



Money Don't matter? How incubation experience affects start-up entrepreneurs' resource valuation

Frank J. van Rijnsoever^{a,b,*}, Chris P. Eveleens^c

^a Innovation Studies, Copernicus Institute of Sustainable Development, Utrecht University, the Netherlands

^b INGENIO (CSIC-UPV), Universitat Politècnica de València, Valencia, Spain

^c Advisory Council for Science, Technology and Innovation, Den Haag, the Netherlands

ARTICLE INFO

Keywords:

Start-up
Incubator
Resource-based view
Entrepreneurship
Discrete choice experiment

ABSTRACT

According to the resource-based view, for start-ups to gain a sustainable competitive advantage their resources should be valuable, rare, inimitable, and non-substitutable (VRIN). However, early-stage entrepreneurs often do not have the capability to properly value resources. Incubators are popular tools for supporting early-stage entrepreneurs. Many entrepreneurs initially prefer that incubators provide tangible non-VRIN resources such as funding and office space. While in incubators, entrepreneurs increasingly learn to value intangible resources as VRIN. It is unknown whether this change in resource valuation is caused by the incubator or a learning process common to all entrepreneurs. The aim of this study is to discern whether the change in valuation of resources is a result of the incubation experience or a consequence of a normal learning process. This contributes to a better understanding of the impact of incubation on start-up development. We pose the following research question: *What are the effects of incubation experience on start-up entrepreneurs' valuation of different tangible and intangible resources offered by incubators?* We develop hypotheses about how incubators change the valuation of specific resources. We test these hypotheses using data from 935 entrepreneurs in North America and Western Europe who completed a survey containing a discrete choice experiment in which entrepreneurs with and without incubation experience were asked to choose between two hypothetical incubators that offer different resources. Our results reveal that incubators indeed contribute to entrepreneurs' capacity to value resources. First, we find that entrepreneurs of incubated start-ups value non-VRIN resources less than entrepreneurs of non-incubated start-ups. Second, start-up entrepreneurs generally value most VRIN resources more than non-incubated start-up entrepreneurs.

1. Introduction

It is not easy for start-up entrepreneurs to value, acquire, and organize the various resources that contribute to a sustainable competitive advantage (Vohora et al., 2004). The capability of understanding the value of resources for pursuing entrepreneurial opportunities in particular lies at the heart of entrepreneurship (Foss et al., 2008; Ireland et al., 2003; Li and Chen, 2009; Rasmussen et al., 2011; Vohora et al., 2004). Successful entrepreneurs understand how particular resources can be

used to create profits before others do (Alvarez and Busenitz, 2001).

Incubators have emerged as popular tools for supporting entrepreneurs to aid with this process (Aernoudt, 2004). Incubators are organizations that help start-up entrepreneurs by providing resources and teaching how to use them. Incubators offer tenant start-ups both tangible resources, such as office space and equipment, and intangible resources, such as business knowledge, networks, and legitimacy (Amezcuca et al., 2013; Clarysse et al., 2005; Eveleens et al., 2017; Mian et al., 2016; van Weele et al., 2017).¹ According to the resource-based

* Corresponding author. Utrecht University, Princetonlaan 8A, 3584 CB, Utrecht, the Netherlands.

E-mail address: f.j.vanrijnsoever@uu.nl (F.J. van Rijnsoever).

¹ In the literature, it is not always clear exactly what the differences between tangible and intangible resources involve (Kristandl and Bontis, 2007). We follow the view from accounting (IAS, 2004; Murphy, 2018), which is also used in the context of the resource-based view (RBV) (Kristandl and Bontis, 2007) and start-ups (Heirman and Clarysse, 2007), according to which tangible resources are assets physical in nature such as cash, land, buildings, and equipment and intangible assets are non-physical in nature and are often used over the long term. Examples include patents, trademarks, copyrights, experiences, and brands. It should further be noted that some tangible resources also have intangible elements. For example, investments are tangible resources but also provide legitimacy because they show that financiers have trust in start-ups.

view (RBV), intangible resources are especially important for creating sustainable competitive advantages because they are difficult to acquire, imitate, and substitute (Amit and Schoemaker, 1993; Barney, 1991).

Interestingly enough, evidence shows that when considering to join an incubator, entrepreneurs generally appear to be attracted by the tangible resources (McAdam and McAdam, 2008; Soetanto and Jack, 2013; van Weele et al., 2017). This may be due to the fact that tangible resources are more readily observable, which makes it easier for start-ups to conceive of their uses and immediate consequences (Alvarez and Busenitz, 2001). However, during their tenancy in an incubator, start-up entrepreneurs increasingly consider intangible resources as more valuable to their business (Lai and Lin, 2015; van Weele et al., 2017).

It is possible that this change in the valuation of resources results from normal learning processes during early business development (Foss et al., 2008; Helfat and Peteraf, 2003; Huber, 1991). Alternatively, incubators may actively contribute to this learning process through offering support services such as training, coaching, and network contacts (Eveleens et al., 2017; Rasmussen et al., 2011; van Weele and Van Rijnsoever, 2017). Incubators may thus strengthen entrepreneurs' capability to value resources (Bruneel et al., 2012; Eveleens et al., 2017; Patton, 2014; van Weele and Van Rijnsoever, 2017), which fits with the trend of using of incubators as tools for learning and human capital development (Bruneel et al., 2012; Nowak and Grantham, 2000; Sullivan et al., 2020). Recent studies show that these newer incubation models indeed increase venture performance in terms of such as long-term revenue, survival, investments raised, and growth (Amezcuca et al., 2013; Gonzalez-Urbe and Leatherbee, 2017; Hallen et al., 2014; Lukeš et al., 2019; Stokan et al., 2015; Van Rijnsoever et al., 2017b). Moreover, the learning processes that take place within the incubator have also received ample attention (Eveleens et al., 2017; Fang et al., 2010; Rice, 2002; Scillitoe and Chakrabarti, 2010; van Weele et al., 2017; van Weele and Van Rijnsoever, 2017).

However, whether these learning processes in the incubator lead to different, more strategic resource valuation capabilities compared to those of start-up entrepreneurs that have not been part of an incubator has not been studied. Scholars on incubation have limited their efforts in this area to qualitative and descriptive studies (McAdam and McAdam, 2008; Soetanto and Jack, 2013; van Weele et al., 2017) and have never tested the actual development of capabilities.

The aim of this research is thus to uncover if the change in valuation of resources is the result of experience gained at the incubator or a consequence of regular learning processes. Uncovering this knowledge is important because recognizing the value of resources is a crucial step in the emergence of new firms and obtaining sustainable competitive advantages (Foss et al., 2008). If incubators indeed engender such capability development, it provides an explanatory mechanism for the impact of incubation on start-up development.

We therefore pose the following research question: *What are the effects of incubation experience on start-up entrepreneurs' valuation of different tangible and intangible resources offered by incubators?*

Using argumentation from the RBV, we develop hypotheses about how incubators change the valuation of specific resources. We test these hypotheses using data from 935 entrepreneurs in North America and Western Europe. These respondents completed a discrete choice experiment (DCE) that asked them to indicate their preferred incubators based on the resources offered. The choices made by entrepreneurs allowed an estimation of the valuation of resources.

We show that start-up entrepreneurs with incubation experience develop the capability to value resources that are consistent with VRIN argumentation more than non-incubated start-up entrepreneurs. We thereby reveal a missing link between newer incubation models and start-up performance. In particular, start-up entrepreneurs with incubation experience value tangible resources less than their counterparts without incubation experience. Also, having incubation experience increases entrepreneurs' valuation of the intangible resources offered by

incubators.

This insight is of practical relevance for incubators to improve their value proposition towards potential tenants. Additionally, this result may encourage non-incubated start-up entrepreneurs to apply.

We make a methodological contribution by employing a DCE in the field of strategic choices made by start-ups. This method is a more reliable tool to elicit preferences than conventional methods, such as rating and ranking scales (Ben-Akiva et al., 1991), and which have a higher internal validity due to the employment of an experimental design (Van Rijnsoever et al., 2012).

The remainder of this paper is organized as follows. Building on the RBV, entrepreneurship, and incubation literatures, we assess how incubation experience affects entrepreneurial valuation of the resources that incubators provide. We then discuss our methods and data before presenting the results. We end the paper with the conclusions and a discussion on the theoretical and managerial implications of our results.

2. Theory

2.1. The resource-based view, entrepreneurship and incubation

The RBV is the theory most used to explain the effects of incubation (Eveleens et al., 2017). It sees firms as bundles of resources and capabilities by which products and services are developed (Penrose, 1959; Wernerfelt, 1984). Resources are the "stocks of available factors that are owned or controlled by the firm" (Amit and Schoemaker, 1993, p. 35). Typical examples of resources that start-ups need are financing, physical resources, technological resources, reputation or legitimacy, and social or network resources (Ireland et al., 2003; Lichtenstein and Brush, 2001; Vohora et al., 2004; Wright and Stigliani, 2012).

Resources that contribute to sustainable competitive advantages must be valuable, rare, inimitable, and non-substitutable (VRIN; Amit and Schoemaker, 1993; Barney, 1991). Valuable resources "enable a firm to conceive of or implement strategies that improve its efficiency and effectiveness" (Barney, 1991, p. 106). "Rare" means that the valuable resource is not available to competitors that need it for their strategy (ibid), "inimitable" (or imperfectly imitable) means that others cannot easily obtain or implement the resource. "Non-substitutable" means that there are "no strategically equivalent valuable resources that are themselves either not rare or imitable" (ibid p. 111).

