESIDUAL^j_{i,t} + b_3 RESIDUAL^j_{i,t} DID^j_{i,t} + c_1 \Delta CFOS^j_{i,t} + c_2 CFOS^j_{i,t-1} + c_3 DDPS^j_{i,t-1} + e^j_{i,t}$.

Explanatory variables $OPTIMAL^j_{i,t}$ and $RESIDUAL^j_{i,t}$ represent the fitted and the residual values of the estimated regression models presented in Table 5 (panel A) and Table 6 (panel A).

Variable $DID^j_{i,t}$ is dummy variable which equals 1 for the time period after the change on the strategic positioning has occurred. The models are estimated using year and industry fixed effects and clustering standard errors by firm to control for autocorrelation and heteroscedasticity (Petersen, 2009). Variables are defined in the Appendix. [a,b,c] indicate 10%, 5% and 1% levels of significance, respectively.

5 Sensitivity analysis

In previous sections, we provided evidence that prospectors are anchored with greater mean IC intensity than defenders. In addition, it seems that prospectors are more likely than defenders to be classified as high IC intensive. Further, we verified that higher levels of IC capital improve future performance in an unrestricted data sample that consists of firms with different strategic orientations, and among samples that consist of firms with the same strategic orientation. To provide further evidence that a high IC intensive firm exhibits superior future performance than a low IC intensive firm, regardless of strategic orientation, we perform an additional sensitivity analysis. Our sensitivity analysis focuses on changes in strategic orientation.

We focus on a data sample that consists of two types of firms:

1. those classified initially as prospectors and retain this strategic position throughout the time horizon of our research design
2. those classified initially as prospectors, but at a certain point of time their strategic positioning has changed for the remedial time horizon of our research design.

Initially, we estimated the following regression models:

$$\Delta ROA_{i,t+1}^{j} = b_0 + b_1 IC_{i,t}^{j} + b_2 IC_{i,t}^{j} DID_{i,t}^{j} + c_1 \Delta ROA_{i,t}^{j} + c_2 ROA_{i,t-1}^{j} + e_{i,t}^{j} \quad (6a)$$

$$\Delta CFOS_{i,t+1}^{j} = b_0 + b_1 IC_{i,t}^{j} + b_2 IC_{i,t}^{j} DID_{i,t}^{j} + c_1 \Delta ROA_{i,t}^{j} + c_2 ROA_{i,t-1}^{j} + e_{i,t}^{j} \quad (6b)$$

where the independent variable $IC_{i,t}^{j}$ equals either the variable $OC_{i,t}^{j}$ or the variable $RDOC_{i,t}^{j}$. The variable $DID_{i,t}^{j}$ is a binary variable receiving the value of 1 for all years after the time point that a prospector has changed the strategic positioning, otherwise 0. If the strategic positioning has no effect on the relationship between IC and future operating performance, then the estimated coefficient b_2 is expected to be insignificant.

Table 7 (panel A) exhibits the estimation results of the regression models of equations (6a) and (6b). It seems that the relationship between IC and future change in return on assets is not affected by a change in strategic orientation, regardless of the financial proxy for IC (i.e., organisational capital or R&D capital). In addition, a change in strategic orientation affects the relationship between IC and future change in cash flows from operations only when R&D capital is employed as a financial proxy for IC. A possible explanation is that abandoning a prospecting strategy enables firms to reduce cash flows consuming R&D projects.

