Strategic use of corporate and scientific boards in the internationalisation of biotech firms

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Abstract: Biotech firms are faced with particularly complex decisions early in their development. Because of the specific nature of their products, their growth strategy rapidly entails the internationalisation of their activities, especially through alliances. Small and medium-sized enterprises (SMEs) wishing to develop and access complementary skills may use corporate boards and scientific advisory boards. The resource-based view provides a compelling rationale for efficiently using these external sources of knowledge in order to access the key resources SMEs need to improve their performance. This study investigates how corporate and scientific advisory boards are involved in the internationalisation of biotech firms through strategic alliances. Based on semi-structured interviews and secondary data from 22 biotechnology firms, we describe the characteristics of these external sources of strategic advice and explore their impact on the firms’ internationalisation. A discussion of the results, along with their implications for future research and managerial practices are also presented.

Keywords: board of directors; scientific advisory board; internationalisation; biotechnology; alliance; SMEs; small and medium-sized enterprises; knowledge transfer; resource-based view; strategic management; competencies; governance.


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1 Introduction

High tech SMEs are faced with particularly complex decisions in the early stages of their development. Because of the specific nature of the products they create, their growth strategy rapidly entails the internationalisation of their activities (Al-Laham and Souitaris, 2008; De Clercq et al., 2012; Jones et al., 2011; Nordman and Melen, 2008). The internationalisation can be particularly daunting for young companies and entrepreneurs, as this approach requires specific knowledge and expertise that they may not possess. They are indeed facing liabilities of newness, smallness, and foreignness (Kraus et al., 2010; Stinchcombe, 1965). Knowledge about innovation, networking, and financing, as well as a strong management team are considered to be key success factors to their internationalisation (Crick and Spence, 2005; Ibeh and Kasem, 2011; Laanti et al., 2007; Mort and Weerawardena, 2006; Oviatt and McDougall, 2005).

There are several options for SMEs wishing to develop and access these types of skills (Robson and Bennett, 2000). They can access and possibly take advantage of external sources such as corporate boards and scientific advisory boards (SAB). The resource dependency theory (RDT) and resource based view (RBV) provide a compelling rationale for both building and efficiently using these sources. They argue that these groups can help SMEs access the key resources they need to improve their performance (Hillman and Dalziel, 2003; Knockaert and Ucbasaran, 2013).

This examination of external sources of knowledge and expertise comes at a time when corporate boards are under increased pressure to play a more active role in corporate oversight. Indeed, the role of corporate boards has evolved significantly over the years. Whereas they used to focus primarily on monitoring management, they are now increasingly expected to assume an advisory role as well and to actively participate in the strategic process (Pugliese et al., 2009). Some researchers have started to examine these issues by investigating the possible role of corporate directors in specific strategic decisions such as internationalisation (Barroso et al., 2011; Bjørnåli and Aspelund, 2012; Rivas, 2012). However, the results of these studies have been inconclusive in terms of identifying what particular role and what particular set of skills and competencies are associated with a higher level of internationalisation.

The focus of this study is on two sources of external knowledge: Boards of directors and scientific advisory boards. Our aim is to investigate whether, and how, they are related to the internationalisation of biotech companies. More specifically, two main research questions are investigated:
• Do biotech firms that have achieved a higher level of internationalisation make greater use of these sources?
• Are these sources characterised by a specific set of skills and competencies?

In order to examine these questions, we conducted semi-structured interviews with 22 biotechnology SMEs from Montreal (Canada) and Boston (USA). Examining how these firms can enhance their knowledge base is particularly important for human health biotechnology firms – they are indeed evolving in an especially complex environment that requires a broad diversity of both scientific and managerial expertise. Efforts to gain a better understanding of these issues will be valuable for academics and practitioners alike. An examination of these issues would make a contribution to the literature on governance and international entrepreneurship by providing much-needed empirical evidence on boards’ internal functioning and scientific advisory boards. While both these sources have been examined independently in other studies, the simultaneous examination of these sources is certainly an important contribution of this study.

Increasing pressures to rapidly and efficiently access foreign markets have certainly forced companies to evaluate whether they have access to the necessary skills to accomplish this goal. Our goal is to provide guidance to entrepreneurs and managers, as they must make important decisions about the composition of their corporate boards and possibly create a scientific advisory board.

The paper is organised as follows: Section 1 presents the literature review and related research propositions. Sections 2 and 3 present the methodological aspects of the study and its main results, respectively. A discussion of the results, along with their implications for future research and managerial practices, is presented in the last section.

2 Literature review

High tech SMEs evolve in an intense global competition environment with shortened product life cycles and rapid technology replacements (Carayannopoulos, 2009; Crick and Spence, 2005; Lambin and Moerloose, 2012; Li et al., 2012; Preece et al., 1998). In order to develop their products rapidly, SMEs require a diversity of knowledge that might be found around the world, requiring multiple collaborations (Kuivalainen et al., 2004; McNaughton, 2003; Powell, 1998; Wright and Dana, 2003). To overcome these constraints, they often use alternative governance structures such as international strategic alliances (Amal and Freitag, 2010; Mort et al., 2012; Oviatt and McDougall, 2005). Furthermore, to obtain a respectable return on their large amount of R&D investments, they must penetrate as many geographical markets as possible for their niche technologies. For instance, small biotech firms must collaborate with a wide range of potential partners throughout the value chain (Niosi, 2003). Upstream alliances made with universities and research centres are sources of knowledge. Downstream alliances are formed with large pharmaceutical companies for financial considerations, as well as for access to intangible resources such as know-how in regulatory approval, operations management, and marketing to favour future growth. These different types of alliances impact the likelihood of their internationalisation (Yu et al., 2011). More specifically, marketing alliances will promote initial foreign sales. Firms benefit from prior alliance experiences as they undertake international strategic alliances (Lai et al., 2010; Al-Laham and Souitaris, 2008). By developing their ability to locate new partners through their
network, new international links may be quickly developed, with internationalisation being an outcome (Freeman et al., 2010). These make alliance partner selection and alliance portfolio management crucial elements to their growth and survival.

This internationalisation may go beyond a small firm’s abilities because of its complexity and resources requirements (Laanti et al., 2007; Li et al., 2012). Examining performance measures of the internationalisation of high technology firms used in previous studies provides valuable insights into the types of knowledge these firms should be developing or acquiring. Speed, diversity, and intensity are meaningful indicators of a successful international process (Manolova and Manev, 2004; Oviatt and McDougall, 2005; Preece et al., 1998). Undoubtedly, accelerating the internationalisation to rapidly capture key local resources, by increasing both the number of countries where the firms are present and the amount of sales generated in these countries, is essential to the survival of high technology firms. However, to achieve these objectives, these firms must closely examine the sources of knowledge they can tap into. Indeed, they must ensure that they can access innovation and scientific knowledge that can help them produce quality products, but also develop the ability to both understand and rapidly respond to specific customers’ needs. Corporate boards and SABs can be among these sources of knowledge and are being examined as such in the upcoming sections.