However, acquiring a bundle of VRIN resources is not easy. Firms need to recognize the value of resources, which makes the capability to value resources critical (Foss et al., 2008; Ireland et al., 2003; Li and Chen, 2009; Rasmussen et al., 2011; Vohora et al., 2004). For start-ups, there is broad scientific consensus that intangible resources contribute more than tangible resources to a sustainable competitive advantage for start-ups (Bruneel et al., 2012; Eveleens et al., 2017; Gimmon and Levie, 2010; Hansen et al., 2000; Lai and Lin, 2015; van Weele et al., 2017), because intangible resources tend to be socially complex and thus more difficult to obtain, imitate, or substitute (Barney, 2001). However, intangible resources are not always valuable or rare. Resources offered by incubators only satisfy the VRIN criteria if they also have value to the specific business models of start-ups and are tailored uniquely or provided exclusively to start-ups, which makes them rare.

The resources provided by incubators have been extensively described in the literature (Aerts et al., 2007; Bruneel et al., 2012) (Bøllingtoft and Ulhøi, 2005; Bruneel et al., 2012; Hansen et al., 2000). From this literature we identify five resources consistently listed in the literature as the most important ones provided to start-ups by incubators (Amezcuca et al., 2013; Bruneel et al., 2012; Eveleens et al., 2017; van Weele et al., 2017). We use these resources as basis for our theory development, below:

- (1) physical resources (tangible)
- (2) financial capital (tangible)
- (3) business knowledge (intangible)

- (4) networks (intangible)
- (5) legitimacy (intangible)

2.2. Learning to value resources

Entrepreneurs' preferences for particular resources offered by incubators depend on more than the degree to which resources meet the VRIN criteria. Entrepreneurs, as boundedly rational agents, have subjective judgements about the value of resources to their businesses (Foss et al., 2008). These subjective judgements can lead to underappreciation of intangible resources whose added value can be much more difficult to grasp than more readily observable tangible resources (van Weele et al., 2017), for which start-ups can more easily conceive of their uses and immediate consequences (Alvarez and Busenitz, 2001).

Therefore, valuing resources is an essential capability for entrepreneurs (Alvarez and Busenitz, 2001; Ireland et al., 2003; Li and Chen, 2009). It entails a mental model of how resource inputs can lead to start-ups' possible market outputs (Foss et al., 2008; Nicholls-Nixon et al., 2000). Startups can learn the value of a particular resource, i.e., develop stronger mental models, through trial-and-error learning processes or imitation (Eveleens et al., 2017; Massini et al., 2005; Wang and Chugh, 2014). Trial-and-error learning is often inefficient (Bandura, 1977; Huber, 1991) and costly for start-ups (Wang and Chugh, 2014). Yet, it can lead to more original ideas. Trial-and-error learning means that entrepreneurs have to experience the value of each resource throughout the process of starting a business. This is largely a process of experimentation, self-discovery, and improvisation (van Weele and Van Rijnsoever, 2017). Imitation is a more efficient form of learning and entails mimicking the behavior of successful role models (Massini et al., 2005), or directly acquiring knowledge from other sources, such as incubator managers or coaches (Eveleens et al., 2017). However, relying solely on imitation might be poorly suited because the resources involved are unlikely to be inimitable (Alvarez and Busenitz, 2001). It is likely that combining both forms of learning will lead to the best result (Bergh et al., 2009; Crossan et al., 1999).

However, combining both trial-and-error and imitative learning processes comes with challenges. Both types of learning processes tend to be path-dependent (Becker, 2004; Cohen and Bacdayan, 1994; Van Rijnsoever et al., 2012), leading to routines, heuristics, and increased economies of scale (Argote and Epple, 1990) but also cognitive lock-ins that are difficult to break (Betsch et al., 2004; Murray and Haubl, 2007). Once set out in a certain direction, start-ups often have difficulty recognizing alternatives due to limited information (Cooper et al., 1995), attention (Ocasio, 1997), ability to absorb relevant information (Cohen and Levinthal, 1990), and ability to reflect on what information means to their businesses (van Weele and Van Rijnsoever, 2017), in addition to challenges in breaking existing routines (Betsch et al., 2004). Taken together, these problems make it difficult for start-up entrepreneurs to acquire the capability to value individual resources.

2.3. Entrepreneurs' incubation experience and resource valuation

Incubators can contribute to these learning processes by demonstrating the importance of VRIN resources and enabling entrepreneurs to assess the degree to which certain resources meet the VRIN criteria (Eveleens et al., 2017). This can be done through mandatory training, proactive mentoring, intensive coaching sessions, and embedding entrepreneurs in networks of more experienced entrepreneurs (Cooper et al., 1995; Rice, 2002; Rotger et al., 2012). These support services provide start-up entrepreneurs with extra information, help them absorb that information, and create an environment in which to reflect on this information (Patton et al., 2009). They remove most barriers that inhibit the development of entrepreneurial capabilities and contribute to more efficient, reflective learning processes (Huber, 1991; Rasmussen et al., 2011; van Weele and Van Rijnsoever, 2017). If this learning indeed takes place, one can expect these entrepreneurs' valuation of non-VRIN

resources to decline, and their valuation of resources that meet the VRIN criteria to increase, compared to valuation by entrepreneurs without incubation experience (van Weele et al., 2017). Start-up entrepreneurs without incubator experience lack these learning experiences, and must base their value on other factors, such as other experiences, personal preferences or observations they have made by looking at start-ups that are part of an incubator. The differences in valuation between both groups are demonstrated by differences in preferences for certain resources between entrepreneurs with or without incubation experience. We hypothesize how incubation experience affects start-up entrepreneurs' valuation of the resources offered by incubators.

Fig. 1 summarizes our hypotheses.

2.3.1. Financial resources

Financial resources refer to the monetary resources some incubators offer upon admission. Entrepreneurs often struggle to obtain the funding they need (Carpenter and Petersen, 2002; Westhead and Storey, 1997), and incubators can provide up to several hundred thousand dollars (Pauwels et al., 2015; Rubin et al., 2015). While clearly valuable to start-ups and generally seen as rare (van Weele et al., 2018b), financial resources are not a source of sustainable competitive advantages because they are imitable; in principle, anyone could acquire this resource. Moreover, financial resources are substitutable. Indeed, the very purpose of money is to be substituted with goods and services such as employees' hours worked, office space, equipment, and expertise.

Still, financial resources are attractive to start-ups. Their tangible nature means that understanding how they can be used is straightforward. However, being part of incubators helps start-up entrepreneurs realize that financial resources alone do not provide competitive advantages because they do not meet the VRIN criteria. Incubators often teach start-up entrepreneurs to seek financial resources associated with intangible resources such as business advice, network contacts, and legitimacy (Björgum and Sørheim, 2015; Harkness, 2016), as often in the cases of venture and angel investors. Start-up entrepreneurs thus learn that financial resources by themselves, especially in the amounts typically offered by incubators, do not yield a sustainable competitive advantage. We therefore propose the following:

Hypothesis 1. Start-up entrepreneurs with incubation experience value the financial resources offered by incubators less than start-up entrepreneurs without incubation experience.

2.3.2. Physical resources

The physical resources provided by incubators consist of office space and other tangible facilities such as parking spaces and meeting rooms (Chan and Lau, 2005; Hansen et al., 2000; Mian, 1996; Sá and Lee, 2012). Start-up entrepreneurs often struggle to find such physical resources on relatively small scales. Incubators can offer these resources to multiple start-ups at the same time, which is more efficient than each start-up procuring the resources on its own. Offering physical resources reduces costs and allows tenants to focus their time and efforts on developing and finding resources crucial to their businesses (Barrow, 2001; Bruneel et al., 2012). While physical resources are valuable to start-ups (Mian, 1996), these tangible resources are not a source of sustainable competitive advantages because they can be found elsewhere with relative ease. For example, many smaller businesses choose to operate from flexible co-working spaces and even coffee bars. In other words, physical resources are not rare, inimitable, or non-substitutable.

Being part of an incubator enables start-up entrepreneurs to understand that the physical resources offered by incubators do not meet the VRIN criteria. Moreover, incubated start-up entrepreneurs also experience the possible downsides of the physical resources offered by incubators. There is anecdotal evidence that the physical proximity and open office plans typically offered by incubators can distract start-up entrepreneurs and sometimes make them hostile and secretive toward one another (Mcadam and Marlow, 2007; van Weele et al., 2018a). As a

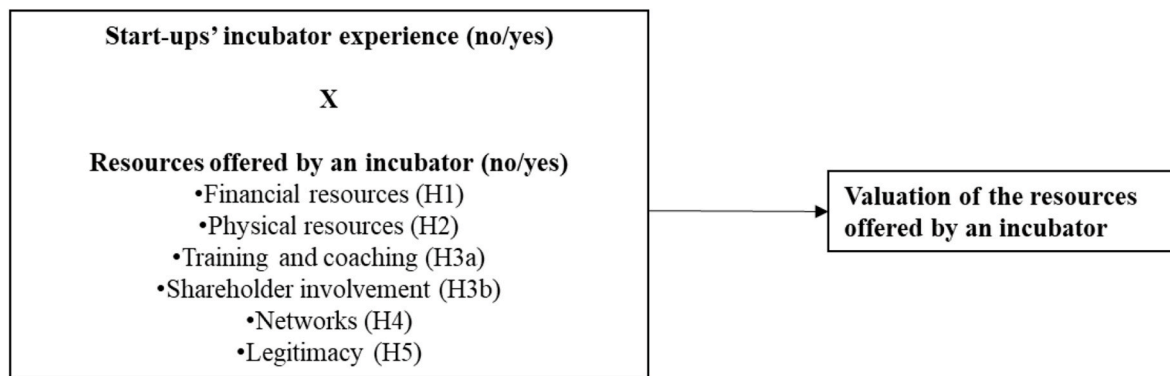


Fig. 1. Conceptual model summarizing the hypotheses (H1–H5).

result, we propose the following:

Hypothesis 2. Start-up entrepreneurs with incubation experience value the physical resources offered by incubators less than start-up entrepreneurs without incubation experience.

