Journal of Business Research xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

# Leveraging international R&D teams of portfolio entrepreneurs and management controllers to innovate: Implications of algorithmic decision-making

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ARTICLE INFO

*Keywords:*
International R&D teams
Portfolio entrepreneurs
Throughput model
AI algorithms
Decision-making
Management controllers

ABSTRACT

We focus on how international research and development (R&D) teams of portfolio entrepreneurs and their management controllers can help to innovate and sustain entrepreneurial activities. An algorithmic decision-making model is implemented that indicates how such portfolio entrepreneurs build complex business structures and create a context for management accounting controllers' information that is suggestive of R&D internationalization challenges. A case study is utilized to compare one large and one medium-sized business conglomerate. Open interviews were conducted with portfolio entrepreneurs and their management controllers. We found that the international R&D teams of portfolio entrepreneurs and their management controllers have different mindsets when assessing sustainable innovative approaches for the existing business and for future expansion through acquisitions. Our findings assert the importance of context when understanding the challenges of management controllers dealing with the internationalization of such R&D efforts.

## 1. Introduction

Teams engaging in innovation and entrepreneurial activities within and across organizations have attracted significant scholarly attention due to their unique characteristics as sources of research and development (R&D) (Vrontis & Christofi, 2019) and corporate venturing (Battistini et al., 2013). In the same vein, a recent surge in cross-border R&D collaborations has brought about challenges associated with managing R&D internationalization (Hurtado-Torres et al., 2018; Zhang et al., 2021). Such associated challenges are no less prevalent in entrepreneurship decision-making processes under uncertain conditions, severe time pressure, and complex environments (Shepherd et al., 2015) by upper echelon teams comprising portfolio entrepreneurs and management controllers (Frank & Landström, 2016; Strike, 2013) as a response to other actors and the dynamic business environment. Yet a great deal of research on the key actors in the entrepreneurial and innovation process has predominantly focused on the roles played by employees or technical experts and their collaborators in R&D teams (Hoisl et al., 2017; Lisak et al., 2016), while directing relatively less attention to the upper echelon teams in an organization (Talke et al., 2010; Zhang et al., 2021) and their decision-making processes (Frank & Landström, 2016; Strike, 2013). This article extends extant research on the role of the decision-making processes of top management teams (TMTs) in leveraging R&D internationalization to innovate and sustain entrepreneurial activities by exploring 1) how portfolio entrepreneurs influence controllers' management accounting processes to foster innovation and 2) the similarities/differences in the team roles of management controllers and portfolio entrepreneurs.

Entrepreneurial decision-making is a well-established area of interest (Forlani & Mullins, 2000; Lévesque et al., 2009; Shepherd et al., 2015),

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https://doi.org/10.1016/j.jbusres.2021.10.053
Received 26 January 2019; Received in revised form 18 October 2021; Accepted 20 October 2021

given the emphasis on accurate decision-making under conditions of uncertainty regarding how, when, where, and by whom opportunities are discovered, evaluated, and exploited to produce future goods and services (Shane & Venkataraman, 2000). Here, we draw specific attention to the mindset and decision-making process of portfolio entrepreneurs (a type of habitual entrepreneurs who found companies that build and expand to innovate via complex business structures; see Brown et al., 2017; Westhead & Wright, 1998; Wiklund & Shepard, 2008) and management controllers working as a team to shape R&D internationalization and to its effect on innovation and entrepreneurial outcomes. Our focus is on examining the black box of portfolio entrepreneurs' decisions. That is, this paper presents algorithmic pathways, such as artificial intelligence (AI) algorithms, that allow for a unique interpretation of the decision-making process of portfolio entrepreneurs (Rodgers et al., 2021). In addition, our approach contributes to the literature by addressing entrepreneurs' strategic problems and employing a decision-making model, which is discussed later. We define AI as an assembly of algorithms that use a prearranged set of instructions to select a predetermined, fixed, coded procedure that is implemented when it comes across a prompt (Rodgers, 2020).

A comprehensive review examining the internationalization of R&D and innovation activities by business enterprises operating across borders has identified increasing scholarly interest in two major perspectives that continue to challenge business research scholars: the network-like characteristics of international R&D activities and the role of location-specific factors (Papanastassiou et al., 2020). The network-like characteristics of international R&D activities suggest that R&D internationalization is geared primarily toward a more complex, multicentric perspective on R&D activities that involves multiple actors within and across the borders of multinational enterprises (MNEs) (Castellani & Zanfei, 2006; Papanastassiou et al., 2020). This increasingly dominant viewpoint represents a fundamental shift from the traditional model, which emphasizes the centralization of international R&D activities in the MNEs' home country (Belderbos et al., 2013).

The second dominant perspective contends that locational factors are the driving determinants for location-based patterns in the cross-border R&D activities of MNEs, including the generation, exploitation, and diffusion of knowledge (Ambos & Håkanson, 2014; Feldman & Kogler, 2010; Papanastassiou et al., 2020). We also argue that the above two perspectives on R&D internationalization and their impact on innovation can be related to the decision-maker's environmental map of entrepreneurial decision-making. In the latter context, the decision-maker portrays the characteristics of the entrepreneur, while the environment represents the entrepreneurial decision context (Shepherd et al., 2015).

However, the diverse streams of studies on the two perspectives not only indicate divergence with respect to the basis (networks or locational factors) but also a lack of explicit consideration of the team context—that is, upper echelon teams (comprising portfolio entrepreneurs and management controllers) in which both perspectives are extended from the viewpoint of team-level actions (i.e., the decision-maker characteristics and decision contexts are integrated from the viewpoint of team entrepreneurial decision-making). Our focus is also consistent with a recent empirical study on R&D internationalization and innovation outcomes that has highlighted the team process–cognition nexus to foster understanding of the innovation process (Hadjielias et al., 2021). Consequently, we emphasize that our study brings new contributions. First, we model a decision-making pathway, unlike previous studies on entrepreneurial decisions that focus mostly on judgment and decision-making choices (Hastie, 2001; Hogarth & Karelaia, 2012), without explicit emphasis on the information available to decision-makers and their perception, interconnections, and pathways leading to more effective decisions (Foss & Rodgers, 2011; Rodgers et al., 2019).

Moreover, our proposed decision pathways use AI algorithms to facilitate R&D internationalization–innovation decisions (cf. Rodgers et al., 2019). Second, we advance the concept of the global mindset (Andresen & Bergdolt, 2017; Torkkeli et al., 2018) from the viewpoint of team-level decision-making in the international entrepreneurial context, as opposed to individual entrepreneurial decision-making under conditions of uncertainty (Hammond, 1996; Hastie & Dawes, 2009), and thus complement our proposed decision-making model.

The rest of the study is structured as follows: Next, we discuss the background and review of the literature from which we build the theoretical development and framework of the study. Thereafter, we outline our methodology and discuss the findings. Finally, we conclude by discussing the theoretical and practical implications, and avenues for future research.

## 2. Background and literature review

Decision-making processes are important for advancing innovation and entrepreneurial activities. Particularly in the context of R&D internationalization (which herein relates to international expansion and development activities), entrepreneurial decision-making involves greater uncertainty, where the effective decision-making of key actors becomes even more critical in fostering such developments, whether in SMEs or in large companies (cf. Shepherd et al., 2015). Moreover, the global mindset of portfolio entrepreneurs and management controllers can shape the effectiveness of R&D internationalization, given that cultural and strategic realities regarding global and local tensions demand an optimal balancing position (Levy et al., 2007). Next, we review extant scholarship on the internationalization of R&D teams and situate portfolio entrepreneurs, management controllers, and their decision-making processes within the team context.