2.1 Board of directors and strategic decisions

Though senior managers are responsible for managing corporations on a day-to-day basis, boards of directors assume a central role in governance, as their primary mandated duty is to promote the long-term interests of the corporation. Over time, there have certainly been changes in the definition of the roles and responsibilities of corporate boards. While boards were once asked only to review past corporate performance and either accept or reject management’s plans and analyses, they are now expected to actively participate in strategy formulation and implementation (Adams and Ferreira, 2007; Anderson et al., 2007; Pugliese et al., 2009). Many observers have argued that if boards are to truly represent shareholders’ interests, they must evaluate the quality of proposed strategies and how they are implemented.

While scholars are increasingly examining board involvement in strategy, the definition and boundaries of this concept remain ambiguous. Early contributions from Judge and Zeithmal (1992), and Zahra and Pearce (1990) have provided valuable insight into better defining this construct. They have both underlined the long-term nature of these decisions and how this involvement can vary according to each stage of the strategic management process. Furthermore, securities regulators in both Canada and the Unites States have provided guidelines to help define the board’s strategic oversight role. For example, the Canadian Securities Administrators (CSA) have stated, in their National Policy (National Policy 58-201 Corporate Governance Guidelines), that the board’s mandate should include the following activities: “adopting a strategic planning process and approving, on at least an annual basis, a strategic plan which takes into account, among other things, the opportunities and risks of the business” (Canadian Securities Administrators, 2005). The CSA further suggests that the board’s mandate be explicitly established and disclosed.

To provide strong oversight and relevant input into strategic decisions, companies must ensure that board members have the right qualities. Thus, among the many decisions companies and their boards make, they must also determine the appropriate
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qualifications and criteria for selecting individual board members and the balance of skills that is necessary for effective governance. Typically, as they relate to the board’s composition, criteria include the level of independence, the level and type of skills and knowledge, and board size. These criteria can have a direct impact on the board’s credibility and performance.

In the case of listed companies, stock exchange requirements and legislations are naturally powerful forces driving corporate governance decisions. The ‘independence from management’ principle is certainly a thread running through these requirements. Arguments in favour of board independence are grounded largely in agency literature. Because they possess a greater level of detachment and objectivity and are more likely to question management decisions, many have argued that independent directors are better monitors (Bryant and Davis, 2012; Fama and Jensen, 1983; Jong Seop et al., 2012). Many corporations have tried to improve the independence of their boards by ensuring that the board leadership is also independent through either a separation of the role of CEO and Chairman of the Board or by the appointment of a lead director. For small firms, demonstrating ‘independence from management’ is particularly important as it can help them gain legitimacy and credibility to a broad range of stakeholders and also favour the development of new knowledge resources (Ingley and McCaffrey, 2007; Knockaert and Ucbasaran, 2013; Zahra et al., 2007). However, the superficial adoption of practices aimed essentially at responding to external pressures, disconnected from a true willingness to improve governance practices, can create inefficiencies and missed opportunities. Using neo-institutional theory arguments (Dimaggio and Powell, 1983; Meyer and Rowan, 1977), some have suggested that a number of organisations have incorporated these institutional rules only as a means to gain and maintain legitimacy vis-à-vis their stakeholders, not as a means to increase both board and corporate performance (Judge et al., 2008).

Nonetheless, there are arguments in favour of insider representation. Because they are part of the decision processes, insiders are viewed as better equipped to evaluate managerial competence and the strategic desirability of initiatives. Fundamental arguments in favour of insider representation are often grounded in the resource-based view (Pugliese and Wenstøp, 2007) and the knowledge-based view of the firm (Kroll et al., 2007; Zahra and Filatotchev, 2004). These theories underline the value of firm-specific and in-depth knowledge of the firm. They also emphasise that because this type of knowledge is tacit, it cannot be substituted with general business expertise (Kroll et al., 2007). Daugherty et al. (2012) identified planning, strategy, documentation, and interaction tactics to facilitate efficient knowledge transfer. They also outline the importance of tracking board members’ skills to avoid redundancy.

However, now that the boards of most North American listed companies have a majority of independent directors (SpencerStuart, 2012), information asymmetry problems have become more significant: Outside directors typically do not possess the same company-specific knowledge as do executive directors, which can hinder them in their role of providing sound advice to senior management. Many have argued that a strong knowledge base is essential to understand, evaluate, and contribute to discussions on complex issues (Baysinger and Hoskisson, 1990; Kroll et al., 2007). Consequently, there are increased efforts to reduce information asymmetry between senior management and corporate boards through a greater focus on board members’ skills and knowledge (Brown, 2007; Withers et al., 2012). Accordingly, many stock exchanges require listed companies to establish a nominating/corporate governance
committee composed entirely of independent directors and to disclose the process by which the new potential candidates are identified.

Experts suggest that boards should possess a balanced mix of both functional knowledge in the traditional areas of business such as accounting, finance, legal, or marketing as well as industry specific knowledge that will enable members to truly understand specific industry issues and challenges. Because CEOs have developed strategic problem-solving skills, Barroso et al. (2011) have also underscored the importance of their expertise. They have argued that directors with executive experience have developed a tacit knowledge that is both valuable and difficult to imitate. Moreover, science-based companies such as biotech firms require for their directors to have, in addition to a strong scientific background, a specific set of characteristics and qualifications in international management: knowledge of acquisitions, mergers, strategic alliances, and R&D investments (Audretsch and Lehmann, 2006; Knockaert and Ucbasaran, 2013). Marketing skills that can assist in developing a strong market orientation are also essential to biotech firms planning to operate in these various international markets. They can help to better understand and respond to the specific needs of these various markets (Knight and Kim, 2009).

The potential benefits of venture capital representatives on corporate boards are often examined – there are indeed differing views about the value of the expertise they can bring to the board. Some researchers have suggested that their expertise lies more with financial management (e.g., venture creation, the IPO process), and may not be industry specific enough (Clarysse et al., 2007; Williams et al., 2006). Williams et al. (2006) have also called attention to the risk of VC representatives influencing strategic priorities towards short-term profitability instead of long-term success. Yet, two studies reported positive results regarding possible links between VC ownership and internationalisation of small business (Fernhaber and McDougall-Covin, 2009; Zahra et al., 2007). Such results raise questions about possible tensions and missed opportunities with VC representatives as board members.

Another important issue associated with director nominations is board diversity, particularly gender diversity. Researchers have recognised that when the board as a whole encompasses a broad range of knowledge, expertise and viewpoints, diversity is fostered and the quality of board decisions is improved (Dunn, 2012; Tuggle et al., 2010; Van der Walt et al., 2006). Yet, despite these potential benefits, women remain under-represented on boards in most industrialised countries (Dunn, 2012). In their annual board review, SpencerStuart found that in the case of large S&P 500 companies, women accounted for just over 17% of independent directors and that 9% of S&P 500 boards still had no women (SpencerStuart, 2012). Similarly, in their annual survey of 1300 public companies, the National Association of Corporate Directors (NACD) found that nearly 68% of boards have one or more female directors. They found, however, that in the case of smaller companies (nano-cap and micro-cap), over 55% have no female directors on their boards (NACD, 2011).