2.3.3. Business knowledge

The business knowledge offered by incubators includes the information and advice provided through training, coaching (Patton, 2013; Rice, 2002), and shareholder involvement (Björgum and Sørheim, 2015; Harkness, 2016). “Training” refers to collective sessions such as seminars and workshops (Patton and Marlow, 2011; Rice, 2002) that enable entrepreneurs to learn specific skills and methods, including customer development, accounting, design thinking, and pitching. “Coaching” refers to one-on-one sessions with incubator managers and mentors who are often experienced entrepreneurs themselves. Coaching exposes start-up entrepreneurs to ongoing review, thereby facilitating a learning process with several iterations (Patton and Marlow, 2011; Sullivan, 2000) in search of a viable business model (van Weele and Van Rijnsoever, 2017). The often assertive coaching methods (van Weele et al., 2017) help start-ups break their cognitive lock-ins and prevent them from prematurely stopping their searches (Cohen et al., 2018).

The business knowledge conveyed through coaching and training sessions is valuable to start-ups because it teaches technology-driven entrepreneurs how to conduct their businesses (Rice, 2002; van Weele et al., 2017). It is debatable how rare this knowledge is; generally, there is an abundance of business knowledge in the form of business courses, MBAs, and other educational programs, independent trainers, literature and videos. However, tailoring business knowledge to the needs of specific start-ups requires experienced mentors and coaches who invest substantial time in these start-ups (Sullivan, 2000; van Weele and Van Rijnsoever, 2017). This knowledge tailored to the business models of specific start-ups is difficult to imitate or substitute. We conclude that the business knowledge offered through training and coaching by incubators, taken together, meets the VRIN criteria.

Incubators also convey business knowledge through shareholder involvement. This happens when incubators acquire equity shares in exchange for funding. Providing funding in exchange for equity is often seen as an appropriate financing mechanism for start-ups due to their lack of tangible assets to serve as collateral for loans (Carpenter and Petersen, 2002; Gompers and Lerner, 2001). Investors also often take positions on the boards of start-ups to offer their business knowledge (Björgum and Sørheim, 2015; Harkness, 2016). Shareholder involvement is costly for entrepreneurs who give up at least partial control over their firms, but the practice is common. After all, shareholders can be a committed source of information and advice and thereby have value to start-ups (Ter Wal et al., 2016). However, it is unclear whether this resource is rare. On the one hand, as incubators sometimes take equity shares in several start-ups, the benefits from this shareholder involvement can be experienced by all these start-ups and is thus not rare. On

the other hand, the specific relationship between each start-up and shareholder is unique, so every particular shareholder relationship is rare. Similarly, having incubators as external shareholders can be imitated by competing start-ups but only if they meet the quality criteria set by incubators. Shareholder involvement is substitutable because venture capitalists are also interested in buying equity in start-ups. However, engaging with venture capitalists requires a costly process of due diligence that is often unfeasible for start-ups. Moreover, the effects of shareholder involvement in providing business knowledge can be substituted with effective training and coaching sessions. However, these external advisors often cannot provide sufficient depth. Overall, we conclude that shareholder involvement can indeed meet the VRIN criteria and thus be a source of sustainable competitive advantages. Still, start-up entrepreneurs likely prefer the training and coaching provided by incubators over shareholder involvement because it does not involve giving up power.

Many entrepreneurs starting businesses lack business knowledge but are not always aware of this gap (van Weele et al., 2017). Incubators changes this; start-up entrepreneurs with incubation experience become more aware of their limits, and the business knowledge offered is an important antecedent for this realization (van Weele et al., 2017). Start-up entrepreneurs in incubators experience how this business knowledge satisfies the VRIN criteria and is helpful in better understanding the value of other resources, so we expect the following to hold true:

Hypothesis 3. Start-up entrepreneurs with incubation experience value the business knowledge offered by incubators through a) training and coaching and b) shareholder involvement more than start-up entrepreneurs without incubation experience.

2.4. Networks

The networks offered by incubators refer to the contacts with other actors that incubators provide to start-ups. These networks have internal and external components (Bøllingtoft and Ulhøi, 2005; Eveleens et al., 2017; Patton and Marlow, 2011). Internal networks consist of the relationships among the start-up firms, and between the start-ups and the incubator staff. Co-location in incubators can create strong internal networks in which start-ups can quickly share problems, knowledge, and networks (Tötterman and Sten, 2005) and obtain a sense of belonging (van Weele et al., 2018a). External networks consist of relationships with actors outside the incubator, including venture capitalists, potential clients, service providers, and (local) governments (Eveleens et al., 2017).

Networks are commonly seen as key resources for entrepreneurs and modern-day incubators (Bøllingtoft and Ulhøi, 2005; Hansen et al., 2000; Leyden et al., 2014). They enable entrepreneurs to access resources controlled by others and thus can compensate for entrepreneurs' own resource gaps (Adler and Kwon, 2002; Groen et al., 2008).

Moreover, networks embody social capital, “which is the good-will that is engendered by the fabric of social relations and that can be mobilized to facilitate action” (Adler and Kwon, 2002, p. 17). Finally, networks help start-ups recognize business opportunities (Elfring and Hulsink, 2003). These features make networks valuable. Network relationships with investors and customers are relatively rare for start-ups. To gain access to these contacts, entrepreneurs have to be introduced by a broker such as an incubator (Engel et al., 2017; Fritsch and Schilder, 2008; Shane and Cable, 2002; van Rijnsoever, 2020). Moreover, these valuable contacts are also the most sought-after partners (Barabási and Albert, 1999), so they have to be selective about which start-ups they connect with. This would make incubator networks a rare resource. The limited availability of these contacts and their social complexity (Barney, 2001) also make networks resources difficult to imitate. Networks can be partly substituted by the resources to which they provide access such as physical and financial resources, market intelligence, and business knowledge from entrepreneurs’ own experience. However, the goodwill and trust embedded in networks are non-substitutable (Adler and Kwon, 2002).

Incubator networks, therefore, meet the VRIN criteria, at least to some extent, and as such are a source of a sustainable competitive advantage. Initially, however, it is difficult for start-up entrepreneurs to exactly know who is part of the network and realize how these network contacts can impact their firm’s success (Cooper et al., 2010). Incubation experience enables entrepreneurs to experiment with incubator networks as a resource, which improves understanding of how incubator networks can serve their tenant’s needs and the extent to which networks meet the VRIN criteria. Incubator networks are thus sources of competitive advantage. In particular, start-up entrepreneurs in incubators learn which resources can be found in which networks (Sá and Lee, 2012; Soetanto and Jack, 2013). This makes incubator networks more valuable for start-ups in incubators than for other start-ups that do not yet know their way in incubator networks. We therefore expect the following to hold true:

Hypothesis 4. Start-up entrepreneurs with incubation experience value the networks offered by incubators more than start-up entrepreneurs without incubation experience.

2.5. Legitimacy

Incubators can provide start-ups with legitimacy, which refers to an organization’s “right to exist and perform an activity in a certain way” (Bruton et al., 2010). Start-up firms often lack legitimacy because they do not have a track record or an established network (Aldrich and Fiol, 1994; Bruton et al., 2010; Singh et al., 1986). They can overcome these deficits by associating themselves with other, more reputable organizations (Rao et al., 2008), such as incubators with a track record of supporting successful start-ups (NESTA, 2014; Patton, 2013). Incubators themselves can also be affiliated with reputable partners that are a source of legitimacy, such as universities or venture capitalists (Lasrado et al., 2016; van Stijn et al., 2018). In addition, incubators can focus on specific industries, which allows them to build a reputation (Sagath et al., 2019). Factors such as track record, incubator affiliation, and industry focus, also contribute to the perceived legitimacy of start-ups in those incubators (Amezcuea et al., 2013; Bergek and Norrman, 2008; McAdam and McAdam, 2008).

Legitimacy is valuable because it aids in access to other resources such as funding and network contacts (Rao et al., 2008; van Stijn et al., 2018). The rarity of this resource is a matter of debate. On the one hand, start-ups have several sources of legitimacy such as the sheer number of similar businesses (Hannan and Freeman, 1989; van Weele et al., 2018a), entrepreneurs’ own past experience (Tornikoski and Newbert, 2007), alliances with similar start-ups (Van de Ven, 2005), and policies that favor entrepreneurship (Mandakovic et al., 2015). On the other hand, the legitimacy provided by incubators is unique, especially to

inexperienced entrepreneurs. It often provides specific industry legitimacy (Amezcuea et al., 2013; Schwartz and Hornych, 2008) and signals greater potential compared to competing start-ups because incubators are selective and incubator staff have experience and expertise in assessing the potential of early-stage start-ups (Aerts et al., 2007; Pauwels et al., 2015). Incubator legitimacy is therefore fairly rare and not easily imitable. It might be substituted by other sources of legitimacy, but they are more difficult to attain and less suitable for start-ups.