A recent review of international business scholarship has underscored a gradual and comprehensive change in perspective over the past 50 years regarding R&D internationalization and innovation in enterprises running businesses across national boundaries (e.g., MNEs) (Papanastassiou et al., 2020). Such a gradual and comprehensive shift in perspective has led to two increasingly dominant perspectives: the network-like characteristics of international R&D activities and the role of location-specific factors in R&D internationalization. These two viewpoints have resulted as outcomes of attempts to develop comprehensive interdisciplinary frameworks for understanding MNEs' cross-border R&D activities, especially after the turn of the 21st century.

Scholars agree that international R&D networking derives from the combination of the traditional asset-exploiting motives of R&D internationalization and asset-seeking or asset-augmenting activities, which thus foster a double network structure in organizing MNEs' innovative activities (Castellani & Zanfei, 2006). On the one hand, researchers have demonstrated the interconnection of an increasing number of internal units deeply engaged in a firm's use, generation, and absorption of knowledge (Narula, 2017). On the other hand, studies have also shown that the networks of internal units develop external networks with actors outside the firm's boundaries to enhance the prospect for the use, generation, and absorption of knowledge (Narula & Duysters, 2004; Chen et al., 2019). In their review article, Papanastassiou et al. (2020) summarized that complementarity between internal and external networking is an important development that emerges from the literature on R&D networking as key to leveraging a variety of knowledge sources, although this aspect requires further studies.

Further, regarding the perspective of locational factors driving cross-border R&D activities, scholars have found a growing consideration of the role played by subnational levels (e.g., regions, cities, and metropolitan areas) in drawing global players for innovation (Castellani & Santangelo, 2016; Tojeiro-Rivero & Moreno, 2019). Studies point to varying locational factors, such as the role of "local buzz" in driving the geographic clustering of innovation (Storper & Venables, 2004), cluster global connectedness (Esposito & Rigby, 2019), external agglomeration economies relating to the information costs of destination countries, regions, and cities (Henisz & Delios, 2001), and internal agglomeration

economies and intra-firm co-location, which allows for sharing physical and human assets in geographically concentrated units (Stallkamp et al., 2018).

However, the role of teams has gained growing interest in recent scholarship on R&D internationalization and associated innovation outcomes. For instance, in an empirical study exploring the functioning of teams dealing with digital transformations, Hadjielias et al. (2021) found that innovation teams rely on both team-specific and digital project-specific cognitions to function, thus establishing the need for a cognition-process nexus with such contexts. In addition, using a study of 1635 Chinese manufacturing firms, Zhang et al. (2021) explored the effects of the internationalization of R&D teams on firm innovations and found support for the impact of foreign technocrats in TMTs. Further, in a qualitative study on multicultural R&D team operations in five Finnish software firms, Arslan et al. (2021) found the team task environment and individual team members' personal experiences to positively influence R&D operations. Another empirical study on the impact of scientific knowledge within inventing teams on the development of more general-purpose solutions within the aerospace sector showed the effect to be negatively related, to be reduced when the scientists worked in an international team, and to be further strengthened by their team experience (Ardito et al., 2021).

Here, we extend this team context with relevance to a particular set of TMTs in the entrepreneurial context: teams of portfolio entrepreneurs and management controllers in their international expansion and development activities. In entrepreneurship scholarship, there are two groups of habitual entrepreneurs (people who have created, inherited, and/or acquired more than one enterprise; see Iacobucci & Rosa, 2010; Spivack et al., 2014) that are involved in R&D internationalization (Westhead & Wright, 1998; Ucbasaran et al., 2006). The first group starts companies in a serial manner—one after the other (Parker, 2013), while the second builds portfolios consisting of companies in a variety of industries (Iacobucci, 2002; Parker, 2014). This study examines the second category: company founders who build complex organizational structures alongside innovation and R&D activities that become mid-sized enterprises through R&D internationalization. Prior literature has identified and discussed the distinct types of entrepreneurial teams brought into existence by portfolio entrepreneurs: joint ventures with established entrepreneurs, employee involvement, and intrapreneurship (Iacobucci & Rosa, 2010; Sieger et al., 2011).

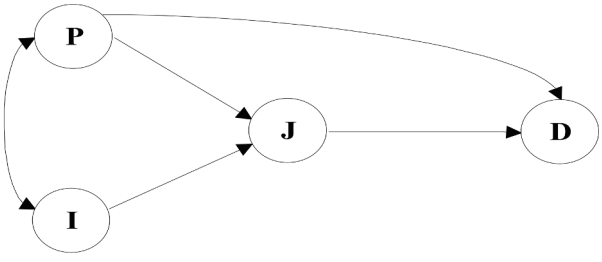
The business community and popular media often feature portfolio entrepreneurs (e.g., Birley & Westhead, 1993; Chang, 2006). Nonetheless, such entrepreneurs have seldom been the subject of qualitative academic research (Fu et al., 2018; Gottschalk et al., 2017; Ucbasaran et al., 2006; Westhead & Wright, 2015) or studied within a team decision-making context. In addition, studies on habitual entrepreneurs have usually focused on the personalities of entrepreneurs and their evolving organizational structures and are frequently based on survey data. Case studies, while in high demand, are less common (Ucbasaran et al., 2006). In addition, there is little research on the complex and dynamic relationship between an enterprise's entrepreneur and its controller. In this study, qualitative data are used to address challenges relating to innovation and entrepreneurial activities in the portfolio entrepreneurs–management controllers nexus (see Huovinen & Tihula, 2008), in which the possibility of "creative destruction" exists (Schumpeter, 1939). Moreover, much is known about management accounting information and the role of management accountants/controllers (Macintosh & Scapens, 1990; Scapens, 2006). For example, previous research has noted that management accountants make decisions about existing R&D activities and new businesses in both the short and long term (Samuelsson, 1996, 2008). Writing on the balanced scorecard strategy in management accounting, Kaplan and Norton (1996, 2001) stressed the importance of developing new control systems and links between R&D strategy, budget, and operative controls. It is of interest to learn whether more advanced management accounting tools are useful tactics in portfolio entrepreneurship, where spur-of-the-moment acquisitions, fast growth, and *ad hoc* decisions are common (Nilsson, 2003).

Our study advances the literature by suggesting that a process thinking decision-making model (described as the Throughput Model) approach (Foss & Rodgers, 2011; Rodgers et al., 2019) can be useful in addressing several limitations in traditional approaches to studying R&D internationalization in entrepreneurship, including different sustainable innovative perspectives on the entrepreneurial process (Agarwal & Braguinsky, 2015; Baron & Ward, 2004). We further complement this approach with insights from the concept of "global mindset" (Felício et al., 2012), which represents the international/global characteristics of entrepreneurs' psychological openness to and articulation of multiple realities that allow for finding the optimal response to the inevitable tensions between global and local strategic imperatives (Contractor et al., 2019; Levy et al., 2007).

Research from the managerial cognition literature (Hodgkinson & Sparrow, 2002; Huff, 1997) underlines that the global mindset represents a core determinant of top managers' strategic perception of the global market (Gupta & Govindarajan, 2002; Nummela et al., 2004). Kyvik et al. (2013) found a strong causal association between global mindset and small firms' internationalization behavior while emphasizing that the formation of decision-makers' global mindset is strongly influenced by their cognitive flexibility, networking capability, and interdisciplinary collaboration. Relatedly, in an empirical analysis of managers from headquarters and subsidiaries of 312 Chinese multinational enterprises, Jiang et al. (2021) showed that subsidiary managers' global mindset is positively related to the quality of the headquarters–subsidiary relationships, although this association is positively moderated, for instance, by a higher flexibility of subsidiary managers' cognitive personality. Moreover, while the concepts of global mindset and cultural intelligence are described as two main intercultural competencies in the management literature, Andresen and Bergdolt (2017) noted that global mindset is highly relevant at the strategic and normative levels of business management as opposed to cultural intelligence, which is sufficient for employees working at the operative level. While prior studies underscored the vital role of global mindset in the decision-making process of top-level managers, we extend this discussion to TMT decision-making with respect to how they arrive at optimal positions that address strategic imperatives relating to the international expansion and development of business ventures.