Board size is also an important factor to consider as it can affect both board functioning and diversity level. Larger boards will likely offer a broader set of knowledge and skills to choose from and may provide some beneficial redundancy; however, coordinating these larger boards can be more complex (Dalton and Dalton, 2005; Larmou and Vafeas, 2010).

Increasingly, researchers have been examining directors’ skills and knowledge as potential determinants of board performance. Because these studies focus on board
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resources, they have often used resource dependency theory (RDT) and resource-based view (RBV) to examine these issues (Pugliese et al., 2009; Withier et al., 2012). While studies grounded in RDT focus more on external resources and the different processes aimed at co-opting these resources, those grounded in RBV typically examine how boards’ resources can lead to superior board/corporate performance. For example, building on RDT arguments, Hillman and Dalziel (2003) have used the notion of ‘board capital’ to describe how outside directors provide human capital (experience, expertise, reputation) as well as relational capital (access to networks/stakeholders) to companies. Because RBV seeks to explain different organisational outcomes by examining critical resources, they have proved useful in examining how different combinations of directors’ knowledge and skills can lead to different outcomes. Studies grounded in this framework have underscored the notion that directors’ knowledge and skills can explain differences in board performance because such capital is valuable, rare and inimitable. They have found evidence of a positive correlation between directors’ knowledge and skills and the board’s monitoring role and overall strategic involvement (Carpenter and Westphal, 2001; Zona and Zattoni, 2007).

In addition, researchers have been examining how particular board characteristics have an impact on specific strategic outcomes (Pugliese et al., 2009), such as acquisitions, innovation, diversification, and more germane to our study, internationalisation (Barroso et al. 2011; Bjørnåli and Aspelund, 2012; Rivas, 2012; Sanders and Carpenter, 1998). However, these studies provide mixed evidence of relationships between board characteristics and specific outcomes (Daily et al., 2003; Pugliese et al., 2009). In the case of internationalisation, results seem to indicate that larger boards are indeed associated with greater levels of internationalisation. However, the impact of board independence on internationalisation remains inconclusive. Two studies are particularly relevant when examining our research questions. Rivas (2012) recently reported a positive association between the level of international experience of corporate directors and the likelihood of internationalisation of large listed companies. In addition, when examining academic spin-offs, Bjørnåli and Aspelund (2012) found that heterogeneity in the composition of corporate boards increased the likelihood of international sales. However, they did not find that greater board involvement in strategy tasks was associated with greater levels of internationalisation.

Building on RBV arguments, our focus is on corporate boards and their possible role in internationalisation. Our aim is twofold: First, we wish to investigate whether corporate boards play a role in achieving greater levels of internationalisation. Second, by characterising the experience (industry and managerial), the background (academic and financial), and demography (gender and origin) of each director, we intend to examine whether this greater level of involvement is associated with a specific board profile.

Research question 1(a): Are boards of directors of biotech firms that have achieved a higher level of internationalisation more involved in strategic decisions?

Research question 2(a): Are board of directors of biotech firms that have achieved a higher level of internationalisation associated with a specific profile?

2.2 Scientific advisory boards and strategic decisions

While establishing a board of directors is a legal requirement for incorporated companies, creating a scientific advisory board remains a discretionary decision. Studies indicate that
about half of science-based companies decide to create these advisory boards; results also show that smaller firms with less access to resources are more likely to create them (Cetindamar and Laage-Hellman, 2003; Chok, 2009). For these smaller companies, SABs are perceived as an effective means to access scientific knowledge, gain legitimacy, and reduce uncertainty for their various stakeholders such as investors, or regulators (Audretsch, 2001; Cetindamar and Laage-Hellman, 2003; Chok, 2009). However, for other companies, maintaining both a corporate board and an SAB may prove to be too burdensome, particularly for listing companies that must comply with several additional requirements regarding their boards of directors.

Whereas there are numerous guidelines helping companies to define the role and composition of corporate directors, particularly for those listed on a stock exchange, such explicit guidelines do not exist in the case of SABs. However, researchers who have examined these issues have helped to determine that SABs are usually composed of researchers, managers, and executives from various types of organisations. They are typically chosen by the company CEO and/or the chief technical officer based on the candidate’s expertise and reputation. The SAB could also include key representatives from the company’s suppliers or clients. Although members could be company employees (e.g., senior technological individuals), they are, by and large, outsiders acting as consultants to the company’s top management (Cetindamar and Laage-Hellman, 2003). In some cases, SAB memberships have also been known to be given to founders after being removed from executive roles (Bains, 2007). Finally, the size of the average SAB varies between five and nine members (Chok, 2009).

In terms of their role, it is important to underscore that SABs do not have executive or corporate oversight powers (Bains, 2007) – hence, their role is typically an advisory one. However, it is essential to note that in some jurisdictions (for example, in Australia), SAB members may be considered a ‘de facto director’ or ‘shadow director’, depending on the actual level of authority they have on company business. In these cases, such advisors would be exposed, like corporate directors, to legal liabilities (Mueller, 1988; Walker, 2012). Further, in the context of SMEs, there could be considerable blurring between roles and responsibilities if they are not specifically defined for both corporate and advisory boards. Reviewing the literature, we found evidence of this advisory role in the different stages of the company’s strategic decision-making process: situation analysis, strategy formulation, strategy implementation, and evaluation and control (Cetindamar and Laage-Hellman, 2003; Chok, 2009; Isaacson et al., 1994). Discussions about industry trends, competitor intelligence, regulatory, political and economic information, and technological forecasts are essential to evaluate the quality of a strategic plan. The plan should indeed be coherent with both information about the company’s industry and the company’s strengths and weaknesses, especially as it relates to its R&D performance and technological/scientific knowledge. Their input can also have an impact on strategy formulation (corporate, business and functional strategies). At the corporate level, companies must decide what industry they will operate in; at the business unit level, companies must articulate how they will use resources and competencies to gain a competitive advantage in a specific market. Corporate level decisions may involve major capital expenditures, acquisitions, and divestitures. SABs should examine how major functions such as marketing, manufacturing, and obviously R&D, contribute to the achievement of the strategies. SABs should also be consulted on issues related to the implementation and evaluation of these strategies. As such, they can provide input on decisions regarding the programs, policies, systems, and structure that support the overall
strategy. Finally, as a way to provide input in the evaluation/control stage of the strategic process, SABs should regularly examine progress and performance reports on major initiatives.

As we just demonstrated, SABs can be involved in several critical decisions affecting long-term firm performance. Hence, it is important to clearly define their role. Isaacson et al. (1994) have long stressed the importance of planning beforehand when establishing an SAB. Specifically, they have suggested that companies should adopt a written charter that specifies information such as the SAB’s role and responsibilities, its authority (and reporting structure), membership criteria/size, and estimated frequency of meetings.