Overall, we conclude that the legitimacy provided by incubators meets the VRIN criteria. As an intangible resource, incubator legitimacy is difficult for start-up entrepreneurs to value, and incubation experience is the only way to truly understand the benefits of legitimacy from incubators. We therefore expect the following to hold true:

Hypothesis 5. Start-up entrepreneurs with incubation experience value the legitimacy provided by incubators more than start-up entrepreneurs without incubation experience.

2.6. Control variables

Incubation experience is not the only factor influencing resource valuation by start-up entrepreneurs. Based on the RBV and incubation literature, we identify several possible causes of the heterogeneity in start-ups’ resource valuation. We include these possible causes as control variables to isolate the effects of incubation experience.

First, it is possible that not all start-up entrepreneurs are familiar with the concept of incubators, which may influence the resources entrepreneurs expect to gain from them. Second, there is heterogeneity in firms’ existing resource stocks (Lewin et al., 2004; Rumelt, 1984; Wernerfelt, 1995). Before entering incubators, entrepreneurs bring a number of resources to their newly founded businesses (Adner and Helfat, 2003; Helfat and Peteraf, 2003) or develop them internally (Bruneel et al., 2012; McAdam and McAdam, 2008; Van Weele et al., 2016). These resources include start-up experience, industry experience, and financial resources. Possessing these resources reduces start-ups’ need to acquire them from incubators. Still, ownership does not mean that resources are valued appropriately. Start-up entrepreneurs can discover the value of resources themselves through trial-and-error learning processes (Huber, 1991; Wang and Chugh, 2014), but there is no guarantee of success from these efforts (see section 2.3). Nonetheless, ownership of resources can affect their valuation by start-up entrepreneurs, so we must control for this aspect.

Third, the valuation of resources depends on start-ups’ development stage and the associated needs for resources. For example, the need for funding as a tangible resource increases dramatically when a life sciences start-up enters the clinical trial stage (Moors et al., 2014; Morgan et al., 2011). Fourth, start-ups’ environment matters. High-technology industries rely more on specialized equipment than those that operate in medium- or lower-technology industries. Access to resources also differs by country; for example, there is a large difference in the supply of financial resources available in North America and Western Europe (van Weele et al., 2018b) based on location. Finally, entrepreneurs’ ambitions need to be considered. The RBV presumes that firms strive to seize a sustainable competitive advantage, but start-ups can also serve as vehicles to realize the personal ambitions of their founding entrepreneurs (Baum and Locke, 2004). This can affect start-ups’ perceived resource needs. For example, those that seek to grow quickly have much greater need for financial resources than those that make remaining small and independent a high priority (Wasserman, 2008).

3. Methods

3.1. Research design: discrete choice experiment

To model the influence of incubators on entrepreneurs’ valuation of resources, we used a DCE (Louviere and Woodworth, 1983). Choice

experiments such as DCEs² originally were designed to measure consumer preferences for marketing purposes, but there has been increasing interest in applying them more broadly within the social sciences (Aguinis and Bradley, 2014; Shepherd, 2011; Shepherd and Zacharakis, 1999). Choice experiments have proven to be useful for understanding entrepreneurs' preferences for innovation networks (Lefebvre et al., 2014), ethical venture capital (Drover et al., 2013), and the choice among the strategies of making, buying, and allying (Van Rijnsoever et al., 2017a).

The DCE presented the respondents with a series of choice tasks in which they had to choose between two alternatives (in our case, two hypothetical incubators). The respondents based their choice on the levels (values) of the attributes of each alternative (in our case, resources). The levels varied across choice tasks and questionnaire versions, so the overall survey had an orthogonal design (i.e., there was zero correlation among the attributes). Each choice forced the respondents to make a trade-off between the alternatives and their attributes so that the DCE revealed the utility attached to each individual attribute.

We opted to apply a DCE design in this study because the attribute levels were pre-given by design and did not correlate with one another. The DCE thus enabled us to assess the relative importance or value of each resource without any confounding factors and could yield generalizable insights into entrepreneurs' decision making without the bias that could result from retrospective techniques such as interviews.

3.2. Sample and data collection

The entrepreneurs studied were members of an established European marketing agency's larger online citizen panel. The panel members were volunteers who could regularly participate in studies for which they were eligible.³ The respondents received modest rewards for completing the survey such as gift certificates and discounts at selected stores, and the researchers paid a fee to the marketing agency for each completed response. The respondents surveyed came from the United States, Canada, the United Kingdom, Ireland, France, Germany, Austria, Switzerland, the Netherlands, and Belgium. These countries were selected because they had high concentrations of both start-ups and incubators (Aerts et al., 2007; WEF, 2015).

The respondents had to meet three criteria. First, to limit the sample to entrepreneurs, the respondents had to be working in businesses they owned. Second, the respondents had to be founders of technology-based start-ups, defined as new firms whose business was based on the exploitation of technological know-how through the creation of new products and services. Third, to target start-ups, the respondents were excluded if their businesses had been paying salaries for more than two years. To increase reliability, whenever possible, we based the screening questions on validated questions from the *Global Entrepreneurship Monitor* (2015) and the Panel Study on Entrepreneurial Dynamics (Davidsson, 2008). Appendix B presents the screening questions.

The incidence rate of finding start-up founders in a population of citizens is very low (Davidsson, 2008). Moreover, the number of start-up founders is expected to vary per country (*Global Entrepreneurship Monitor*, 2015). Due to these reasons, we did not rely on random sampling. Instead, we used quota sampling, an efficient non-probabilistic form of sampling, to obtain a representative sample.

We based these quota on the total early-stage entrepreneurial activity (TEA) from the *Global Entrepreneurship Monitor*, which measures

² A similar method to DCEs is conjoint analysis. Technically, conjoint analysis can also include ranking and rating tasks, which do not capture behavior in real-life choice situations (Louviere et al., 2010). Hence, DCEs ask respondents to make choices between discrete alternatives. As this is the case in our study, we use the term "DCE."

³ To maintain quality standards, the marketing agency strictly controlled eligibility.

the percentage of the adult population that is either a nascent entrepreneur or the owner-manager of a new business. Based on the TEA and our expectations of feasibility, we established quotas for each country that had to be met (Appendix A). The marketing agency continued to approach panel members until the pre-set number of desired respondents was met (Bryman, 2013).⁴ To further increase the response rate, the questionnaire was administered in the native language of each country.

Scholars trying to sample start-up founders are also advised to increase the incidence rate by targeting individuals more likely to have founded start-ups by approaching individuals with particular educational backgrounds (Davidsson, 2008). Start-up founders are more likely to be highly educated (Storey and Tether, 1998; Wadhwa et al., 2008), so we chose to approach more highly educated individuals (those with bachelor's degrees or higher) than found in the broader population.

In this manner, 935 startups completed the questionnaire. The United States had the largest number of respondents but was underrepresented in our sample, while Ireland was most overrepresented. To correct for these differences, we weighted the respondents in our sample according to the 2015 TEA (see Appendix A for the case weights).

We could not report a meaningful overall response rate for our survey due to the low incidence rate of entrepreneurs in the population, screening questions for start-ups, between-country variation in responses, and quota sampling method. However, that did not mean that the sample was not representative for the population (Visser et al., 1996), but it did mean that we needed to check and correct for potential bias.

To this end, we compared our descriptive statistics with previous studies targeting the founders of technology-based start-ups. Table 1 gives the full descriptive statistics of the sample. The ages of our respondents ranged from 20 to 69 years (weighted average: 37.7 years). Our respondents were primarily male (75%), university educated (69.9%), and first-time entrepreneurs (87.7%). These numbers are in line with earlier studies targeting the founders of technology-based start-ups (*Global Entrepreneurship Monitor*, 2017; *Kauffman Foundation*, 2017; Storey and Tether, 1998; Sullivan et al., 2020; Wadhwa et al., 2008). Of particular importance is the observation that our percentage of entrepreneurs with incubation experience (24.3%) is very close to the 23.8% found in empirical work from Italy (Lukeš et al., 2019). These numbers indicate that our sample was likely representative. Completing the questionnaire took 20 min on average.

3.3. The discrete choice experiment

The respondents who met the screening question criteria were first introduced to the study aim and design and then received an explanation of the choice tasks and their attributes. Each task consisted of a choice between two fictional incubators that differed in the amounts or levels of particular resources or attributes they offered. The attributes were based on the theoretical expectation that they affected the respondents' choices (see section 2; Hensher et al., 2005). Further, as common in choice modeling (Kløjgaard et al., 2012), we conducted qualitative interviews in Germany with entrepreneurs (12), incubator staff (6), and policymakers (2) to validate the list of attributes and levels used. We specified the levels to make the choice tasks as realistic as possible. For our analyses we recoded these levels to variables that allowed us to test our hypotheses. Table 2 gives explanations of the attributes to the respondents and how the variables were used in the analysis. Below, we discuss the variables that required additional argumentation.

We chose four levels for funding amounts, in accordance with the ranges mentioned in the literature (Pauwels et al., 2015; Rubin et al., 2015): \$0, \$10,000, \$25,000, and \$100,000 (all figures are here in US

⁴ This prevented approaching the respondents to participate in studies too often and recruiting too many respondents.

Table 1

Measurement and weighted descriptive statistics of the characteristics of the entrepreneurs and their start-ups. SD = standard deviation. All financial resources were presented as local currency.