## 3. Framework and theoretical development

We frame our theoretical development in the evolving context of R&D internationalization and through the lens of the information available to the portfolio entrepreneur and the controller. This framing is consistent with the neo-Schumpeterian perspective (Hanusch & Pyka, 2007), which situates entrepreneurial activities in evolving contexts, and with the British management accounting approach to contextual dimensions (Scapens, 2006). In order to illustrate these frameworks, we implement a process thinking model called the Throughput Model




where P= perception, I= information, J= judgment, and D= decision choice.

**Fig. 1.** Entrepreneurs' decision processes diagram.

(Rodgers, 1997), which depicts four major concepts: (1) perception (**P**), (2) information (**I**), (3) judgment (**J**), and (4) decision choice (**D**) (see Fig. 1).

In this model, the perception of entrepreneurs' R&D activities and of the new building process represents the categorization and classification of information. That is, perception and the "presented information" (i.e., financial/management information) are interdependent or coherent in this model, since information can influence how entrepreneurs frame a problem (i.e., their perception) or how they select the evidence (i.e., information) to be implemented in the decision-making process (i.e., P ↔ I). Judgment (intermittent development) represents the middle stage and constitutes the analysis of perception and/or information. Furthermore, perception has a direct impact on judgment (i.e., P → D). Entrepreneurs' methods of problem selection influence their intermittent development in the judgment stage (Foss & Rodgers, 2011; Rodgers, 1997).

In the Throughput Model, information (circle 1 in Fig. 1) also influences judgment (i.e., I → J). For example, information stored in memory affects entrepreneurs' assessments of framed evaluations. Before individuals can make a decision, they generally encode the information and develop a representation of the problem. Finally, perception and judgment can influence decision choice (i.e., P → D, and J → D, respectively). That is, automatic perception-like heuristics and more purposeful information-processing strategies (judgment) are intricately connected in most decision choices. Errors, biases, and context-dependent heuristics may derive from cognitive apparatuses of which individuals are essentially unaware, and these may have a direct effect on decision choice (Rodgers, 1997). The judgment strategies that impact decision choice are under an individual's intentional control.

Hence, the evolving context of

1. **P ↔ I** denotes the interaction between entrepreneurs' new building processes and the use of management control information;
2. **P → J** represents the entrepreneur's framing that influences intermittent development;
3. **P → D** embodies the entrepreneur's framing that influences the organizational group structure of the decision choice;
4. **I → J** characterizes management control information affecting intermittent development;
5. **J → D** symbolizes intermittent development impacting the organizational group structure of the decision choice (see Fig. 2).

This model was selected because it examines the decision-making processes that are part of individuals' managing activities (Foss & Rodgers, 2011). Furthermore, this modeling process enables an examination inside the black box containing the pathways that contribute to the internationalization of R&D teams. Finally, the Throughput Model provides a deeper understanding of the processes employed by entrepreneurs and management controllers working as teams in the context of R&D internationalization.

This model has been implemented in studies that conceptualize a number of important issues in accounting, management, and organizational behavior (Foss & Rodgers, 2011; Rodgers & Housel, 1987). Furthermore, the Throughput Model has been used to illuminate critical pathways in ethical decision-making that are impacted by different sources of information and environmental conditions (Rodgers et al., 2009).

Stacey's (2007) theory on strategic management, which deals with the complex responsive processes of organizational dynamics (J → D), helps us understand the evolving contexts in which portfolio entrepreneurs and controllers find themselves within their sphere of tension (P → D) and the entrepreneur's framing that influences intermittent development (P → J). Given the fast pace of business development, investments and other decisions must be made quickly and sometimes without thorough analysis. The decision-makers may not be able to make calculated decisions that require lengthy study (i.e., P → D). Their learning seems to lag behind their responses (Weick, 1995). Using dynamic functionalistic theory, Mintzberg (1983a) discussed how organizational structures must transform if they are to innovate. Such transformations are coupled with emotional tensions (Moxnes, 2008). The entrepreneur who directly controls a simple structure must switch to a more remote role as a capitalist, thus concentrating on high returns on investment when the structure transforms, for instance, into a decentralized organization (Mintzberg, 1983a). Since entrepreneurs' priorities may be deeply embedded in the organizational structure, there is already a high degree of internal complexity. If the transformation fails, we can assume that the complexity of controlling such structures will increase.

International mergers and acquisitions (M&As) have long been used as an important strategic tool to develop and expand organizations (Degbey & Pelto, 2013, 2015, 2021; Larsson & Finkelstein, 1999; Tarba et al., 2019) and sustain their innovation and R&D activities (Dao et al., 2017). Thus, M&As are a means for organizations to innovate by restructuring or internationalizing (Vermeulen & Barkema, 2001; Zollo & Singh, 2004) and are employed to cope with environmental changes (Bauer et al., 2017; Swaminathan et al., 2008). However, M&A decisions are full of complexity and cause disruptions to both the acquiring and acquired parties, particularly due to challenges during integration—the phase regarded as decisive for M&A success (Angwin & Meadows, 2015; Haspeslagh & Jemison, 1991). Thus, M&A integration actions, though complex and disruptive, are tightly linked to synergy realization (Larsson & Finkelstein, 1999), as it is the phase involving linking, removing, transforming, and adapting the previous mental models, routines, and structures (Bauer et al., 2017; Hughes et al., 2020; Shrivastava, 1986).

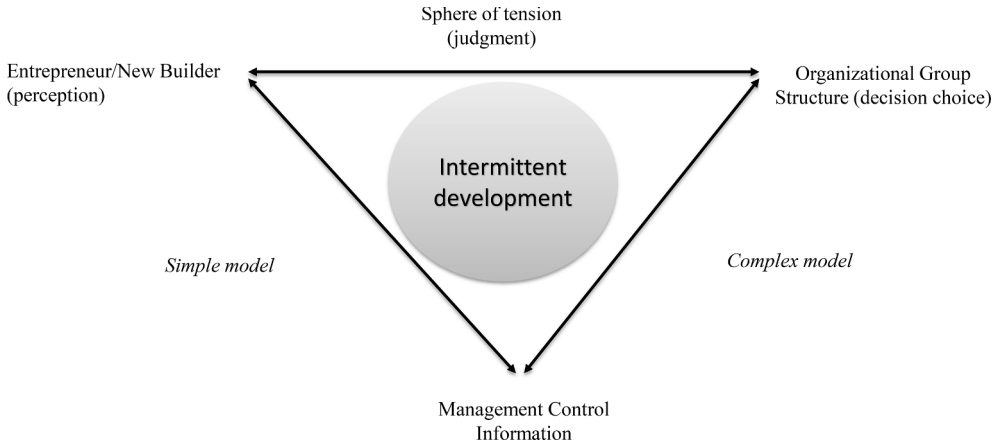



**Fig. 2.** Enterpreneur/New Builder pushing hard on intermittent business development in the context of a sphere of tension with simple and complex models.

For example, during takeovers (e.g., especially hostile ones), the organizational structural change due to integration may lead to tensions between high-level strategies and customary procedures (Angwin, 2007), or integration challenges may result in problems related to different cultures, values, and ways of working (Rottig et al., 2013; Stahl & Voigt, 2008; Tarba et al., 2019; Weber et al., 2009, 2011). However, the frequency and scale of M&As have dramatically increased during the past two decades (Degbey, 2015; Gomes et al., 2011; Weber et al., 2014), despite vast evidence demonstrating that M&As, on average, fail to meet performance objectives due to the complexity involved (King et al., 2021; Meglio & Risberg, 2011; Papadakis & Thanos, 2010).