Because SABs can enhance the overall ‘resources’ of companies, some researchers have been examining whether and how they can have an impact on different dimensions of corporate performance. Such studies are designed to identify what company resources are valued by financial markets. However, because of the discretionary nature of SABs, significantly fewer studies have examined SABs (as opposed to corporate boards) as a potential valuable company resource. Given the type of hypotheses and propositions examined in their studies, researchers have often used similar frameworks as in the case of corporate boards. They have indeed grounded their studies in resource dependency theory and resource-based view (Ahn and York, 2011; Cetindamar and Laage-Hellman, 2003; Coombs and Deeds, 1998).

Researchers have used an array of variables to capture the members’ knowledge and skills. They have, for example, characterised their background in terms of industry or functional expertise, or used citation index to evaluate their overall level of notoriety (Coombs and Deeds, 1998). They have also examined each SAB members’ networks individually as a means to evaluate more broadly the SABs’ overall resources. All these variables have been examined, much like in the case of corporate boards, in the context of various performance constructs and strategic outcomes. Because early growth and development are essential to the survival of start-ups, access to capital and market value, have been particularly examined as performance variables. Undoubtedly, because it focuses on rare, valuable, and inimitable resources, the RBV is also an appropriate framework to use when examining SABs.

The notion of ‘information asymmetry’ has also been helpful when examining potential benefits associated with SABs (Coombs and Deeds, 1998). When companies’ strategies and business plans are based on advanced scientific knowledge, investors may not be equipped with the necessary knowledge to properly evaluate their long-term potential. Hence, companies have been using different signalling devices, such as the creation of SABs, as a means to clearly and credibly communicate information to investors about the quality of the company. They can also be used to reduce the information asymmetry that can exist between the management team and its corporate board by providing directors with an ‘independent opinion’ from the SAB. The independent evaluation and expertise associated with SABs are thought to reduce the uncertainty associated with this information gap. While results regarding the value of SABs as a compelling signalling device to investors have not been conclusive, benefits associated with this enhanced pool of knowledge cannot be overlooked. However, when SABs are created only to respond to external pressures, missed opportunities can arise.

Building on RBV arguments, our focus is on SABs and their possible role in internationalisation. Our aim is twofold: First, we wish to investigate whether SABs play a role in achieving greater levels of internationalisation. Second, by characterising the experience (industry and managerial), the background (academic and financial), and
demography (gender and origin) of each SAB member, we intend to examine whether this greater level of involvement is associated with a specific board profile. Based on the arguments presented in this section, we offer the following propositions:

Research question 1(b): Are SABs of biotech firms that have achieved a higher level of internationalisation more involved in strategic decisions?

Research question 2(b): Are SABs of biotech firms that have achieved a higher level of internationalisation associated with a specific profile?

3 Methods

3.1 Sample and data collection

Human health biotechnology firms are an ideal ground to examine our research questions. The complexity of the life science industry requires a large diversity of scientific competencies to develop new products. In addition, a previous study has shown that strategic alliances in human health biotech industry can either come from venture capital, board members or a scientific advisory board (Veilleux et al., 2012). The cities of Boston (USA) and Montreal (Canada) were chosen because they are especially well known for their concentrations of biotechnology firms. Furthermore, even though they are culturally similar (Hofstede, 2001), the significant difference in their economic environment and home markets size impact their level of internationalisation (Gilding, 2008). US firms find complementary resources at home, while Canadian biotechnology firms are forced to search for them in the international arena. A comparison between their use of corporate and scientific advisory boards in that matter is therefore particularly interesting. Also, the high level of convergence between Canadian and US corporate governance practices allowed us to compare corporate and advisory board of each country (Bozec and Dia, 2012) We identified Boston companies using the Massachusetts Biotechnology Industry Directory, BioSpace, Bio Member Directory, and Bioscan. These databases allowed the preparation of a list of 37 organisations. In Montreal, we drew the list of 38 potential respondents from Canadian and Quebec government websites, the trade association BioQuébec, and scientific parks (Cité de la biotechnologie, Technopole Angus, and Technoparc St-Laurent). Having firms from two distinct locations, one a small and the other a large home market, gives additional information about the cultural dimension and potential of generalisation of the results.

Qualitative analysis is recommended to deepen the understanding of a phenomenon (Patton, 2002). In-depth case analysis limits the number of companies that can be studied within a reasonable timeframe and at a reasonable cost (Yin, 2003). Eisenhardt (1989) recommends using a relatively small number of cases in order to allow for in-depth analysis of each case, as well as relative diversity of respondents to increase the validity of the results. Cases should be chosen for the quality of information they may provide (Patton, 2002). Semi-structured interviews with the vice-president of business development or the CEO of these companies provided data concerning the internationalisation and the alliance formation process. A standard interview guide was used to permit data comparison. The questionnaire had 33 open questions spread over four sections: firms’ general description, internationalisation process, alliances, and learning. Interviews lasted approximately 90 minutes. Secondary data (website, annual
report, press releases, media coverage ...) was used to complete and compare information. The final samples are composed of 12 Boston firms and 16 Montreal firms (which represents response rates of 32% and 42%, respectively), with no response bias after analysis. At the time of data collection, all respondent firms were involved in international activities. Given our research focus, the dynamic between corporate and scientific advisory boards in the internationalisation through alliances, firms without a board of directors were eliminated from our population. Hence, six companies were excluded, for a total sample of 10 firms from Boston and 12 from Montreal.

3.2 Research variables

3.2.1 Descriptive variables: firm characteristics

Based on our literature review, we included six firm-specific variables that can have an impact on either the use of external sources of knowledge or the level of internationalisation. The median age in years of firms was evaluated because the organisational age can have an impact on forming alliances. The earlier a company integrates a network, the more it is able to establish partnerships by virtue of a better position in the network (Powell et al., 2005). While the median number of employees was examined as an indicator of company size, the presence of income (yes/no) was considered as an expression of growth that can promote the internationalisation of the firm (Aharoni, 1966). Because they have been positively associated with internationalisation, we also examined whether firms had obtained venture capital (yes/no) and whether they were listed on a stock exchange (yes/no). While venture capital is said to facilitate the formation of international alliances though preferential access to these investors’ network of contacts’ venture (Fernhaber and McDougall-Covin, 2009; Ingley and McCaffrey, 2007), the stock market can supply firms with outside investors that often favour and encourage internationalisation (Arbaugh et al., 2008). Finally, the location of the company was also included as a firm-specific variable, as it can influence the internationalisation. Firms in small home markets like Canada (Montreal) must look internationally to find partners and commercialise their technologies while firms in large home markets like the USA (Boston) may find sufficient resources at home (Gilding, 2008).