Independent variable	Indicators in survey	Value	Variable in model
Incubation experience	Never been part of an incubator	75.7%	Incubation: dummy variable (Yes = 24.3%)
	Is part of an incubator	15.1%	
	Has been part of an incubator	9.2%	
Control variables	Indicators in survey	Value	Variable in model
Familiar with incubators	Were you familiar with the concept of “incubators” and/or “accelerators” prior to participating in this study?		Familiar with incubators: dummy variable (Yes = 56.2%)
	Resource stock: financial, legitimacy	Less than \$1000 \$1000–\$9999 \$10,000–\$49,999 \$50,000–\$99,000 \$100,000–\$249,999 \$250,000–\$499,999 More than \$500,000	5% 11.1% 19.4% 22.7% 23.3% 13.1% 5.3%
Resource stock: business knowledge, legitimacy	Number of previous businesses		Start-up experience: (mean = 0.23, SD = 0.72)
	Number of years working in the same industry as the business’ current primary industry		Industry experience: continuous variable (mean = 8.97, SD = 6.90)
Resource stock: network, legitimacy	What is the highest level of formal education you completed?		University degree: dummy variable (Yes = 69.9%)
	University		
Development stage	No spinoff from a larger organization	86.5%	Spinoff: dummy variable (Yes = 13.5%)
	Spinoff from a university or research lab	8.8%	
	Spinoff from another company	4.7%	
	Did your business make use of any of the following sources to raise funds? Bank loan	39%	
Development stage	Governmental subsidy	15%	External investors: dummy variable (Yes = 57.5%)
	Investor	21%	
	Formally registering the business	36.3%	
	Organizing a start-up team	45.4%	
	Devoting yourself full time to the business	37.7%	
	Hiring employees	28.5%	
	Receiving money from the sale of goods or services	27.5%	
	Discussing the new business’s product or service with potential customers	34.9%	
	Preparing a written business plan	36.3%	
	Developing a proof of concept or working prototype	35.0%	
	Applying for a patent/copyright/trademark	24.3%	
	Defining market opportunities	46.3%	
		30.7%	

Table 1 (continued)

Independent variable	Indicators in survey	Value	Variable in model	
Environment	Asking financial institutions or other people for funds	34.3%	Size: Natural log (mean = 1.68, SD = 1.08) Continent: dummy variable (Western Europe = 27%) High tech: dummy variable (Yes = 72.6%)	
	Purchasing materials, equipment, facilities, or other tangible goods for the business			
Ambitions	Number of paid employees			
	Country list: see Appendix A			
Ambitions	Sector list: see Appendix C			
	Please rank the top three statements that best describe your ambitions for your business (I want the business to ...). Items were reverse scored, and non-selected items were given a value of 0 (ref).			
	Grow and become a large company	1	9.9%	Grow large: continuous variable (mean = 1.82, SD = 1.00)
		2	14.6%	
		3	25.5%	
	Make me a lot of money	1	36.6%	Make money: continuous variable (mean = 2.43, SD = 1.35)
		2	10.8%	
		3	11.1%	
	Be acquired by a larger company for a good price	1	1.9%	Be acquired: continuous variable (mean = 1.46, SD = 0.76)
		2	7.6%	
	3	23.4%		

dollars, but in the choice experiment these were presented as local currency). As equity percentages, we chose 6 or 15 percent, which are close to those mentioned in the interviews and in several online sources (Quora.com, 2013; Reddit.com, 2016). We created a dummy variable for physical resources, with “No access” and “Paid access” to resources coded as “No” and free access coded as “Yes.” We merged the first two categories, as paid physical resources are very easy to obtain on the market.

It is difficult to assign quantities to a concept as abstract as legitimacy, let alone to add quantities of legitimacy from different sources. For this reason, we approximated the concept with a dummy variable that indicated whether or not an incubator had a source of legitimacy. The DCE contained three attributes measuring legitimacy (track record, incubator affiliation, and industry focus; see section 2.3.5) that we used to create one dummy variable signifying high or low legitimacy. We coded a track record of “good” as giving high legitimacy. Regarding incubator partners, we identified six types frequently mentioned in the literature (Barbero et al., 2013; Gassmann and Becker, 2006; Pauwels et al., 2015; Rothaermel and Thursby, 2005a): (1) independent, privately-owned incubators; (2) regional governments; (3) local universities; (4) internationally renowned universities; (5) start-up investors; and (6) multi-national companies active across global markets. We recoded categories 1, 2, and 3 as giving low legitimacy and categories 4, 5, and 6 as giving high legitimacy, as the latter are known to be sources of legitimacy (Evald and Bager, 2008; Lasrado et al., 2016; Rothaermel and Thursby, 2005b; van Stijn et al., 2018). Finally, we coded an incubator with a specific industry focus as having high legitimacy (see Sagath et al., 2019). For our analysis, we merged these three dummy variables into one dummy variable with the value “yes” if the incubator provided any of these three forms of legitimacy.

Table 2

Attributes, explanations, and levels as presented to the respondents and the recoding to variables. Currency symbols depended on the country of the respondent.

Resource type	Attribute	Explanation to respondents	Levels in choice experiment	Variable used in analysis
Financial resources	Funding amount	The incubator may provide different amounts of funding to your business. The funding may be provided as a grant, as a loan, or the incubator may take a certain amount of equity and shares in the start-up. This leads to different combinations of funding amounts and funding forms.	\$0 \$10,000 \$25,000 \$100,000	Funding amount (continuous variable based on the levels of the DCE)
Physical resources	Physical resources	The incubator may provide your business with appropriate physical resources, including office space and shared facilities or equipment.	No access Paid access Free access	Physical resources (dummy variable, "No" and "Yes"): 1 and 2 were recoded to "No"; 3 was recoded to "Yes."
Business knowledge	Training and coaching	The incubator may provide coaching by experienced entrepreneurs who act as mentors or advisors. The incubator may also provide training such as masterclasses and workshops.	None Coaching only Training only Training and coaching	Training and coaching (dummy variable, "No" and "Yes"): 1 was recoded to "No"; 2, 3, and 4 were recoded to "Yes."
	Shareholder involvement		Grant or subsidy Loan against commercial rates 6% equity 15% equity	Shareholder involvement (dummy variable, "No" and "Yes"): 1 and 2 were recoded to "No"; 3 and 4 were recoded to "Yes."
Networks	Internal and external networks	The internal network refers to interactions with other entrepreneurs in the incubator, and the external network includes access to experts, customers, and investors. If networks are strong, members are well connected, accessible, and willing to help one another.	No strong networks Strong external network only Strong internal network only Strong internal and external networks	Networks (dummy variable, "No" and "Yes"): 1 was recoded to "No"; 2, 3, and 4 were recoded to "Yes."
Legitimacy	Track record	The start-ups that previously participated in the incubator. Incubators with a good track record have a history of incubating successful start-ups.	No track record yet Bad Neutral Good	Legitimacy (dummy variable, "No" and "Yes"): Track record was recoded into a dummy variable. Values 1, 2, and 3 were recoded to "No"; 4 was recoded to "Yes."
	Incubator affiliation	The incubator may have various organizations as its core partner.	None: independent, privately-owned incubator Regional government Local university Multinational company active across global markets Internationally renowned university Start-up investor	Partner reputation (dummy variable, "No" and "Yes"): Incubator affiliation was recoded into a dummy variable. Values 1, 2, and 3 were recoded to "No"; 4, 5, and 6 were recoded to "Yes." Industry focus was recoded, with a value 1 to "Yes," and Value 2 to "No." If any of the three dummy variables had the value of "Yes," the legitimacy variable was coded as "Yes."
	Industry focus	The incubator may only support start-ups in your specific industry, or the incubator may support start-ups from a broad range of industries.	Focus on your industry Broad range of industries	

After the introduction, we asked the respondents to imagine that they were looking for an incubator to support their businesses. They then received eight choice tasks that varied systematically according to the orthogonal experimental design (see Fig. 2 for an example of a task). For each choice task, we presented two incubator alternatives and asked, "Which incubator would you most likely choose?" During the choice tasks, the respondents could return to the explanations of the attributes and levels via a pop-up window. The respondents spent an average of 20 s on each choice task.

3.4. Measurement of incubation and the control variables

After the choice tasks, the respondents were presented with additional questions designed to measure the characteristics of the entrepreneurs and their start-ups. These questions formed the basis for our main independent variable and the control variables.

3.4.1. Incubation

We first asked if the respondents were familiar with incubators (yes/no). To those who were familiar, we asked whether they were currently part of incubators or had been in the past. To test our hypotheses, we merged the first two categories (i.e., currently part of an incubator and in the past part of an incubator) into a dummy variable capturing incubation experience. In the results we explore what the effects of this

choice are.

3.4.2. Familiarity with incubators

The question on familiarity with incubators (see section 3.4.1) was used as a dummy variable and a control variable in our model.

3.4.3. Resource stock

We measured resource stock as financial resources, knowledge, network, and legitimacy. To measure financial resources, we inquired about the amounts of funds raised. Due to the sensitive nature of the information, the question measuring capital raised allowed the respondents to decline to answer, and 7.8% of the respondents did not answer. We estimated these missing values by applying multiple imputation (Donders et al., 2006) using the MICE package in the R software.

It was important to control for prior (business) knowledge because it could also be a source of capability development. To measure it, we asked whether the respondents had obtained university degrees, their years of experience in the primary industry of their businesses, and the number of businesses they had founded in the past.