How is this complexity handled? Abell (1993) concluded that outstanding firms manage with dual strategies: mastering the present and preempting the future. To Abell's two strategies, we add a third: *Integrating a Throughput Model in order to gain more clarity regarding sustaining innovation and entrepreneurial activities*. In the Boston Consulting Group's Growth-Share Matrix, which lacks this third dimension, the organization's "cash cows" provide the resources needed to acquire new entities (Henderson, 1984). This assumption has no relevance to the integration of the present and the future; it refers to the situation in which the new replaces the old or to Abell's dual strategies. There is no simple solution for handling the complexity of integrating business entities (Bauer et al., 2017).

### 3.1. The portfolio entrepreneur (perception or framing issues)

Entrepreneurship is a multidisciplinary area with several schools of thought (see Bjerke, 2005; Granovetter, 1973; Hanusch & Pyka, 2007; Kaplan, 2003; Nyström, 1993; Schumpeter, 1939). A key question in all these schools is whether the entrepreneur is dependent on or creates the R&D environment. Taking a social constructivist perspective on entrepreneurs, Reynolds (1991) believed that a combination of social context and opportunity explains the differences in sustaining innovations arising from entrepreneurial behavior (McKeever et al., 2014).

According to Abell (1993), portfolio entrepreneurs have shown an overwhelming preference for the strategy of pre-empting the future. Eckhardt and Shane (2003) claimed that portfolio entrepreneurs are more interested in seeking opportunities based on their strong emotional drive than in administering existing structures. As portfolio entrepreneurs, they recognize the opportunities for sustaining innovation in new businesses, examining international R&D processes, and restructuring existing businesses. Schumpeter (1939) referred to the latter activity as "creative destruction." Given the contextual perspective of the neo-Schumpeterian school (Hanusch & Pyka, 2007), it is natural that there are many entrepreneurial categories (Ucbasaran et al., 2006). This school of thought also focuses on the entrepreneurs themselves as actors who advance business development in such societal and organizational contexts. Some examples are Li and Mitchell's (2009) study of small enterprise innovation in China and studies on entrepreneurship in development contexts (Ucbasaran et al., 2003; Westhead et al., 2005). Portfolio entrepreneurs acting in several contexts require a plural engagement in which they act as managers of meaning (Nilsson, 2003).

### 3.2. Management accounting information

Young (1987) and Gibson (1992) claimed that the meaning of accounting information, when coupled with the international R&D activity of the entrepreneur, has little effect on actions. However, other researchers disagree. Ax et al. (2002) wrote that the primary aim of management accounting is to provide business entities with information they can use to meet their objectives. Hallgren (as cited in Samuelsson, 1996) stated, "company expansion and growth require capital. The controller plays an important role in making decisions about how and where capital is acquired" (authors' translation, p. 452). More recent research also claims that both financial and management accounting information are important for sustaining innovative business decisions (Lövstål, 2008; Lundell, 2005) in entrepreneurial companies.

For this study, we adapted the British management accounting approach (Scapens, 2006). This school is concerned with accounting practices in their external and internal institutional aspects, especially those influenced by trust and power relationships. One conclusion of this approach, based on more than 35 years of research by Scapens (2006), is that entrepreneurial organizations often have a pattern of unobserved managerial accounting activity that influences the development of the business.

Johnson and Kaplan (1987) argued that it is difficult to understand management accounting when several tabulations and reporting systems are used. This is especially the case in international entrepreneurial companies because of the entrepreneurs' often minimal accounting knowledge. For them, the R&D interpretation of different costing reporting systems and tabulations requires considerable analysis, which may slow down productivity. Moreover, as the complexity of the business environment increases, it is ever more difficult to evaluate the relevance of such criteria.

### 3.3. The portfolio entrepreneur–controller relationship ($P \leftrightarrow I$)

Portfolio entrepreneurs (Ucbasaran et al., 2006) seek new businesses, integrate R&D activities into new and complex international structures, and work partly within pluralistic frames. Portfolio entrepreneurs do not seem to recognize the theory of "relevance lost" (Johnson & Kaplan, 1987; see also Hopper & Bui, 2016 for an analysis of the theories in management accounting research) from their self-constructed costing models based on the business opportunity perspective. Controllers take an entirely different approach and use a different set of management techniques.

In this study, however, we move beyond the notion that controllers work primarily with a set of techniques (Puxty, 1993; Smith, 2019). We assume that controllers recognize the necessity of delivering relevant and important information in a timely manner to principals regarding R&D internationalization. Portfolio entrepreneurs expect their controllers to present them with information that both explains and predicts the R&D internationalization. Controllers, who need to understand past, present, and future situations, have to communicate relevant information to decision-makers, which they accomplish using routine accounting structures (Englund & Gerdin, 2014; Macintosh & Scapens, 1990). Yet, more management accounting information is needed when companies are growing and/or undergoing change and thus lack a stable accounting structure (Alsharari, 2019; Feeney & Pierce, 2016; Macintosh, 1994; Makrygiannakis & Jack, 2016). Nevertheless, we propose that because portfolio entrepreneurs are constantly looking to integrate R&D into international business activities, often in crisis mode, these management accounting information structures may have little importance.

According to Puxty (1993), management accounting is traditionally treated as a closed system with a technical orientation that is ahistorical, apolitical, rationalistic, functionalistic, reductionist, and problem-centered (see also Bromwich & Scapens, 2016 work on management accounting research: 25 years on). There are three main tasks for controllers who report to portfolio entrepreneurs in this closed system: the organization of daily management accounting work; the adaptation of R&D internationalization activities and the integration of sustainable innovative businesses into the existing accounting structure; and the search for capital infusion. Yet, an additional task is managing the information systems that, within the context of balancing, compromising, and structuring strategies, may cause complicated international organizational tensions. The various tasks assigned to the controller require a deeper examination (Král et al., 2017; Rieg, 2018; Scapens, 1991), particularly in organizations headed by portfolio entrepreneurs. The controller undoubtedly finds themselves in an even more complicated situation when such entrepreneurs use their own internal accounting models for R&D decision-making (Blomkvist, 2008).

Controllers outside the portfolio entrepreneurial environment use various accounting techniques (Samuelsson, 1996, 2008) to fulfill their tasks. They do not need to cope with the problems that arise from sudden growth, such as from acquisitions. Their work involves slow, organic growth combined with "ordinary" accounting work, and they have few requests for immediate action. The scenario for controllers working in the portfolio entrepreneurial R&D environment is quite different. While such controllers may be dissatisfied with standardized methods of management accounting that do not readily adapt to those used by newly acquired businesses, rapid growth and crisis situations are not viewed as disturbances but as typical events. Dealing with them is a matter of using "standard operating procedures."

Furthermore, the constant need to raise additional capital and integrate sustainable innovative companies into the group is an external complexity; the controller in the portfolio entrepreneurial environment must deal with international R&D opportunities. Owing to these pressures, the controller's tolerance for dealing with internal complexities may decrease (Graham et al., 2012; Streufert, 1972). Therefore, in studying the portfolio entrepreneur–controller relationship, the role that personalities play in stressful situations in the context of management accounting is of interest.

### 3.4. Intermittent development (judgment)

Both portfolio entrepreneurs and controllers attempt to construct their roles in a very dynamic context, particularly regarding international R&D. In a complex company or group of companies, certain areas provide greater revenues than others, and similarly, certain areas are less cost-effective than others (J → D) (Henderson, 1984; Madsen, 2017). In this context, genuine uncertainties about the future exist, especially when unplanned international R&D opportunities arise. The result is that both portfolio entrepreneurs and controllers experience stress as the tension between them grows (Moxnes, 2008; Weick, 1995). This tension risks turning into a situation described by Leijon and Söderbom (2005) as a "singularity." This singularity terminology is used to manage this complex international R&D situation; for example, a company "shall have" a clear strategy or business plan.

A notable challenge encountered by portfolio entrepreneurs is to pave the way for strategic business decisions in their organizations. Our approach contributes to the literature by addressing strategic problems using an AI algorithmic pathway approach, as AI systems are predicted to take over more and more of the strategic decision-making tasks (Rodgers et al., 2021).