3.2.2 Descriptive variables: corporate board and SAB characteristics

Consistent with our literature review, we included nine variables to capture and characterise potential skills and knowledge of the companies’ external sources of strategic advices. Independent director members are members working outside the company, as opposed to insiders (Bryant and Davis, 2012; Cetindamar and Laage-Hellman, 2003; Fama and Jensen, 1983; Kroll et al., 2007; Spencer-Stuart, 2012). CEO as chairperson of the Board measures the separation of the role of CEO and Chairman of the Board with a dichotomised variable (yes/no) (Ingley and McCaffrey, 2007; Knockaert and Ucbasaran, 2013; Zahra et al., 2007). CEO members are presidents of companies, including the CEO of the respondent firm (Barroso et al., 2011), as opposed to functional experts (law, accounting, finance, science…). Directors and consultants are part of the functional expertise. Venture capital members are members currently working in venture capital organisations (Clarysse et al., 2007; Fernhaber and McDougall-Covin, 2009;
Williams et al., 2006; Zahra et al., 2007). Foreign members are members currently living and working in a different country than the one where the firm is located. Academic members are those mainly working in universities and public laboratories. The gender diversity is considered with the total number of female members (Dunn, 2012; Tuggle et al., 2010; Van der Walt et al., 2006). Industry members are currently working, or have previously worked, in the industry. Their experience might be in a life science firm, but could also be as a lawyer or a venture capitalist specialised in that industry, compared to pure academic experience or experience in low technology sectors. Finally, the Board/SAB size was established by adding the total number of members (Adams and Mehran, 2005; Dalton and Dalton, 2005; Isaacson et al., 1994; Vafeas, 2000).

3.2.3 Use of external sources of strategic advices

The Board and SAB involvement in strategy was dichotomised (yes/no) according to the verbatim coded through Atlas.ti. Firms using external sources of strategic advice are those who mentioned that the members were involved in firm orientation, strategic issues, partnerships opportunities, business development, potential contacts, and marketing. If respondents mentioned that they were not satisfied with either the board’s or the SAB’s contribution, it was coded as a no. More specifically, for SABs, a distinction has been made between scientific decisions that were not strategic advice and scientific strategic orientations that were computed as an external source of strategic advice.

3.2.4 Level of internationalisation

Our measure of internationalisation takes into account many of the performance dimensions found in the literature. Speed of internationalisation, diversity, and intensity are among the most well-recognised performance measures. Speed of internationalisation is often measured by the age at which the firm undertakes its first international activity, such as signing an alliance with a foreign partner (Autio et al., 2000; Oviatt and McDougall, 2005). In the international entrepreneurship literature, early internationalisation occurs within the six-year period following the foundation (Coviello and Jones, 2004). Early internationalisation benefits the firms through the learning opportunities it provides since the company is not yet stuck in local routines (McDougall et al., 1994).

Diversity refers to the number of countries and continents where the firm undertakes activities (Manolova and Manev, 2004; Oviatt and McDougall, 2005). Subsequent studies addressing the issue of geographic diversity have shown that even though many companies were involved in multiple countries, they were regionally based in their home-triad market (North America, European Union or Asia). Therefore, some authors suggest that to be considered a truly global firm, a company should maintain activities in each of these three economic blocs (Qian et al., 2008; Rugman, 2005). Diversity offers companies a large range of environmental conditions inside which they can operate during times of turbulence. It also brings experiences, ideas and concepts that facilitate the development of innovations (Li et al., 2012). Consequently, organisational learning would explain diversified SME success in foreign markets.

As for intensity, it represents the firm’s commitment in international markets in terms of resources leading to an increase of the firm’s competencies (Li et al., 2012). It usually refers to the percentage of sales in foreign countries (Oviatt and McDougall, 2005).
However, this measure cannot be used for activities inward the value chain, such as R&D alliances. Indeed, biotechnology firms generally register international partnerships worldwide before generating revenue (McKelvey et al., 2003). In this situation, Nummela et al. (2004) suggest using the percentage of alliances with foreign partners over the total number of alliances (both national and international).

In order to determine the level of internationalisation of our sample firms, we dichotomised firms according to four criteria (see Table 1):

- the six-year period criteria (speed)
- registering a minimum of 10 alliances (intensity)
- an international intensity equal to or higher than 50% of their alliance portfolio (intensity)
- a presence in all regions of the triad (diversity).

To be considered more advanced in their internationalisation (i.e., Level 2), firms had to meet at least three of these four criteria. Consequently, while firms in our sample have all reached a certain level of internationalisation, only nine were classified as Level 2 (13 were classified as Level 1).

Table 1 Level of internationalisation of sample firms

<table>
<thead>
<tr>
<th></th>
<th>Level 1 (n = 13)</th>
<th>Level 2 (n = 9)</th>
<th>Sample (n = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed of internationalisation (6 year criteria)</td>
<td>12</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Total number of alliances (≥10)</td>
<td>3</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>International intensity (≥50%)</td>
<td>7</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>Presence in the triad</td>
<td>0</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

In addition to descriptive data, quotations from top managers are also included to provide more insight into corporate boards and SABs as external sources of strategic advice. The names of companies are kept confidential, and were labelled using both their level of internationalisation (L1 and L2) and their localisation (B for Boston and M for Montreal).

4 Results and analysis

4.1 Sample profiles

Table 2 presents general information about our sample. Overall, it reveals that the companies are somewhat young (the median age is eight years) and small (the median number of employees of 41). Eighty-six percent of the sample has used venture capital while 55% are listed on a stock exchange. When examining the information for each of the two groups, results essentially show comparable profiles in terms of size, use of venture capital, and being listed on a stock exchange. However, Level 2 companies are somewhat older and a majority of them (56%) have generated revenue. Firms from this group are also most often from Montreal.
Table 2 Sample profile

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Level 1 firms</th>
<th>Level 2 firms</th>
<th>Sample (n = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 13)</td>
<td>(n = 9)</td>
<td></td>
</tr>
<tr>
<td>Age (median in years)</td>
<td>6</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Size (median number of employees)</td>
<td>40</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>Income (yes/no)</td>
<td>6(46%)</td>
<td>5(56%)</td>
<td>11(50%)</td>
</tr>
<tr>
<td>Venture capital (yes/no)</td>
<td>11*(85%)</td>
<td>8*(89%)</td>
<td>19(86%)</td>
</tr>
<tr>
<td>Stock market (yes/no)</td>
<td>7(54%)</td>
<td>5(56%)</td>
<td>12(55%)</td>
</tr>
<tr>
<td>Boston</td>
<td>7(54%)</td>
<td>3(33%)</td>
<td>10(45%)</td>
</tr>
<tr>
<td>Montreal</td>
<td>6(46%)</td>
<td>6(67%)</td>
<td>12(55%)</td>
</tr>
</tbody>
</table>

*The information was not available for one firm.

4.2 Examining research questions

In this section, results about the involvement of both corporate boards and SABs in strategic decisions are examined. Demographic profiles of both types of boards were also investigated in order to identify whether specific characteristics are associated with companies that have reached a higher level of internationalisation.

4.2.1 Board of directors

Specific information about the companies’ boards of directors is presented in Table 3. It first indicates the number of companies (and percentage) that have reported a significant board involvement in their strategic decisions. Regarding the overall sample, we found that a majority of firms do indeed involve their boards in strategic decisions (64%). And, in the case of the specific results, they suggest that a larger proportion of companies associated with a higher level of internationalisation (level 2) have reported significant board involvement in strategy (78% vs. 54%).