We also examine the investing and expensing explanations of the relationship between IC and future operating performance in the context of strategic repositioning, by estimating the following regression models:

$$\begin{aligned}\Delta ROA_{i,t+1}^{j} = {} & b_0 + b_1 OPTIMAL_{i,t}^{j} + b_2 OPTIMAL_{i,t}^{j} DID_{i,t}^{j} + b_3 RESIDUAL_{i,t}^{j} \\ & + b_4 RESIDUAL_{i,t}^{j} DID_{i,t}^{j} + c_1 \Delta ROA_{i,t}^{j} + c_2 ROA_{i,t}^{j} + c_3 DDPS_{i,t-1}^{j} + e_{i,t}^{j}\end{aligned} \quad (7a)$$

$$\begin{aligned}\Delta CFOS_{i,t+1}^{j} = {} & b_0 + b_1 OPTIMAL_{i,t}^{j} + b_2 OPTIMAL_{i,t}^{j} DID_{i,t}^{j} + b_3 RESIDUAL_{i,t}^{j} \\ & + b_4 RESIDUAL_{i,t}^{j} DID_{i,t}^{j} + c_1 \Delta ROA_{i,t}^{j} + c_2 ROA_{i,t}^{j} + c_3 DDPS_{i,t-1}^{j} + e_{i,t}^{j}\end{aligned} \quad (7b)$$

Table 7 (panel B) exhibits the estimation results of the regression models of equations (7a) and (7b). In the case that R&D capital is employed as a financial proxy of IC, strategic repositioning does not affect the relationship between IC and future change in return on assets or future change in cash flows from operations. However, strategic repositioning seems to decrease the effects of the optimal (investing) component of organisational capital on future change in cash flows from operations (the value of the estimated coefficient b_2 is negative and significant at the 10% level).

Summarising the above analysis, strategic repositioning has not substantial effects on the relationship between IC and future operating performance. Most notably, strategic repositioning reduces slightly the positive effects of the investing component of organisational capital on future cash flows from operations. The above sensitivity analysis provides additional evidence that different strategic orientations pose different requirements for the initial investment in intangible resources but, once upon the intangible investments are realised, they affect future operating performance positively, regardless of strategic positioning.

6 Conclusions, limitations and future directions

A central theoretical proposition within the context of IC literature is that IC is a strategic enabler (Cohen et al., 2014). This theoretical proposition enabled prior research to develop its rhetoric and the logical position that IC is positively associated with future operating performance (Sougiannis, 1994; Lev and Sougiannis, 1996; Al-Horani et al., 2003; Eberhart et al., 2004; Hansson, 2004; Lajili and Zéghal, 2006; Eberhart et al., 2008; Pantzalis and Park, 2009; Ciftci and Cready, 2011; Wang et al., 2016). We attempt to enhance this theoretical proposition by emphasising on two relatively unexplored dimensions. First, the relationship between IC and business strategy should be enriched with empirical evidence. If IC is a strategic enabler, then firms with clear strategic positioning (i.e., prospectors or defenders) should invest resources in IC development activities. However, the arguments employed in the IC literature regarding the strategic role of IC might be interpreted as suggesting that a firm with high IC intensity is expected to implement a prospecting strategy. But a firm implementing a defending strategy might also invest a considerable amount of resources in the development of specific IC configurations. We documented that both prospectors and defenders are associated with increased likelihood to exhibit high IC intensity, but if a firm is classified as a prospector decreases the likelihood to exhibit low IC intensity, whereas if a firm is classified as a defender increases the likelihood to exhibit low IC intensity. Thus, business strategy has a critical role in determining if a firm is anchored with low IC intensity and we cannot exclude the possibility that a firm classified as a defender might exhibit high levels of IC intensity.

Second, the relationship between IC and future operating performance should be examined under two conditions. First, a firm's strategic positioning might affect the intensity of the positive relationship between IC and future operating performance. As strategy defines the desired IC configuration, it might influence the capability of IC to generate future value. Our empirical evidence documents that this positive association is manifested under the condition that IC is compatible with a firm's strategic positioning Second, the positive relationship between IC and future operating performance might be explained in different ways. The positive relationship between IC and future operating performance cannot be attributed only to the value generating capabilities of IC. Rather, the relationship encompasses both the value generating ability of IC (investing hypothesis) and managerial overspending due to expectations of improved future performance (signalling hypothesis).