Adding to the sphere of tension is the perception (P → D) influenced by the information provided by controllers working in an unsatisfactory and monotonous cycle of repetitive working moments (P←→I) (Leijon & Söderbom, 2005). Many controllers seem to prefer work that is closer to that of a business analyst. However, it is unclear whether working with portfolio entrepreneurs satisfies this wish. In resolving such problems, according to Stacey (2007), organizational dynamics that involve power relationships, rather than constructive dialogue, are the most likely solution (Blaschke & Schoeneborn, 2017; Habermas, 1984). Management accounting and entrepreneurship theories have elaborated on the stability–change dichotomy. Formal and informal practices in management accounting respond to both the stability and change associated with international R&D (cf. Lukka, 2005). More specifically, international business structures formed by portfolio entrepreneurs are clearly dominated by stability in the existing business and change during acquisitions. The internationalization of R&D synergy ambitions also stresses the need for integration between existing and new international R&D structures evolving from sustaining innovation and entrepreneurial activities. Due to the business context, the interplay between change and stability varies; thus, we expect the same interplay in the business structure of a portfolio entrepreneur.

## 4. Method

This study focuses on the R&D internationalization process of two Swedish family enterprise groups (cf. Perri & Peruffo, 2017). More specifically, the study explores how the dynamics between teams of portfolio entrepreneurs and management controllers help to innovate and sustain entrepreneurial activities by using qualitative comparative case studies of one large and one medium-sized Swedish business conglomerate. Based on the exploratory nature of our research questions, the qualitative research approach is considered appropriate. In addition, this study is exploratory, as the qualitative approach to portfolio entrepreneurs and management controllers working as teams in the R&D internationalization process to innovate and sustain entrepreneurial activities has remained underexplored in previous research. Our use of comparative qualitative case studies aims to extend the existing theory and produce new theoretical insights into such processes (Birkinshaw et al., 2011; Eisenhardt & Graebner, 2007).

Although the groups differed in age and growth rate, they also presented similarities: they both own diversified companies and have expanded their R&D internationalization by sustaining innovation and entrepreneurial activities, particularly through acquisitions. The portfolio entrepreneurs behind the two groups we chose for our case studies were anonymized as Entrepreneur Alpha of the ALPHA Group (unlisted) and Entrepreneur Beta of the BETA Group (listed on the Stockholm Stock Exchange).

This research is a comparative triangulated case study (see Rosa, 1998 for a discussion of business cluster formations) that draws on multiple data sources (Gibbert & Ruigrok, 2010). To enhance our grasp of the relationship between portfolio entrepreneurs and the information provided by management controllers, we employed both narrative and discourse analysis (cf. Burck, 2005; Dyer & Wilkins, 1991; Eriksson & Kovalainen, 2015). Following the methodology described by Czarniawska (1997), our research characterizes the portfolio entrepreneurs, controllers, and their organizations. In this way, a multidimensional "reality/entity" is formed based on interpretive sensemaking, and in the findings, we present closely interwoven elements from both theory and evidence (Welch et al., 2011).

Specifically, we examined R&D internationalization through the following lenses:

1. The portfolio entrepreneurs' framing (perception) and (judgment): their strong drive to look for enhanced international R&D activities applied to opportunities;
2. The controllers' provided information: their budgetary, managerial, and financial roles in connection to the portfolio entrepreneurs' ambitions;
3. The organizational pathways: their sphere of tension (P → D) and simple (P ↔ I) and complex (J → D) internal and external structures.

Using the conversation method developed by Schön (1983), we recorded our in-depth conversations and interviews with Entrepreneur Alpha of the ALPHA Group and Entrepreneur Beta of the BETA Group. Our discussions allowed for an exchange of experiences and reflections. We later transcribed these conversations and interviews in preparation for the discourse analysis. In this way, we reached an understanding of why certain actions were taken. We also conducted interviews with the controllers of the two groups, interviews which were recorded and transcribed. We triangulated the primary interview data collected from our expert informants (cf. Siggelkow, 2007) with multiple data sources. These complementary data sources include autobiographies (e.g., Branson, 1999) and biographies that provided us with narratives and commentary on the complex relationship between the portfolio entrepreneur and the controller. In addition, insights from the interview data of Endres and Woods' (2007) study provided additional background on entrepreneurs and opportunity creation. Further, we examined the two companies' quarterly and annual financial reports for the past 10–15

years. We also read media articles and viewed television programs about the companies and their entrepreneurs. When necessary, we revisited the companies to acquire complementary data, such as supported internal managerial and financial information.

Following the narrative tradition, we present these individuals and their organizations in their own words (Mills & Pawson, 2006; Riggs, 2005). This method allows us to explore the complex development of the relationships between portfolio entrepreneurs, controllers, and their organizations.

Both images and the more objective realities are in focus for interpretation (Alvesson & Sköldberg, 2009). The language used in the narratives, as well as the values and scripts of the actors and the business structures referred to, are thus of interest in relation to our research purpose. The discursive analysis was performed at three levels (Alvesson & Sköldberg, 2009): at the discursive level, the use of language and expressions constitute the phenomena in themselves; at the influential level of conception, we grasp and express assumptions, valuations, and ideas from an interpretation of statements made during the interviews and in common situations; and finally, through the level of actions and state of things, we scientifically discuss the relations, incidents, social patterns, and structures associated with our subjects.

## 5. Background of the case studies

The ALPHA Group is a privately held, mid-sized company that holds the majority ownership of ten companies. The BETA Group is a publicly traded enterprise that has majority ownership in some ninety companies. Entrepreneur Beta (of the BETA Group) is now experiencing the kind of corporate sustainable innovation growing pains to which Entrepreneur Alpha (of the ALPHA Group) has been exposed for many years. Through these time-lagged experiences, top managers enact and make sense of their international R&D environments, themselves, and their businesses (Weick, 1995).

### *5.1. Case 1 description and findings: Entrepreneur Alpha, the ALPHA Group, and the controller*

Entrepreneur Alpha earned a Master's in Business Administration from one of the largest universities in Sweden. Following graduation, Entrepreneur Alpha took a job as a sewing machine salesperson. In 1961, Entrepreneur Alpha entered the textile business as an entrepreneur in both textiles and ready-made clothing when the first company of Entrepreneur Alpha was founded. Even when the textile industry experienced a crisis that lasted several years, Entrepreneur Alpha's companies recovered. After some time, Entrepreneur Alpha founded various other companies under the corporate name of ALPHA Group (ALPHA); these companies do not seem to have much in common in terms of international R&D activities. Entrepreneur Alpha said they saw sustainable innovative synergies that others did not: "We have struggled to be a business group strong in identification."

ALPHA grew thanks to the various imaginative international R&D activities and risky steps taken by Entrepreneur Alpha. Entrepreneur Alpha said, "For example, we constructed the first digital X-ray for the dental industry." Another example of Entrepreneur Alpha's daring is entry into the Russian business world. Soon after the fall of the Soviet Union and the beginning of Perestroika, Entrepreneur Alpha founded new companies in Russia, working with many highly placed individuals in government. Introduction of Entrepreneur Alpha to the Russians came with the startling statement, "I am a capitalist!" Entrepreneur Alpha said, "Our problem was that we were too small, even though we earned good money—everything was so big in Russia. But we opened the first foreign currency shop for ordinary people." Entrepreneur Alpha also entered the Vietnamese and Chinese markets. In the words of Entrepreneur Alpha, "From the beginning, I searched for empty places, empty places, empty places—hunting every minute of the day, all days of the week, wherever these empty places might be."

Entrepreneur Alpha said, "I have never actually thought of money at all, but business has always worked. People say now the company is doing well." Entrepreneur Alpha still complains of the high taxes in Sweden that cause entrepreneurs to sell their companies. Entrepreneur Alpha continued, "The result is that the big institutions are going to buy companies. Companies are actually leaving Sweden." His slogan is, "We must decrease taxes!" Entrepreneur Alpha thinks the corporate rate of Swedish taxes must be lowered, or other countries will surpass Sweden. Entrepreneur Alpha conveys this message to governmental cabinet members nationally and to chambers of commerce locally.