However, when examining the possible differences regarding the composition of these boards, results were mixed. Indeed, results did not show any differences between the two groups in terms of board size, level of independence, the presence of foreign members, the presence of academics, and the presence of women. Because the median number of these last three elements was zero, we also examined the mean statistics to get a clearer picture. In the case of women representation, we globally found that 14 out of 22 companies (64%) have at least one or more female directors. The mean ratio for the sample is 7% (results vary between 0% and 30%). When using the mean ratio as the measure of central tendency for each group, we did find some differences between them (6% for the level 2 group and 8% for the level 1). In the case of foreign members, we found that the mean ratio for the sample is 6% (results vary between 0% and 38%). And, when using the mean ratio as the measure of central tendency for each group, we found some differences between the two groups (9% for the level 2 group and 3% for the level 1). Finally, with regards to academic representation, the mean ratio for the sample is 6% (results vary between 0% and 20%) and specific results indicate that level 2 companies have an average of 3% while level one have 8%. Only 2 level 2 companies had academics on their boards, while six level one companies had either one or two academics on theirs.
There were some notable differences between the two groups regarding board leadership (dual role of CEO/chairperson of the board), the median percentage of members with industry experience, the median percentage of CEO experience (vs. functional background), and to a lesser degree, the median percentage of members from venture capital companies. These numbers suggest that the boards of level 2 companies have more often selected directors with both CEO experience (50% vs. 41%) and a stronger industry background (86% vs. 67%). In the case of the median percentage of members from VC companies, results suggest that level 2 companies have a higher percentage (20% vs. 13%). Finally, in terms of board leadership, results indicate that the international companies chose to bestow upon their CEOs the additional role of chairperson of the board (67% vs. 23%).

In order to provide more insight into the role and composition of corporate boards, we have presented some quotations that highlight both favourable and unfavourable views (see Table 4). With regards to the boards’ roles, the quotations underline both the monitoring and the advisory roles. One respondent emphasised the monitoring role by describing how the board acts as a watchdog and keeps them accountable (L2-M7). Examples of involvement in strategic decisions are numerous: some have mentioned board input in merger decisions (L2-B8) and in functional strategies such as R&D and finance (L2-M11). L2-M11 is certainly among the companies that perceive its board in a positive light. It is interesting to note that this particular listed company is one of the few companies in our sample that has developed and disclosed on its website a set of governance guidelines that include an explicit mandate for its directors. It asserts the board’s oversight role (as opposed to day-to-day management) and provides recommendations about its role in strategy, such as the annual review of the strategic process and overall strategic directions.
Table 4 Quotations about board of directors

<table>
<thead>
<tr>
<th>Favourable</th>
<th>Unfavourable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Role</strong></td>
<td></td>
</tr>
<tr>
<td>The board is the watchdog that encourages managers to pay attention and be careful. It is about accountability, not about debates. L2-M7</td>
<td>They help to build the portfolio, but most of the time they remain passive. The members of the board are more like mentors. They could push us more, even if it is in our culture to push ourselves. L2-M9</td>
</tr>
<tr>
<td>The Board is very active and focuses primarily on R &amp; D management, legal aspects, and finance. They also contribute objectivity and experience. L2-M11</td>
<td>The board helps more to validate the strategic plan. Only one of the six members of the Board truly understands our strategy. However, one member is a scientist and almost assumes the role of the SAB. L1-M3</td>
</tr>
<tr>
<td>The board advises on preclinical studies and strategy. It ensures that managers keep the focus on the programs and provide feedback on past decisions. L1-B7</td>
<td></td>
</tr>
<tr>
<td>They provide input in the overall strategy; react to the proposals of the management team. They were helpful during the merger. L2-B7</td>
<td></td>
</tr>
<tr>
<td><strong>Skills</strong></td>
<td></td>
</tr>
<tr>
<td>They bring expertise and experience in finance, law, business development, and product development, as well as credibility and their network. L1-M8</td>
<td>The board consists of 10 members, but the management team has more experience than they do. L1-M1</td>
</tr>
<tr>
<td>Members are chosen based on their vision of the future and their industry experience, which is essential to understand the company. L1-B6</td>
<td>The board previously included members of the venture capital company. They gave very bad advice because they knew nothing about the field of biotechnology. We had to educate them so they understood how their advice did not make sense. L2-M12</td>
</tr>
<tr>
<td>All topics are covered: management, marketing, finance and regulation. The board lends credibility to the company. L2-B10</td>
<td></td>
</tr>
<tr>
<td>Once the venture capital companies withdrew, the board was built to assemble complementary skills. It includes both business people and scientists. It is complemented by small business owners abreast of daily concerns. They must have the same ethical approach, the same work ethic as the CEO. L2-M12</td>
<td></td>
</tr>
</tbody>
</table>

Two quotations draw attention to some dissatisfaction with the role corporate boards play. One respondent suggested that their board can only ‘validate the strategic plan’ but cannot assume an advisory role, as only one member truly understands the company’s strategy (L1-M3). Another respondent has characterised their board as being too passive (L2-M9).

Regarding the board’s composition, quotations underscore how companies can seek different types of skills/competencies: Some seem to focus on functional knowledge of traditional areas of business such as finance or marketing (for example, L2-B10), while others seem to focus more on industry experience as it is perceived as essential to truly understand the company (L1-B6). In some cases, personal qualities such as work ethic were mentioned (L2-M12). L1-B6 is another example of a company that has developed and disclosed its governance guidelines. More precisely, they have disclosed the charter of their Nominating/Corporate Governance Committee, which provides an explicit list of criteria used by the Committee to identify and nominate new directors.
Appropriately, the criteria include a mix of skills, competencies (for example, business acumen and experience) and personal qualities (for example, integrity and honesty). They further emphasise the importance of a strong commitment to understand the specificities on the company and its industry. The document clearly highlights the demanding nature of this appointment and how director diligence is essential to the position.

However, as seen in Table 4, there were also unfavourable views about the level of skills and knowledge that directors possess. Both of these quotations were associated with companies that had venture capital company members sitting on the board (L1-M1 and L2-M12).

4.2.2 Scientific advisory board

Because these SABs are not mandatory, we wanted to first examine whether there was a specific profile associated with the firms that did decide to establish an SAB. This examination can provide useful information about possible factors driving the decision to create SABs (see Table 5).

Table 5 Profile of companies with SABs

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>SAB (n = 12)</th>
<th>No SAB (n = 10)</th>
<th>Sample (n = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (median number of years since creation)</td>
<td>6</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Size (median number of employees)</td>
<td>32</td>
<td>58</td>
<td>41</td>
</tr>
<tr>
<td>Income reported (number of firms)</td>
<td>4/12(33%)</td>
<td>7/10(70%)</td>
<td>11/22(50%)</td>
</tr>
<tr>
<td>Venture capital (number of companies using VC)</td>
<td>11/11*(100%)</td>
<td>8/9*(89%)</td>
<td>19/20(95%)</td>
</tr>
<tr>
<td>Stock exchange (number of listed companies)</td>
<td>3(25%)</td>
<td>9(90%)</td>
<td>12(55%)</td>
</tr>
<tr>
<td>SAB involvement in strategy (number of firms)</td>
<td>4/12(33%)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*The information was not available for one firm.