To control for networks, we investigated whether start-ups were plausibly connected to important sources of tangible or intangible resources. We asked a yes/no question about whether start-ups were spinoffs of existing companies or universities and whether start-ups received funding from governments, banks, or venture capitalists.

Imagine that you were to choose an incubator to help you establish your business. We ask you to choose between two hypothetical incubators. Each incubator has its own characteristics. You can find the table to help you understand these characteristics and their respective levels [here](#). Characteristics that are not mentioned do not vary across incubators.

Attributes	Incubator #1	Incubator #2
1. Incubator affiliation	Local university	Start-up investor
2. Physical resources	No access	Free access
3. Funding	\$ 25,000 as a grant	\$ 100,000 as a loan against commercial rates
4. Training and coaching	Coaching only	Training and coaching
5. Networks	Strong external network only	Strong internal network only
6. Track record	Good	No track record yet
7. Industry focus	Broad range of industries	Focus on your industry
Which incubator would you most likely choose? <i>Please select one of the two incubators</i>	<input type="checkbox"/>	<input type="checkbox"/>

Fig. 2. Example choice task.

Imagine that you were to choose an incubator to help you establish your business. We ask you to choose between two hypothetical incubators. Each incubator has its own characteristics. You can find the table to help you understand these characteristics and their respective levels [here](#). Characteristics that are not mentioned do not vary across incubators.

These measures were not perfect proxies for networks, but our data did not supply any other measures, and they were plausible indicators of the contacts from which the start-up actually received resources. Moreover, as demonstrated in the following, all of the control variables had very little influence on our main results.

“Legitimacy” referred to the extent to which start-ups were deemed to be appropriate for their environment. Legitimacy was quite challenging to measure because the opinions of others about the start-up had to be captured. The variables controlling for networks also captured the possible reputation effects of associations with other partners. Industry experience captured start-ups’ reputations in their industries. Financial investments have also often been used as a signal for the appropriateness of a given start-up, so the amount of investments also captured reputation effects (De Clercq et al., 2006; Rothaermel and Thursby, 2005a; Vohora et al., 2004). That some measures captured several concepts was unproblematic in the present study because they were all control variables that functioned to capture variance that might have confounded the effects of our independent variable.

3.4.4. Development stage

To measure start-ups’ development stages, we inquired about the activities in which they had engaged during the past 12 months to develop their businesses (Dombrovsky et al., 2011; Liao and Welsch, 2008). These activities are given in Table 1. As indicators for development stage, we summed the number of activities and inquired about the number of paid employees working for the businesses.

3.4.5. Environment

We investigated the sectors in which the start-ups operated. Using

the NACE classification (Eurostat, 2013), we coded medium-high and high-technology industries as high technology, and the rest as low technology. We also asked about the countries in which the businesses operated and recoded the answers as either North America or Western Europe.

3.4.6. Ambitions

We asked the respondents to rank their three top ambitions from a list of eight options. For control variables, we used the rankings of the three growth-related ambitions: to grow and become a large company, to make a lot of money, and to be acquired at a good price.

3.4.7. Descriptive statistics and correlations

Table 1 presents the exact measurements and descriptive statistics of the characteristics of the independent and control variables. Table 3 gives the correlation matrix of all predictor variables. Variable 1 is the dependent variable (0/1). Variables 2 to 6 vary withing respondents according to the experimental design, and hence have very low correlations. Variables 7 to 22 are measured as additional questions in the survey.

3.4.8. Data analysis

We fitted a series of conditional logit models (McFadden, 1974) to model the probability that respondent *i* selects alternative *j* at replication *t*, given the values of the attribute levels of the alternatives (z_{it}^{att}). The model has the following form:

$$P(y_{it} = j | z_{it}^{att}) = \frac{\exp(\eta_{j|z_{it}})}{\sum_{j=1}^J \exp(\eta_{j|z_{it}})}, \tag{1}$$

Table 3
Correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1 Choice (0/1)																						
2 Financial resources	0.05																					
3 Physical resources	0.06	0.00																				
4 Training & coaching	0.02	0.00	0.00																			
5 Shareholder involvement	-0.03	0.00	0.00	0.00																		
6 Networks	0.03	-0.01	0.00	-0.02	0.00																	
7 Legitimacy	0.01	-0.05	-0.01	-0.02	0.03	-0.02																
8 Incubation	0.00	0.00	0.01	0.00	0.00	0.01	0.01															
9 Familiar with incubators	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.52														
10 Investments raised	0.00	0.01	0.00	-0.01	0.01	0.00	0.01	0.27	0.17													
11 Start-up experience	0.00	0.01	-0.01	-0.01	-0.01	0.00	-0.01	0.03	0.07	0.01												
12 University degree	0.00	0.00	-0.01	-0.01	-0.01	-0.01	0.01	0.05	0.07	0.14												
13 Industry experience	0.00	0.00	0.00	-0.01	0.00	-0.01	-0.01	-0.06	0.04	0.10	0.14											
14 Spinoff	0.00	0.00	0.00	0.00	0.01	-0.01	0.00	0.20	0.08	0.15	0.06	0.07	0.01									
15 External investors	0.00	0.00	-0.01	0.01	0.01	-0.02	0.00	0.22	0.08	0.38	-0.08	0.04	0.00	0.06								
16 Gestation activities	0.00	-0.01	0.00	0.01	0.00	-0.01	0.01	0.14	0.20	0.26	0.03	0.10	0.03	-0.07	0.24							
17 Size	0.00	-0.01	0.00	0.00	0.00	0.00	0.01	0.22	0.10	0.48	0.00	0.02	0.01	0.15	0.29	0.21						
18 Continent	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.17	-0.02	0.03	0.04	0.02	-0.01	0.01	0.13					
19 High technology	0.00	0.00	0.00	0.01	0.01	-0.01	0.01	0.04	0.10	0.17	-0.01	0.04	0.01	0.00	0.18	0.09	0.09	-0.05				
20 Make money	0.00	0.00	-0.01	0.01	-0.01	-0.01	0.00	-0.07	-0.02	0.05	0.00	0.05	0.04	-0.09	0.05	0.09	0.01	0.03	-0.03			
21 Grow large	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.07	0.03	-0.06	-0.03	-0.05	-0.12	0.06	-0.01	-0.06	0.04	-0.04	-0.03	-0.16		
22 Be acquired	0.00	-0.01	0.01	0.00	0.02	-0.01	0.00	0.02	0.00	0.06	0.02	0.02	0.02	0.07	0.00	-0.02	0.08	-0.07	0.10	-0.27	0.04	

where y_{it} denotes the value of the binary dependent variable and J denotes the number of alternatives. In our models, $\eta_{j|z_{it}}$ is a linear function of the attribute levels (β_p^{att}) and an alternative specific constant (β_j^{con}):

$$\eta_{j|z_{it}} = \beta_j^{con} + \sum_{p=1}^P \beta_p^{att} Z_{itjp}^{att}, \tag{2}$$

where the p -index refers to a particular attribute. The alternative specific constant controls for whether the alternative was on the right or left of the choice set.

In all models, the dependent variable was the respondent's choice of incubator, which is a dummy variable. As each respondent received eight choice tasks with two alternatives, we have sixteen observations for each respondent. Because of this balance, the dependent variable is by definition uncorrelated with the independent variable and the control variables. To test hypotheses 1 to 5, we fitted three models in a stepwise manner. In model step 1, the choice of incubator is predicted by variables capturing the resources offered by the incubator, which reveals the extent to which respondents value each resource. In model step 2, we add interaction terms between the resources offered by the incubator and the incubation experience variable and all control variables, which indicates whether start-up entrepreneurs with incubation experience valued particular resources differently when choosing an incubator than start-up entrepreneurs without incubation experience. In model step 3, we added an interaction effect between both forms of business knowledge.

4. Results

Table 4 presents the results of the conditional logit models with the incubation dummy as the main independent variable. For space reasons, we omit the control variables, which would add many rows to the table. The full models can be found in Appendix D.

Model 1 shows that all of the resources except legitimacy significantly affect the choice of incubator, which means that start-ups perceive the resources as influencing the incubator's value proposition. In line with earlier qualitative evidence, but contrary to the VRIN argument, tangible resources are valued more than intangible resources (McAdam and McAdam, 2008; Soetanto and Jack, 2013; van Weele et al., 2017). The least valued resource is shareholder involvement, which requires giving up equity.

Model 2 shows that start-up entrepreneurs with incubation experience value both financial and physical resources significantly less than their non-incubated counterparts. Entrepreneurs thus learn during incubation that tangible resources are less likely to contribute to sustainable competitive advantages. This supports earlier claims that learning processes in incubators contribute to the changing valuation of tangible resources (Patton, 2014; van Weele et al., 2017) and supports hypotheses 1 and 2.

The picture becomes more complex when we turn to intangible resources. Contrary to hypotheses 3a and 3 b, model 2 shows no differences in the valuation of both forms of business knowledge (Training & Coaching and Shareholder Involvement) between and entrepreneurs with or without incubation experience. A possible explanation for this finding is that both forms of business knowledge essentially carry out the same function (Alexy et al., 2012). Having one can thus make the other redundant.

One could expect that start-up entrepreneurs with incubation experience are also better able to understand that having both forms of business knowledge does not increase the chances of gaining a sustainable competitive advantage. Therefore, we added an interaction effect between both sources of business knowledge (model 3). After this addition, the results are in line with hypotheses 3a and 3 b. Business knowledge from training and coaching and from shareholder involvement are both significantly more valued by entrepreneurs with

Table 4
Results of the conditional logit models with the incubation dummy as main independent variable.