Since 1961, Entrepreneur Alpha has founded many companies. Today, these family-owned companies fall under the umbrella of a parent company with 10 subsidiaries. Entrepreneur Alpha is the chairperson of the group. In 2007, ALPHA had revenues of 300 million Swedish crowns (c. US$ 40 million). ALPHA now makes, among other things, textiles and ready-made clothing, CAD/CAM systems, material handling systems for workshops and factories, design systems, and business-to-business gifts. Entrepreneur Alpha is always looking for new markets and new products, supported by the notion of sustaining innovation and entrepreneurial activities. "I have never thought in terms of business ideas or strategies." Entrepreneur Alpha trusts his instincts: "I have made quick deals, and normally, they have turned out well. But sometimes things have gone quite badly. If you live with a market and a product, then you will see what the course is."

ALPHA compares production costs per minute, both internally and externally. These costs are related to transaction costs, such as freight, logistics, and quality. In describing his control model, Entrepreneur Alpha said it is important to compare offers from potential customers, the number of closed business deals, and cash flows: "These are the most important comparisons that over time give you a good understanding of the business and allow you to intervene quickly." This business idea can be interpreted as growth-, cost-, and revenue-oriented. Entrepreneur Alpha does not rely on budgetary plans as much as Entrepreneur Alpha relies on forecasts. Entrepreneur Alpha is very serious when dealing with international R&D activities and sustainable innovative opportunities. Entrepreneur Alpha said, "We do not have time to perform due diligence." Entrepreneur Alpha also thinks it is important to make quick decisions: "I think that most deals are made very quickly. Look at Christian Jansson and Paul Frankenius, who made an offer for Lindex [a chain of women's clothing stores] at seven billion SEK over a cup of coffee. They used the same quick analysis when they bought KappAhl [another fashion brand]. Nowadays they are more interested in business in Dubai, where they think there is more future."

When we interviewed the ALPHA controller, various companies had recently been sold. ALPHA now had sufficient cash to pay its creditors on a timely basis. There had been cash flow problems due to the rapid expansion. The controller stated, "I have to fight with the banks and sometimes borrow from our suppliers in order to figure out how to make payments." Cash flow management is thus one of the controller's main duties.

The controller noted that the ALPHA board exercises some control over Entrepreneur Alpha. For example, the board opposed at least one company sale that Entrepreneur Alpha promoted as a way to raise cash for other acquisitions. The controller said that the board also thinks that future international R&D activities and acquisitions require more planning. The controller said, "Some due diligence could surely be useful when we buy new businesses. We want some hint of what new businesses will cost in the long run. The cheap price for a company can be expensive when the required future investments are calculated."

### *5.2. Case 2 description and findings: Entrepreneur Beta, the BETA Group, and the controller*

Following his military service, in 1982, Entrepreneur Beta started a t-shirt printing enterprise in the cellar of his parents' house. This was the beginning of his global business journey. The BETA Group (BETA) was

listed on the Stockholm Stock Exchange. In 2006, BETA had revenues of some 3.53 billion Swedish crowns (c. US$ 500 million) and anticipated further growth in 2007. In 2008, BETA had ninety subsidiaries. "Full speed ahead" seems to be Entrepreneur Beta's motto. In a 2007 interview, Entrepreneur Beta was portrayed as a strong-willed competitor who learns by trial and error: "Entrepreneur Beta is not a person who asks for advice. Rather, [Entrepreneur Beta] decides himself' (p. 27).

When BETA went public, there were dramatic changes for Entrepreneur Beta. Suddenly, the business organization was more complex, and media interest increased in part due to the sustainment of innovation and entrepreneurial activities. There were demands for information on results and growth expectations. In our conversations, Entrepreneur Beta discussed the many new problems that arose when BETA became a publicly traded company. Entrepreneur Beta has traveled extensively in China, looking for new business opportunities and partners driven by an international R&D platform. Entrepreneur Beta described a very dangerous trip taken on a riverboat in China, where the Spartan life taught him simplicity and thrift. Entrepreneur Beta thought that this experience may have led to the idea that the chief executive officers of BETA companies should receive relatively low salaries. Entrepreneur Beta thought that such low levels of compensation could be a motivating factor.

In BETA's 2006 Annual Report, Entrepreneur Beta presented high expectations for 2007. Both revenue and profit were expected to rise. Entrepreneur Beta added, "We have a stronger position than ever before, and the journey of the BETA Group has just begun." There are several business acquisitions behind the rapid international R&D-implied growth of BETA: Craft, Hefa, Texet, Sagaform, and Seger Group, plus nine more companies. BETA is engaged in a variety of businesses, including the manufacture of work uniforms, souvenirs, and crystal glass products.

Entrepreneur Beta has an unusual control rule. Chief executive officers in BETA companies may not discharge a controller or financial/accounting employee without consultation with Entrepreneur Beta. Entrepreneur Beta felt that this rule would give these employees the independence and freedom from the pressure to engage in creative accounting, relying on international R&D information. In the leading Swedish business newspaper *Dagens Industri*, Entrepreneur Beta was quoted about his work as an entrepreneur. Entrepreneur Beta said: "The driving force is not money. It is to build a world-leading enterprise." However, BETA has not been wholly successful. At one point, the BETA Group was trading at SEK 88.50 per share; one year later, the price was SEK 39.80 per share—a 55% decline in share value.

Entrepreneur Beta has to manage an increasingly complex group structure. For example, his acquisition of the Swedish glass company Orrefors–Kosta–Boda (OKB) meant that new cost efficiencies and management controls were necessary. The Swedish newspaper *Barometern* reported that BETA's profits fell from SEK 156.1 million to SEK 122.1 million. The main explanation for the decline was the OKB acquisition, in which high energy and staffing costs led to lower profits. Although BETA works toward lean production, the production of glass requires enormous energy expenditures. In addition, glass blowing is a genuine craft that demands a large workforce of highly skilled craftspeople. According to Entrepreneur Beta, "The acquisition of OKB was right, but the timing was wrong. If we had not acquired it, OKB would have disappeared or would have been very hard to reconstruct. Generally, the problem was that the timing of the acquisition was far from optimal."

In a *Dagens Industri* article, Entrepreneur Beta stated, "It is no longer fun to be a famous person. I wanted to become famous, and it was inspiring until it was too much." Today, Entrepreneur Beta has to deal closely with financial and management controls in BETA. In addition, Entrepreneur Beta is faced with the disappointment that certain investments have not generated their promised returns. Entrepreneur Beta continued, "I think it is hard to get all structures in order. Sales and markets are very much about the emotions that control people."

Another problem described in the same article concerns the integration of the newly acquired company, Cutter & Buck. Entrepreneur Beta said, "In Las Vegas, we are now releasing the whole Click collection [of golf clothes] to all the customers of Cutter & Buck, and later, we will introduce the Cutter & Buck assortment to business customers for business-to-business sales." However, the organizational culture at Cutter & Buck differs from the culture at BETA. This may cause tension. Entrepreneur Beta affirmed, "Most people see synergy from the point of view of the product due to R&D internationalization. We have never done that. We look at the problem from a sales and distribution point of view. Then we can say that market synergies exist between all our products except for golf shoes. It is the distribution that is the key. We have now opened five or six shops in China, and we plan to open seventy more shops. That is very exciting."

The controller of BETA is also the treasurer for the entire organization, including the parent company and all its subsidiaries. The controller is aware of the implications of seasonal sales fluctuations for BETA. Cash flows out in the first and third quarters, and it returns in the second and fourth quarters. This fluctuation in cash flow poses interesting and complex problems.