As seen in Table 5, 12 companies decided to establish an SAB. Results seem to indicate that firms that have established an SAB are younger (six years) and smaller (32 employees). We also found that only three of the 12 companies that have established an SAB were also listed on a stock exchange and that only four companies have their SABs involved in strategic decisions. In addition, 33% of firms with SABs have reported actual revenues compared to 70% for those without an SAB.

Because of the much smaller number of companies in this subset, it is difficult to establish a specific profile for each group (see Table 6). However, at first glance, the results do reveal that the level 2 group is comprised of more companies that have reported a greater strategic involvement of their SAB (3 vs. 2); they also indicate that the SAB size of these companies is smaller (5 vs. 7). Results indicate that level 2 companies have a higher median percentage of academics on their SABs (75%) and that their members have slightly less industry experience (27%). Members with CEO experience are a rare occurrence with both groups, particularly when comparing to corporate boards. In the case of global results, only three companies have at least one CEO on their SABs (one level 2 company and 2 level one companies). While female representation is relatively low, it is comparable to the one observed in the case of corporate boards. Finally, in both cases, we found that SAB members are mostly ‘independent’ from the
company and that fewer members of VC companies sit on these types of boards. Indeed, global results indicate that only one company has two venture capital members on its SAB.

Table 6  SAB characteristics and firm level

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Level 1 firms</th>
<th>Level 2 firms</th>
<th>Sample*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 6)*</td>
<td>(n = 6)</td>
<td>(n = 12)</td>
</tr>
<tr>
<td>Involvement of SAB</td>
<td>2/6(33%)</td>
<td>3/6(50%)</td>
<td>5/12(42%)</td>
</tr>
<tr>
<td>Independent members in SAB (median percentage)</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Members with CEO experience (as opposed to functional) (median percentage)</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Members from venture capital (median percentage)</td>
<td>0%*</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Members from universities and public laboratory (median percentage)</td>
<td>70%</td>
<td>75%</td>
<td>70%</td>
</tr>
<tr>
<td>Female members (median number)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Members with industry experience (median percentage)</td>
<td>30%</td>
<td>27%</td>
<td>30%</td>
</tr>
<tr>
<td>SAB size (median number)</td>
<td>7</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

*The information was not available for one firm.

Quotations that highlight opinions regarding SABs are presented in Table 7. Because we wanted to convey a more balanced view of these boards, we included quotations associated with companies that used to have a SAB, but did not at the time of the interview. Various reasons were mentioned in trying to explain why these SABs were dissolved. For example, one respondent (L2-B10) felt that these boards are more appropriate for start-up companies, but may not be as useful for established ones. Another respondent (L1-B7) mentioned that they decided to dissolve the SAB when the company became public. Managing both types of boards had become time consuming and expensive for this company. Actually, our global results are consistent with these views: as mentioned earlier (see Table 5), we found that only three of the L2 companies that established an SAB were also listed on a stock exchange.

As mentioned in Table 7 (L2-B8), some companies have chosen instead to hire consultants when needed – they appreciate the increased flexibility that this alternative to SABs provides. Clearly, many of the comments made during our interviews underscored the need to create a flexible structure around the SABs: One respondent (L1-B6) mentioned that they had established an ‘informal’ SAB composed essentially of scientific advisors around specific products. He further stated that having only one SAB would not be useful. Another respondent (L1-M8) reported that their SAB met formally once a year, but members were consulted throughout the year if need be. This respondent also provided some insights into the reporting structure by mentioning that the SAB produces an annual report for the board of directors.

Several respondents have favourable views of SABs and the potential benefits they can bring the company. For example, one respondent (L2-M7) acknowledged that the SAB was first created only ‘for appearance’; however, he added that the SAB became extremely useful to support scientific decisions. A second respondent (L1-M5) singled out the valuable expertise their SAB members have of FDA regulations, while a third one (L1-M8) drew attention to the useful expertise their SAB has of new product
development and clinical studies. However, as one respondent noted (L2-B10), SAB members cannot be cognisant on all subject matters. Hence, when members offer advice on topics beyond their field of expertise, it can create a delicate situation where ‘egos’ must be managed.

When examining the information provided on company websites, we found examples of some of the best practices proposed to enhance the effectiveness of SABs. One listed company had indeed developed and disclosed on its website a written charter for its SAB. The charter explicitly establishes the SAB’s role in the identification and evaluation of business opportunities. In addition, the charter provides clear examples of SAB involvement in strategic decisions to help better define the scope of the SAB’s activities and also lays out general criteria for board membership.

Table 7 Quotations about SABs

<table>
<thead>
<tr>
<th>Favourable</th>
<th>Unfavourable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role</td>
<td>SABs are especially for start-up companies. L2-B10</td>
</tr>
<tr>
<td></td>
<td>He is satisfied with his SAB in regards to science. However, sometimes members provide advice outside their area of expertise and it makes for a delicate situation to tell them. This is why problems can arise with this type of committee. L2-M12</td>
</tr>
<tr>
<td>Skills/</td>
<td>The company does not have an SAB now that it is public – it has now new obligations. L1-B7</td>
</tr>
<tr>
<td>Competencies</td>
<td>The company does not have a formal SAB, but has scientific advisors recruited by product. One committee would be less useful at the moment. L1- B6</td>
</tr>
<tr>
<td>The SAB has recently changed. Previously, it was more about appearances. Now it is more functional because it is composed of members specialised in their particular field who can truly assist in the scientific decisions. L2-M7</td>
<td></td>
</tr>
<tr>
<td>SAB has evolved and is currently at its lowest number of members. Initially, it consisted of worldwide scientists. For the last three years, it has included experts in clinical studies and product development. It brings expertise and credibility. It is consulted once a year and reports to the Board. In addition, members are consulted as needed according to their expertise. L1-M8</td>
<td></td>
</tr>
<tr>
<td>The SAB consists of nine members including Americans. They are consulted either at official meetings or individually by phone when needed. They are recruited based on their expertise, particularly with respect to FDA expertise, which explains the presence of Americans. L1-M5</td>
<td></td>
</tr>
<tr>
<td>The SAB is composed of very knowledgeable people, world experts in each disease. L2-M12</td>
<td></td>
</tr>
</tbody>
</table>

5 Discussion and conclusion

Increased pressure to compete globally has forced biotech firms to closely examine the resources they can access to formulate and implement a successful international strategy. This study’s main objective was to gain a better understanding of these issues in order to both assist management teams as they make important decisions about the composition of their corporate and scientific boards, and to contribute to the literature on governance and international entrepreneurship. This study generally demonstrates that a majority of firms
are strategically using the knowledge and skills made available through their corporate boards and SABs, and that these resources can contribute meaningfully to their internationalisation.