The theoretical contribution of this study is threefold. First, we fulfil an empirical research gap about the relationship between IC intensity and business strategy. It seems that business strategy affects primarily the likelihood a firm to be classified as low IC intensive. Second, it seems that IC is positively associated with future operating performance, regardless of a firm's strategic orientation. Third, the positive relationship between IC and future operating performance expresses both the IC value generating capability and managerial optimism for future improved performance. Finally, the empirical findings of this study may be utilised by practitioners since managers can evaluate both the relationship between IC and future operating performance within the context of different explanations and strategic orientations.

There are two implications for future empirical IC research. First, IC is a strategy enabler that is not associated exclusively with specific strategic orientation. Each strategy determines the desired IC profile. Indeed, different desired IC profiles might affect IC intensity, but firms with different strategic orientations experience economic benefits when they invest in the development of IC. Second, any empirical evidence for the positive relationship between IC and operating performance should be critically evaluated because this might reflect managerial optimism for improved future performance.

The empirical evidence of the current study should be interpreted with the following caveats in mind. First, we employed sophisticated financial statement analysis tools to visualise two fundamental factors of our research design: strategy and IC intensity. Future studies might seek to link qualitative with quantitative data to generate new insights into the relationships among strategy, IC, and future operating performance.

Second, we place emphasis on two dimensions of IC: organisational capital and R&D capital. We suggest that future research might examine other important dimensions of IC, such as relational capital (Sussan, 2012; Bianchi Martini et al., 2016; Corvino et al., 2019) or human capital (Pantzalis and Park, 2009), as well as additional specialised dimensions of organisation capital, such as the level of managerial ability (Demerjian et al., 2012).

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Notes

1 High (low) IC intensive firms are classified as those within the highest (lowest) quantile of $MIN\_IN_{i,t}^{j}$ per Fama-French 12-industry classification.

Appendix

Variable	*Description*
$AbEarn_{i,t}^{j}$	The sum of the $AbEX_{i,t}^{j}$ and $AbREV_{i,t}^{j}$, capitalised and amortised over the last five years which are then scaled by $ASSETS_{i,t}^{j}$
$AbEX_{i,t}^{j}$	The difference between actual operating costs and the predicted operating costs without firm-specific organisation capital
$AbREV_{i,t}^{j}$	The difference between actual revenues and the predicted firm's revenues without firm-specific organisation capital
ANALYSERS	Firms with a value of its STRATEGY variable ranging from 13 to 23
$ASSETS_{i,t}^{j}$	The magnitude of total assets
$ATO_{i,t}^{j}$	The ratio of $SALES_{i,t}^{j}$ to $ASSETS_{i,t}^{j}$
$CASH_{i,t}^{j}$	The cash scaled by total assets
$CFO_{i,t}^{j}$	The level of cash flow from operations

Appendix (continued)