In addition to sustaining innovation and entrepreneurial activities due to problems posed by seasonal sales fluctuations, the controller must deal with the financial problems created by new acquisitions (e.g., OKB and Cutter & Buck). Such acquisitions complicate the financial picture for BETA. The controller said, "It becomes very tough when an entrepreneur, in this case Entrepreneur Beta, acquires businesses, and more capital is needed. All projects are not 100% complete, but we make evaluations all the time, and the situation often changes—many ideas and many possibilities arise, so to speak." The controller concluded: "It is very hard work being a controller—faster and faster decisions are required."

Monthly key figures are used to monitor the finances at BETA, including those of the subsidiaries. The controller said, "It is better to have fast follow-up with a few key figures and brief comments than a slow system with more detailed analysis." The analysis of the controllable budget variances revealed a negative picture for 2007. None of the subsidiaries achieved their goals for gross sales, profits before tax, or inventory turnover. The controller said, "Problems have been identified, and we are working hard to meet these key financial figures." A specific problem was inventory turnover: "Today, we have a turnover of 1.2 times a year—it is not enough. If we can reach 1.3, we will free up SEK 130 million. That will mean less risk and higher stock market values."

Continuous and rapid growth in 15 global markets exacerbates the accounting and managerial problems for BETA. There is constant change. The controller commented, "As soon as we acquire a company, we must quickly integrate it into our systems and culture so we can get the information we need." Another concern is the synergy among the various companies in the group. The controller said, "We want synergies, and we work together to get synergies for purchases and administration."

## 6. Discussion of findings

### 6.1. The portfolio entrepreneur–controller tension

The two cases described above illustrate different mindsets relating to innovation and entrepreneurship: that of the entrepreneur and his financial controller. The two cases also illustrate that these two mindsets may not align. Each portfolio entrepreneur began with a small company that was built into large and diversified enterprises, largely through acquisitions. Both enterprises now employ a large accounting staff group headed by a group controller who has multiple financial and accounting responsibilities. In both cases, the portfolio entrepreneur–controller relationship is complex because of the different attitudes toward and approaches to growth—the very cornerstone of both companies.

Entrepreneur Alpha of ALPHA is the quintessential portfolio entrepreneur. To survive, Entrepreneur Alpha has had to act rapidly and

intuitively; analysis comes only afterward. Thus, Entrepreneur Alpha has daringly entered new markets by leveraging international R&D teams with new companies and new structures. As a result, the ALPHA subsidiaries are of different sizes and ages and are engaged in many different activities. A very complex group structure has been created over many years, causing an imbalance between the functions of the portfolio entrepreneur and the controller. The economic balance we expect to find between a chief executive officer and a controller is missing in ALPHA's portfolio entrepreneurship.

Probably because BETA is a publicly traded company, Entrepreneur Beta is today a different kind of portfolio entrepreneur than was the case in the early stages. Entrepreneur Beta has become a visionary entrepreneur who looks for synergies when acquisitions are made (see, e.g., Larsson & Finkelstein, 1999). However, difficulties arise from the acquired companies' cultures (Stahl & Voigt, 2008). Moreover, shareholders keep a close eye on BETA's share price. New foreign markets, changing exchange rates, and global economics constantly present new problems, given BETA's complex structure and Entrepreneur Beta's entrepreneurial quest for new acquisitions. The controller must find solutions to these problems, which makes tensions unavoidable.

Portfolio entrepreneurs constantly look for new external opportunities to grow. Controllers look internally at the risks and problems that such opportunities may pose. It is probably inevitable that tensions between portfolio entrepreneurs and their controllers persist as long as there is an innovative and entrepreneurial drive, as well as the money available to exploit new opportunities. The causes of this tension seem to be the rapidity of the acquisitions, which may not satisfy the controller's need for analysis and planning, and the complexity of the subsequent management accounting as new entities join the group (see, e.g., Kengelbach et al., 2011 for discussions on the "Indigestion Hypothesis"). The portfolio entrepreneur acts quickly and forces the controller to respond quickly. Such is the logic of the interplay between these actors.

### 6.2. The portfolio entrepreneur: Caught in projects and visions

Both Entrepreneur Alpha and Entrepreneur Beta fit the portfolio entrepreneurial stereotype in that they continuously look for new opportunities—the so-called empty places (Kim & Maubourgne, 2004). International R&D activities and vision drive them to make acquisitions in which they hope for synergies. An acquisition, once realized, then becomes a project as the group tries to absorb the new company into the organizational structure (see, e.g., Haspeslagh & Jemison, 1991 for discussions on M&A integration typologies). Portfolio entrepreneurs envision the synergy but not the complexity, while controllers take the opposite point of view.

Bjerke (2005) stated that entrepreneurs need to manage, as well as grow. The portfolio entrepreneurs in this study are driven to grow. Managing this growth sometimes means "cleaning" the acquired companies. Cleaning is a concept (Leijon & Söderbom, 2007) for cost reduction: it is similar in meaning to such terms as downsizing, right sizing, reengineering, and to Schumpeter's "creative destruction." It appears that these portfolio entrepreneurs are less concerned with organizational structure as long as the key figures for the new companies—individually and for the group as a whole—are satisfactory. When new acquisitions present problems, the portfolio entrepreneur takes responsibility for the cleaning activity, whose ending marks the conclusion of the project for the entrepreneur.

From a singularity perspective, Entrepreneur Alpha and Entrepreneur Beta are caught in a flow of complex "project traps." Each project is handled on a singular basis according to its own specific logic. The resulting complexity is minimized by using a few key figures to evaluate the performance of the acquisitions. Entrepreneur Beta looks at gross profit and inventory turnover, while Entrepreneur Alpha looks at orders and cash flows. Their dynamic view of the organizational structure is close to the adhocracy described by Mintzberg (1983b) as seizing opportunities and solving problems outside the bureaucratic frame. The coordination difficulties requiring complex responses (Stacey, 2007) in the endless stream of activities are assigned to the controllers.

### 6.3. The controller: Caught in a never-ending jigsaw puzzle

The controllers in this study have a different perspective on sustainable innovation and company growth. They are inclined to calculate risks and weigh options. Charged with the responsibility of both the human and task integration of new companies (e.g., different cultures and accounting systems) (Birkinshaw et al., 2000) and with reporting on their performance, controllers are concerned about the impulsive decisions taken by portfolio entrepreneurs. They understand that companies acquired quickly and "inexpensively" may prove costly in the long term.

The trading conglomerate problem is an example of the controller's outlook. Some trading companies are manufacturers, as well as links between buyers and sellers; other trading companies do not have production facilities. It is challenging to compare these different companies. The portfolio entrepreneur, as in this study, may look at only a few key figures to evaluate group performance. The controller, however, is charged with creating a very complex follow-up system that deals with the accounting differences throughout the entire group.

### 6.4. The portfolio entrepreneur and the controller: Two mindsets

The portfolio entrepreneurs in this study searched for opportunities, sought synergies in acquisitions, desired sustainable innovation, and took decisive and quick action. The controllers in this study observed, analyzed, and sometimes tried to persuade the portfolio entrepreneurs, although they lagged behind the entrepreneur. Therefore, the financial controllers had to reconstruct the financial conditions instead of being on par with the portfolio entrepreneurs. There is an imbalance in the relationship. Organizational low-key control (Solli, 1999), in which careful attention is paid to sound arguments and relevant facts (Habermas, 1984), is out of place. The portfolio entrepreneurs' vision for the future—unlimited growth—and the controllers' reality of the present—low returns and falling share prices—are destined to collide.

First, portfolio entrepreneurs look for sustainable innovation and acquisitions, and only second do they look for synergy potentials (cf. Tarba et al., 2019). The controllers, however, have to work with this synergy management. These are different dimensions of synergy. Portfolio entrepreneurs look to fill what Entrepreneur Alpha calls the "empty places" in the group structure. New companies are seen not only as unique projects but also as contributions to the organization. Where the portfolio entrepreneur sees simplicity in synergy, the controller sees management complexity—one example of the different mindsets. For controllers, developing and maintaining group synergy among diversified companies is a long-term endeavor. See Table 1 for a summary of the different dimensions of synergy.