When examining global results about corporate board composition, we first found that directors are mostly ‘independent’. This finding lends support to the RBV, which suggests that independent directors can contribute valuable, although not firm-specific, knowledge and expertise during board meetings (Hillman et al., 2000; Ravasi and Zattoni 2006) and that independence does not need to be a barrier to strategy involvement. Secondly, we found that companies have opted to build boards with a diversity of director skills, including functional, executive, international, and scientific. They also seem to pursue, on some level, gender diversity. Indeed, we found that 64% of our companies (compared to 55% in the NACD survey) have at least one female on their board.

However, there were also unfavourable views about corporate boards and their strategic value. Some respondents did mention that they found their boards too passive while others questioned the quality of their skills and knowledge. In a few cases, criticisms were addressed specifically in the case of venture capital representatives. These results will certainly fuel the debate about the expertise venture capital representatives can bring to corporate boards (Clarysse et al., 2007; Williams et al., 2006).

When examining results according to each group, we found a specific profile associated with level 2 companies. Indeed, we found that these companies seem to favour directors with industry and CEO expertise (as opposed to a more functional expertise). These results indicate that these companies place more value on this type of expertise that is said to be more tacit, hence more valuable. Furthermore, these companies have a somewhat smaller percentage of academics on their boards, suggesting that they may value the ‘business mindset’ over the ‘scientific mindset’. Business skills and knowledge seem to be more beneficial to these entrepreneurs. Finally, in terms of board leadership, results indicate that level 2 companies have adopted a board structure where the CEO has a dual role (chairperson of the board). While boards of both groups are mostly comprised of independent directors, level 2 companies are not trying to further the independence of their boards by ensuring that its leadership is also independent. Of course, in such a case, it is essential that a good working relationship exist between the two.

The examination of SAB global results leads to a better understanding of possible benefits and drawbacks associated with these boards. First, and consistent with comparable studies, we found that over 54% of companies we surveyed have chosen to establish an SAB. We also found that younger and smaller firms, often lacking the resources of their larger and older counterparts, are more likely to create SABs (Cetindamar and Laage-Hellman, 2003; Chok, 2009). Second, we found that only three of the 12 companies that have established an SAB were also listed on a stock exchange. While we know little about factors driving the decision to establish an SAB, our results do suggest that small listed companies may find that maintaining both types of boards is too demanding. Finally, results about the strategic involvement of the SABs were particularly interesting. The fact that only four out of 12 companies reported that their SABs were indeed involved in strategic decisions was somewhat surprising. It certainly raises questions about their actual contribution to the companies’ decision-making process. These results can certainly be interpreted in the context of the neo-institutional theory. They can illustrate how these companies may have created these SABs only as a means to gain and maintain legitimacy to their stakeholders, not as a means to improve
the quality of their strategic decisions. While these boards may be valuable as a signalling device to various stakeholders, companies do not seem to take advantage of these experts. Reasons behind this superficial use of SABs could be numerous – a closer examination could reveal that these SABs may not meet the actual needs, culture, or managerial style of the management team.

When examining specific SAB results according to each group, we found that level 2 companies have reported a greater strategic involvement of their SABs. In terms of their specific profile, we found that these level 2 companies have smaller SABs that are comprised of a higher percentage of academics. In addition, our results illustrate how both types of boards focus on different types of expertise. Clearly, industry knowledge and CEO expertise is more valuable when exercising corporate oversight. Conversely, academic/scientific expertise is essential for SAB membership.

Using resource-based view arguments, study findings have provided valuable information about two external sources of knowledge available to high-tech firms. This study shed light on the specific role of the corporate and scientific advisory boards in the internationalisation of biotech firms, particularly because of the role they play in strategic decisions and execution in forming international strategic alliances. Indeed, these organisational structures help the firms gain legitimacy and credibility in the eye of investors and partners. Therefore, since we describe board members experience, expertise and the relational capital they provide, this study contributes to the resource-dependency theory. It also contributes to the resource-based view theory by looking at different combinations of board knowledge, skills, and involvement leading to a higher level of internationalisation. These findings will particularly guide future research on scientific advisory boards since very few studies have been published on that matter.

This study’s findings contribute to the literature on governance and international entrepreneurship by providing relevant empirical evidence based on primary data on this complex topic. While there are studies that have examined how corporate boards can contribute to the internationalisation, more studies are necessary to establish an accurate profile that takes into account sector and size specificity. In addition, few studies have closely examined SABs, particularly as they pertain to their strategic role and potential impact.

This study also has managerial implications and should provide guidance to companies both currently examining the composition and functioning of their boards and those wishing to establish (or maintain) an effective SAB. Companies need to address these issues carefully and appreciate the potential trade-offs and consequences associated with decisions regarding both types of boards. Hopefully, these results will encourage dialogue between management and board members to examine and evaluate their role. While it is not the board members’ responsibility to micro-manage the company, they need to thoroughly understand their potential role in developing and implementing the company’s mission, vision, and strategy. Establishing a shared vision and understanding of these responsibilities is critical to manage expectations and ensure constructive relationships. This vision should be documented and communicated to all present and future members. Specific criteria about membership to both types of boards should also be discussed and explicitly determined.

This study should encourage companies to truly evaluate their motivations when selecting directors. Surely, to achieve excellence and to counter passive boards, companies must ensure that their boards are comprised of qualified directors that have the time to diligently prepare for and actively participate in this process. Researchers have
long emphasised the importance of adopting criteria tailored to a company’s specific needs (Withers et al., 2012). They have suggested that issues such as the company’s size, strategy and stage of development should have a bearing on actual needs regarding directors’ expertise. To help build boards with the right pool of talent and qualities, companies and their boards can develop tools to evaluate current expertise against needed competencies and to use this information in the selection process.

Although this study enhances our knowledge about the potential role of both corporate directors and SAB members, the results obtained must be interpreted in the context of the study’s limitations. First, the information collected was based on a single respondent involved in the establishment of international alliances, who provided information for each firm. Second, this study focuses on one sector (human health biotechnology), therefore limiting the scope of findings. Results would greatly benefit from a comparison to other biotechnology or high-tech sectors such as optics, software, and aeronautics.

This study’s findings and limitations point to several interesting avenues for future research. Other studies could combine information from additional actors playing strategic roles, particularly directors and SAB members. Such studies could provide insight into possible factors that can act as barriers to greater involvement from these actors. Indeed, companies must implement the appropriate processes to support boards’ activities. For example, in order to fulfil their responsibilities, they should have access to accurate, relevant, and timely information (Roy, 2011). No doubt, the sensitive nature of internal corporate information can create significant barriers to access. Nevertheless, improving the quality of the information that board members receive is critical, as it can play a key role in enhancing their participation in the decision-making process. It is important to note that lower levels of involvement in strategic decisions by directors and SAB members may also be associated with the CEO’s attitude. Some CEOs can show resistance to an increase in the monitoring and evaluation of their performance. But, rather than obstructing this process, CEOs should focus on the potential benefits that board members’ increased participation and input could bring.

References


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