		Dependent variable: Incubator choice		
Model		1	2	3
	Financial resources	0.217 ^c	0.646 ^c	0.652 ^c
	Physical resources	0.191 ^c	0.121	0.100
	Training & coaching	0.056 ^b	-0.019	-0.167
	Shareholder involvement	-0.091 ^c	-0.037	-0.211
	Networks	0.143 ^c	-0.356 ^b	-0.362 ^b
	Legitimacy	0.045	0.305	0.312
	Incubation		0.157	0.013
	Training & coaching ^a			0.236
	Shareholder involvement			
Hypothesis 1	Financial resources ^a Incubation		-0.238 ^c	-0.265 ^c
Hypothesis 2	Physical resources ^a Incubation		-0.214 ^c	-0.186 ^c
Hypothesis 3a	Training & coaching ^a Incubation		0.02	0.215 ^a
Hypothesis 3b	Shareholder involvement ^a Incubation		0.013	0.347 ^b
Hypothesis 4	Networks ^a Incubation		-0.237 ^c	-0.237 ^c
Hypothesis 5	Legitimacy ^a Incubation		0.245 ^c	0.231 ^b
	Training & coaching ^a			-0.427 ^c
	Shareholder involvement ^a			
	Incubation			
	Alternative specific constant	-0.248 ^c	-0.246 ^c	-0.247 ^c
	Control variables	Yes	Yes	Yes
	Cox and Snell R ²	0.018	0.033	0.035
	Log Likelihood	-32,349.26	-32,237.62	-32,216.61
	Chi-square change compared to model 2			42.02 ^c
	Degree of freedom change compared to model 2			17
	Number of observations	14,960		
	Number of respondents	935		

^a Note: p < 0.1.

^b p < 0.05.

^c p < 0.01.

incubation experience than entrepreneurs without incubation experience, although the former is significant only at the 10% level. A combination of both forms of business knowledge is valued negatively.

Networks are valued less by entrepreneurs with incubation experience than entrepreneurs without incubation experience, which goes against Hypothesis 4. A possible reason for this is that the networks of incubators are the same for all tenant startups and are therefore not very rare. Also, a central part of the incubator network involves the relationships between start-ups (van Weele et al., 2018a). As these startups are mostly connected with each other, this component of the network is not rare.

Finally, legitimacy is valued more by entrepreneurs with incubation experience than entrepreneurs without incubation experience, which supports Hypothesis 5. This finding is in line with the idea that legitimacy is a critical resource for starting firms (Rao et al., 2008; Singh et al., 1986).

To operationalize incubation, we merged “has been part of an incubator” and “is currently in an incubator” into one variable. However, it is possible the learning processes of valuing tangible resources

are shorter and those for intangible resources proceed at a different pace. For example, the valuing of intangible resources might only take place after the incubation process. To gain insights into whether the incubation phase mattered, we re-estimated model step 3 but with separate parameters for being part of incubators and past experience in incubators. Table 5 presents the model that takes into account the incubation phase; the full model with control variables is presented in Appendix D. The model largely replicates the results from model 3, albeit with less statistical power, due to splitting the incubation variable into two. We tested if the models were statistically different from each other using a Chi-square test and found no significant differences between the models ($\chi^2 = 6.23$, $df = 8$, $p > 0.05$).

To test if there are differences in the valuation of resources per incubation phase, we estimated a series of additional models. In each model we imposed an equality constraint on the estimators for each separate resource per incubation phase. This means that, using a chi-square test, we compared the log-likelihood of the model presented in Table 5 with the models where the estimators of the incubation phase were modeled to be equal to see if there were significant differences. Although the positive effects of some intangible resources (Training & Coaching, Shareholder Involvement, Legitimacy) seem to increase from being currently in an incubator to having been in an incubator in the past, we found that there were no significant differences in valuation of resources per incubation phase. This justifies our choice to merge the two categories in the incubation variable.

Table 5

Results of the conditional logit models with separate estimators for being currently in an incubator and having been incubated in the past.

		Dependent variable: Incubator choice
	Financial resources	0.654 ^c
	Physical resources	0.097
	Training & coaching	-0.151
	Shareholder involvement	-0.196
	Networks	-0.361 ^b
	Legitimacy	0.312
	Incubation: currently	0.214
	Incubation: past	-0.254
	Training & coaching ^a Shareholder involvement	0.221
Hypothesis 1	Financial resources ^a Incubation: currently	-0.275 ^c
Hypothesis 1	Financial resources ^a Incubation: past	-0.254 ^b
Hypothesis 2	Physical resources ^a Incubation: currently	-0.195 ^b
Hypothesis 2	Physical resources ^a Incubation: past	-0.167 ^a
Hypothesis 3a	Training & coaching ^a Incubation: currently	0.099
Hypothesis 3a	Training & coaching ^a Incubation: past	0.364 ^b
Hypothesis 3b	Shareholder involvement ^a Incubation: currently	0.267 ^a
Hypothesis 3b	Shareholder involvement ^a Incubation: past	0.439 ^b
Hypothesis 4	Networks ^a Incubation: currently	-0.259 ^c
Hypothesis 4	Networks ^a Incubation: past	-0.209 ^a
Hypothesis 5	Legitimacy ^a Incubation: currently	0.146
Hypothesis 5	Legitimacy ^a Incubation: past	0.349 ^c
	Training & coaching ^a Shareholder involvement ^a Incubation: currently	-0.375 ^b
	Training & coaching ^a Shareholder involvement ^a Incubation: past	-0.483 ^b
	Alternative specific constant	-0.247 ^c
	Control variables	Yes
	R ²	0.036
	Log Likelihood	-32,213.49
	Number of observations	14,960
	Number of respondents	935

^a Note: p < 0.1.

^b p < 0.05.

^c p < 0.01.

5. Conclusion and discussion

Our results clearly show that entrepreneurs with incubation experience value tangible resources less than entrepreneurs without such experience. Furthermore, our results show that overall, start-up entrepreneurs with incubation experience value intangible resources more than their non-incubated peers. Both findings are in line with ideas from the RBV (Barney, 1991) and incubation research on which resources contribute the most to sustainable competitive advantages (Bruneel et al., 2012; Eveleens et al., 2017; Gimmon and Levie, 2010; Hansen et al., 2000; van Weele et al., 2017). As we controlled for other factors that could explain the differences between both groups, our findings is most likely the result of an improved capability to value resources induced by incubation, which results in a more accurate of the limited potential of tangible resources to contribute to a start-ups' sustainable competitive advantage.

As an exception, incubator networks are less valued by start-up entrepreneurs with incubation experience than without incubation experience. This finding nuances the idea that the networks provided by incubators contribute to sustainable competitive advantages (Bøllingtoft and Ulhøi, 2005; Eveleens et al., 2017).

5.1. Implications

Impacts of incubators go beyond merely complementing absent resources in start-ups. Our study is the first to quantitatively demonstrate that incubators contribute to developing the capability of valuing if resources meet the VRIN criteria. In particular, entrepreneurs with incubation experience value tangible resources less than their non-incubated counterparts, while incubation increases entrepreneurs' valuation of the intangible resources offered by incubators. This supports earlier notions from qualitative and descriptive studies (McAdam and McAdam, 2008; Soetanto and Jack, 2013; van Weele et al., 2017), and shows a missing link between newer incubation models and start-up performance. Our research complements the shift from studying the value of tangible resources (Mian, 1996) to the value of intangible resources (Bruneel et al., 2012; van Weele et al., 2017) and capabilities in the process of new venture creation (Lockett and Wright, 2005; Rasmussen et al., 2011).

Overall, improved resource valuation can contribute directly and sustainably to the performance of start-ups. Furthermore, tenant entrepreneurs that do not continue their businesses can still use this capability in their future efforts. This implication contributes to the legitimacy of incubators that emphasize human capital development, which is especially important to incubator managers and policymakers and universities that support incubators. Further research may improve our understanding of how incubators affect other types of capabilities such as resource acquisition and integration.

In this paper, we established that entrepreneurs with incubation experience learn to value resources more, according to the VRIN criteria, than non-incubated entrepreneurs. However, incubators support start-ups in a variety of ways (Bruneel et al., 2012; Eveleens et al., 2017; Theodorakopoulos et al., 2014; van Rijnsoever, 2020), and it is unknown which form of support contributes the most to capability development. Future research should delve into how this learning takes place, by comparing the learning processes of incubated with non-incubated entrepreneurs. Variations in incubator design could be exploited to do so. The process of how intangible resources become valued especially needs more attention. Future research should also focus on how other external organizational sponsors such as chambers of commerce and investors may contribute to capability development in young businesses and the differences in the pace of learning in the positive and negative valuation processes of tangible and intangible resources. An especially interesting line of research is the extent to which incubators' assertiveness plays a role in this process (van Weele et al., 2017). Perhaps a laissez-faire incubation strategy is more effective to help start-ups value intangible resources than an assertive strategy because the tacit nature of

intangible resources demands much learning through experience to understand their contributions. Furthermore, scholars can investigate how incubators help with the acquisition and exploitation of these resources (Sirmon et al., 2010).

Methodically, our use of a DCE is also a contribution. DCEs are a more reliable tool to elicit preferences than conventional methods, such as rating and ranking scales (Ben-Akiva et al., 1991), and which have a higher internal validity due to the employment of an experimental design (Van Rijnsoever et al., 2012). We have shown how DCEs can uncover preferences for resources among startup-up entrepreneurs. We encourage researchers to employ the method among other types of respondents and strategic choices.