## 7. Conclusions

AI-based algorithms for decision-making intentions are used each

**Table 1**
Synergy potentials and their measurability.

| | |
|---|---|
| 1. Earlier customers purchase more from the business group | Relatively promising to monitor R&D-enhanced products and services |
| 2. Mutual and larger purchasers in the business group who provide lower prices | Relatively promising to monitor sustainable innovation |
| 3. Mutual distribution of goods and services | Relatively promising to monitor sustainable innovation |
| 4. International R&D system effects within the business group | Hard to monitor |
| 5. Brands integration into clusters | Hard to monitor: resulting from international R&D activities |

and every day. The algorithms in the Throughput Model are a way of characterizing stepwise solutions to a problem. These algorithms can be used to perform automated reasoning, which involves knowledge representation and the metalogic dedicated to understanding distinct views of reasoning.

When looking into R&D internationalization via the process thinking decision model (i.e., the Throughput Model), R&D exploitation cannot be done without the necessary assistance from other processes and TMTs. This model takes into account our understanding of P ↔ I (which denotes the interaction between portfolio entrepreneurs' new building processes and international R&D activities with the use of management control information), entrepreneurs' new building processes influencing their intermittent development (P → J), entrepreneurs' new R&D building processes influencing their sphere of tension (P → D), management control information affecting intermittent development (I → J), and the intermittent development impacting entrepreneurs' sphere of tension (J → D), as depicted in Figs. 1 and 2.

The results of the throughput modeling process provide more clarity by "looking inside the black box" of the R&D internationalization of group structures. Controllers, who work within certain professional norms, must also ponder advanced financing and implementations of new acquisitions, trying to attain stability and the synergy foreseen by the portfolio entrepreneur. The results, however, successively highlight the extremely unbalanced growing businesses in which genuinely performed due diligence procedures were not undertaken. The consequence of this is several intermittent quick acquisitions, which created an overwhelming growth strategy for the groups studied. The second strategy—the diffusion of synergistic effects—was problematic when considering the controllers, as well as the other staff members, in the business groups that were studied.

The logic of management accounting information is related to its organizational context, and this phenomenon is strongly illustrated in our study. The role of management accounting information concerns reacting to a rapid stream of strategic actions relating to the growth of complex business groups driven by portfolio entrepreneurs. The controller in charge has to manage the existing businesses, change routines, and replace the accounting systems that affect the newly acquired firms. Nevertheless, the controller is, at the same time, coupled to a temporary pause—but on tenterhooks—waiting for a discontinuance leading to the next step of complex implementation challenges for further growth.

### 7.1. Theoretical implications

In line with studies to expand extant knowledge on the impact of R&D internationalization on innovation and entrepreneurial activities within a firm's boundaries (Ferraris et al., 2021; Hurtado-Torres et al., 2018; Vrontis & Christofi, 2019), this study contributes to theory in several ways and indicates directions for further research. We contend that portfolio entrepreneurs and management controllers working together as a team has major effects on the R&D internationalization–innovation (and entrepreneurship) relationship. Our study shows that the effectiveness of R&D internationalization on innovation and entrepreneurial activities is contingent on the decision-making process involving the team of portfolio entrepreneurs and management controllers in their dynamic business environment. Thus, our perspective contributes to a major research stream on the subject—the network-like characteristics of R&D internationalization (Papanastassiou et al., 2020)—by emphasizing that understanding the decision-making pathways through which the portfolio entrepreneur–management controller nexus functions matters for international R&D activities that foster innovation and entrepreneurial outcomes.

More specifically, regarding the use of the Throughput Model, this paper first explores a new way to examine the internationalization of R&D that considers the inclusion of decision-making pathways. In this way, we portray more than a direct route for actors to make final decisions and thus contribute to the literature on entrepreneurial decision-making behavior (Shepherd et al., 2015). Second, by breaking down the four concepts of the Throughput Model (i.e., perception, information, judgment, and decision choice) and applying them in the entrepreneurial decision-making process, this study models the process of R&D internationalization. In this vein, we offer a theoretical perspective that can be implemented in multicultural R&D team operations (e.g., Arslan et al., 2021) and by actors with an entrepreneurial orientation scrutinizing the impact of R&D internationalization on innovation (Genc et al., 2019).

Third, this study offers insights that contribute to scholarly research on "global mindset" (Felício et al., 2012; Levy et al., 2007). Our findings point to a large gap between the two mindsets for leveraging R&D internationalization to innovate and sustain entrepreneurial activities. Due to rapid growth, this gap is increasing: entrepreneurs have a simple mindset when deciding whether to acquire a new business, while controllers implement a more complex approach that needs to align with their management accounting systems and professional accounting standards. This discrepancy is due to the tensions created between the entrepreneurial ambition to grow while running an expanding business, which is contrary to the demands of management accounting systems and models, which, together with administrative international business standards, involve increasingly complex financial accounting rules.

The growth logic of portfolio entrepreneurs starts from small, fast-growing firms (Fu et al., 2018; Gottschalk et al., 2017). In this study, however, the companies consolidated after a couple of years through rapid growth synergy-driven visions, resulting in very complex business groups. We show that the increased complexity and accompanying challenges were experienced by several actors within the group other than the entrepreneur.

### 7.2. Practical implications

In the internationalization of R&D practices, much hope is directed toward predicting portfolio entrepreneurs' behavior in general, as well as team decision-making in particular. However, it is never simple for organizations to understand and analyze entrepreneurial behavior without a decision-making model at hand. A decision-making process such as the Throughput Model can support R&D internationalization via an improved understanding of the pathways that portfolio entrepreneurs follow in making a decision. Therefore, this paper taps into one of the solutions for businesses to forecast their R&D internationalization decision process as it applies to entrepreneurial behavior. Further, by exploring the Throughput Model decision-making pathways for R&D internationalization, a historical template can be provided as a reminder of successful applications. By integrating the concept of global mindset (Andresen & Bergdolt, 2017; Torkkeli et al., 2018) into our process thinking decision-making model, practitioners are able to recognize (using the tools available) that the divergent mindsets of TMT agents/actors need to be reconciled to optimize the balance of tensions, including cultural and strategic realities, between global and local R&D contexts. In so doing, these agents are able to ensure that TMT agents with prior international success, such as portfolio entrepreneurs, do not disregard their counterpart management controllers in the team decision-making process while engaging in their primary entrepreneurial activities (e.g., opportunity assessment decisions, opportunity exploitation decisions, and entrepreneurial entry decisions) (Shepherd et al., 2015).

### 7.3. Future research avenues

We believe future studies can further expand our understanding of decision-making pathways through which portfolio entrepreneur–management controller teams function in the context of international expansion and development activities. For example, one could examine in depth the team decision-making processes of portfolio

entrepreneurs and management controllers during specific entrepreneurial activities, such as opportunity assessment, opportunity exploitation decisions, and entrepreneurial entry decisions. In addition, future studies could investigate these team decision-making processes in other business contexts to ascertain similarities or differences in the decision-making pathways. How the global mindset of other key persons within the organization shapes the team decision-making processes of portfolio entrepreneurs and management controllers would also be an interesting avenue to explore.

## CRediT authorship contribution statement

**Waymond Rodgers:** Writing – review & editing, Writing – original draft, Conceptualization, Formal analysis. **William Y. Degbey:** Writing – review & editing, Writing – original draft, Formal analysis, Conceptualization. **Arne Söderbom:** Data curation, Methodology, Writing – original draft. **Svante Leijon:** Writing – original draft, Methodology, Data curation.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Acknowledgements

William Degbey acknowledges the Foundation for Economic Education (Liikesivistysrahasto) and Marcus Wallenberg Foundation in Finland for supporting this research.

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