Variable	*Description*
$CFOR_{i,t}^{j}$	The ratio of $CFOS_{i,t}^{j}$ to $SALES_{i,t}^{j}$
$CFOS_{i,t}^{j}$	The ratio of $CFO_{i,t}^{j}$ to $ASSETS_{i,t}^{j}$
$DDFS_{i,t}^{j}$	Percentage change of dividends per share
DEFENDERS	Firms with a value of its STRATEGY variable ranging from 6 to 12
$DEFEND_{i,t}^{j}$	A dummy variable which equals 1 for firms classified as defenders and 0 for firms characterised as either analysers or prospectors
$DID_{i,t}^{j}$	A dummy variable which equals 1 the year that prospectors change their strategic positioning and 0 otherwise
$EMPL_{i,t}^{j}$	Number of employees
$EX_{i,t}^{j}$	The level of the operating expenses
$FLV_{i,t}^{j}$	The ratio of long and short-term debt to total assets
$GrPr_{i,t}^{j}$	The gross profit $(SALES_{i,t}^{j}$ minus $COGS_{i,t}^{j})$ scaled by $ASSETS_{i,t}^{j}$
$HighOC_{i,t}^{j}$	A dummy variable which equals 1 if firms fall within the highest quantile according to $MIC\_IN_{i,t}^{j}$ of $OC_{i,t}^{j}$ per industry in the data sample and 0 otherwise
$HighRDOC_{i,t}^{j}$	A dummy variable which equals 1 if firms fall within the highest quantile according to $MIC\_IN_{i,t}^{j}$ of $RDOC_{i,t}^{j}$ per industry in the data sample and 0 otherwise
$IC_{i,t}^{j}$	The magnitude of intellectual capital which equal to either $OC_{i,t}^{j}$ or $RDOC_{i,t}^{j}$
$IC\_IN_{i,t}^{j}$	The intensity of intellectual capital which equal to either $HighOC_{i,t}^{j}$ or $LowOC_{i,t}^{j}$ or $HighRDOC_{i,t}^{j}$ or $LowRDOC_{i,t}^{j}$
$LowOC_{i,t}^{j}$	A dummy variable which equals 1 if firms fall within the lowest quantile according to $MIC\_IN_{i,t}^{j}$ of $OC_{i,t}^{j}$ per industry in the data sample and 0 otherwise
$LowRDOC_{i,t}^{j}$	A dummy variable which equals 1 if firms fall within the lowest quantile according to $MIC\_IN_{i,t}^{j}$ of $RDOC_{i,t}^{j}$ per industry in the data sample and 0 otherwise
$MIC\_IN_{i,t}^{j}$	The median value of $IC_{i,t}^{j}$
$MTBE_{i,t}^{j}$	Sum of market value of equity, long and short-term debt, liquidation value of preferred stock, and deferred taxes and investment credit
$MTB_{i,t}^{j}$	The ratio of $MTBE_{i,t}^{j}$ to $ASSETS_{i,t}^{j}$
$NI_{i,t}^{j}$	Net income before extraordinary items
$OC_{i,t}^{j}$	The operating value of organisation capital

Appendix (continued)

Variable	*Description*
$OPTIMAL^{j}_{i,t}$	The optimal level of $IC^{j}_{i,t}$; described as the fitted value from a regression of $IC^{j}_{i,t}$; on specific economic determinants
$PMR^{j}_{i,t}$	The ratio of $NI^{j}_{i,t}$ to $SALES^{j}_{i,t}$
$PPENT^{j}_{i,t}$	The level of net property, plant and equipment
PROSPECTORS	Firms with a value of its STRATEGY variable ranging from 24 to 30
$PROSP^{j}_{i,t}$	A dummy variable which equals 1 for firms classified as prospectors and 0 for firms characterised as either analysers or defenders
$RESIDUAL^{j}_{i,t}$	Deviation from the optimal level of $IC^{j}_{i,t}$; described as the difference between $IC^{j}_{i,t}$ and $OPTIMAL^{j}_{i,t}$
$RD^{j}_{i,t}$	The level of the research and development expenses
$RDOC^{j}_{i,t}$	The operating value of R&D capital
$RDR^{j}_{i,t}$	The ratio of $R\&D^{j}_{i,t}$ to $SALES^{j}_{i,t}$
$ROA^{j}_{i,t}$	Return on assets
$SALES^{j}_{i,t}$	The magnitude of sales revenues
$SG\&AR^{j}_{i,t}$	The ratio of $SG\&A^{j}_{i,t}$ to $SALES^{j}_{i,t}$
$SG\&A^{j}_{i,t}$	The level of the selling general and administrative expenses
$SG\&A\_AMOR^{j}_{i,t}$	The $SG\&AR^{j}_{i,t}$ capitalised and amortised over the last three years.
$SIZE^{j}_{i,t}$	The logarithm of $ASSETS^{j}_{i,t}$
STRATEGY	The STRATEGY variable ranges from 6 to 30 and it is employed to classify firms as: DEFENDERS, ANALYSERS and PROSPECTORS. The value of the STRATEGY variable calculated using the methodology proposed by Bentley et al. (2013)
i	Represent the firm id
j	Represent the industry sector within a group of firms classified.
t	Represent the fiscal year identifier