From a practical perspective, our results help incubators understand their impact on start-up development. With this insight they can improve their value proposition towards potential tenants. Incubator managers need to be cautious about what resources they offer. Tangible resources can attract start-ups to incubators and are valuable to businesses, which justifies their use. However, in the long term, these resources are not the most highly valued or make the strongest contributions to sustainable competitive advantages. Further, offering generic networks available to every tenant, such as inviting everyone to drinks and networking events, might not be perceived as valuable. Instead, incubators can better display genuine interest in every start-up, for example, through intensive coaching and training and becoming part of their boards (taking equity). Furthermore, incubator managers must realize that lowering the perceived value of tangible resources is probably easier than increasing the perceived value of intangible resources, which likely requires more experience. This means that the incubation process needs to be sufficiently long for start-ups to fully develop resource valuation capabilities.

5.2. Limitations

This study has several limitations. First, to measure research valuation, the DCE explores individuals' stated preferences rather than their actual (or revealed) preferences. Measuring stated preferences allows greater freedom in formulating alternatives because the researcher is not bound by the characteristics of real-world examples. However, it may lead to biased results when hypothetical scenarios do not resemble the real world (Hensher et al., 2005). We have tried to avoid this by both carefully consulting the literature and conducting interviews with entrepreneurs to ensure that the alternatives in our experiment are plausible. Still, we encourage research that complements our study by exploring entrepreneurs' revealed preferences, such as the number of applications incubators receive, whether the incubators selected match the preferences, and to what extent entrepreneurs actually use the resources offered.

Second, designing a DCE requires trade-offs between including all important attributes and ensuring that the respondents can easily understand the choice tasks. In this case, we decided to limit ourselves to the five most common resources important in explaining entrepreneurs' valuations, based on both the literature review and the interviews with entrepreneurs. Future research could expand our approach by testing additional attributes that may play roles in entrepreneurs' resource valuation.

Third, our research reveals a process of change, albeit only through a categorical variable of having incubation experience. Having established this influence, an avenue for further research is to assess how, over time, this change takes place. We encourage further research using a time series models or process models to better understand these processes of change.

Fourth, our sample includes only entrepreneurs from North America and Western Europe. We advise caution when generalizing our results to other continents such as Asia, South America, and even other parts of Europe because these regions have different entrepreneurial ecosystems (Ács et al., 2014) that might require different resources and have

different institutional demands (Hall and Soskice, 2001). For example, Steinz et al. (Steinz et al., 2015) emphasize that access to talent and building goodwill among actors are key resources for entrepreneurs in China. We recommend that future researchers study the degree to which institutional contexts influence entrepreneurs' preferred resources and capability to value these resources.

Fifth, in this study we asked start-up entrepreneurs to value resources offered by the incubator, rather than resources in general. The context of the incubator might have affected our results, as startups with and without incubation experience have different learning experiences, or a different perception of the quality of the resources offered by the incubator. To partially remedy this issue, we controlled for familiarity with incubators and the phase of incubation. We did not find any significant results that indicate that the incubator context influenced the results. However, we cannot exclude this possibility altogether. We recommend follow-up research to test if the differences in resource valuation also

hold for resources independent of the incubation context.

Finally, incubators can be highly selective in their choice of start-ups (Bergek and Norrman, 2008), which may affect our results. It is possible that higher valuation of intangible resources is an a priori selection criteria for many incubators. Our findings thus could result from selection rather than entrepreneurs' learning. However, this explanation contradicts the available evidence on why start-ups join incubators (McAdam and McAdam, 2008; Soetanto and Jack, 2013; van Weele et al., 2017) and is thus questionable.

Acknowledgements

This work was supported by the Climate KIC Program of the European Institute of Technology and the Netherlands Organization for Scientific Research (NWO). The funding sources played no role in the study design. The authors declare no conflicts of interest.

Appendix A. Quota and case weights

Country	TEA 2015	Country population	Population total early-stage entrepreneurs	Panel size	Target Quota	Sample total early-stage entrepreneurs	Case weight
Austria	8.71	8,623,073	751,070	25,544	30	37	0.280
Canada	13.04	35,851,774	4,675,071	471,880	100	109	0.592
Belgium	5.4	11,267,581	608,449	35,501	30	38	0.221
France	5.34	67,107,000	3,583,514	233,623	100	125	0.395
Germany	5.27	81,197,500	4,279,108	275,546	100	125	0.472
Ireland	6.53	4,635,400	302,692	45,221	50	65	0.064
Netherlands	9.46	16,928,000	1,601,389	59,252	50	67	0.330
Switzerland	7.12	8,279,700	589,515	21,684	30	24	0.339
United Kingdom	10.66	64,800,000	6,907,680	672,164	110	104	0.916
United States of America	13.81	322,210,000	44,497,201	3,265,203	400	241	2.546

Appendix B. Selection questions for respondents

- Are you, either alone or with others, currently trying to start a new business? This includes any self-employment or selling of goods or services to others.
 - No Not included in sample
 - Yes
- Would you consider the new business to be a technology-based start-up? A technology-based start-up is a new firm whose business is based on the exploitation of technological know-how through the creation of new products and services. Examples include the development of a new drug or software service.
 - No Not included in sample
 - Yes
- In the past 12 months, in which of the following activities have you engaged during the development of your business? *Tick all that apply:*
 - Formally registering the business
 - Preparing a written business plan
 - Organizing a start-up team
 - Devoting yourself full-time to the business (more than 35 h per week)
 - Developing a proof of concept or working prototype
 - Applying for a patent/copyright/trademark
 - Defining market opportunities
 - Hiring employees
 - Asking financial institutions or other people for funds
 - Receiving money from the sales of goods or services
 - Purchasing materials, equipment, facilities, or other tangible goods for the business
 - Discussing the new business' product or service with potential customers
 - None of the above: Not included in sample
- Has the new business paid any salaries, wages, or payments in kind, including your own? *Payments in kind' refers to goods or services provided as payments for work rather than cash. Payments in kind do not include stock options.*
 - No
 - Yes
- If the previous question was answered 'Yes': For how long has the new business been paying salaries, wages, or payments in kind, including your own?

- For 0–3 months
 - For 3–6 months
 - For 6–12 months
 - For 1–2 years
 - For 3–5 years Not included in sample
 - For more than 5 years Not included in sample
6. Do you, or will you, personally own all, part, or none of this business?
- All
 - Part
 - None Not included in sample
7. Is, or will, the new business be a subsidiary? A subsidiary is a venture where another organization owns more than 50% of voting shares.
- No, the new venture is not a subsidiary of another organization
 - Yes, the new venture is a subsidiary of another organization Not included in sample

Appendix C. Respondents by sector

Sector	Sample respondents
Aerospace	14
Artificial intelligence	47
Basic metals	26
Biotechnology & pharmaceuticals	20
Chemistry	30
Clean technology	69
Coke and petroleum products	6
Electrical engineering & equipment	45
Energy	33
Fabricated metal products	7
Functional or processed food	18
ICT & computers	87
Information systems	157
Machinery	13
Medical & dental instruments	17
Motor vehicles	27
Nanotechnology	5
Optical products	8
Other non-metallic mineral products	1
Photonics	1
Repair & installation machinery	19
Reproduction recorded media	14
Robotics	15
Rubber and plastic products	7
Ships and boats	4
Tele-communications	44
Transport	37
Transport equipment	10
Water	13
Weapons & ammunition	17
Other, please specify:	124
Total	935

Appendix D. Full results of the conditional logit models

	<i>Dependent variable:</i>			
	Incubator choice			
	(1)	(2)	(3)	(4)
Financial resources	0.217*** (0.030)	0.646*** (0.191)	0.652*** (0.191)	0.654*** (0.191)
Physical resources	0.191*** (0.024)	0.121 (0.152)	0.100 (0.153)	0.097 (0.153)
Training & coaching	0.056 (0.028)	-0.019 (0.175)	-0.167 (0.240)	-0.151 (0.241)
Shareholder involvement	-0.091*** (0.024)	-0.037 (0.152)	-0.211 (0.312)	-0.196 (0.313)
Networks	0.143*** (0.028)	-0.356 (0.177)	-0.362 (0.178)	-0.361 (0.178)
Legitimacy	0.045 (0.031)	0.305 (0.202)	0.312 (0.202)	0.312 (0.202)
Alternative specific constant	-0.248*** (0.023)	-0.246*** (0.024)	-0.247*** (0.024)	-0.247*** (0.024)

(continued on next page)

(continued)

	Dependent variable:			
	Incubator choice			
	(1)	(2)	(3)	(4)
Incubation		0.157 (0.134)	0.013 (0.146)	
Incubation: currently				0.214 (0.172)
Incubation: past				-0.254 (0.198)
Familiar with incubators		-0.049 (0.110)	-0.053 (0.119)	-0.063 (0.119)
Investments raised		0.054 (0.126)	0.069 (0.136)	0.059 (0.136)
Start-up experience		0.041 (0.067)	0.075 (0.069)	0.087 (0.069)
University degree		0.164 (0.105)	0.131 (0.114)	0.128 (0.114)
Industry experience		-0.004 (0.007)	-0.002 (0.007)	-0.0001 (0.008)
Spinoff		-0.034 (0.100)	-0.102 (0.110)	-0.106 (0.110)
External investors		-0.130 (0.106)	-0.082 (0.115)	-0.089 (0.115)
Gestation activities		0.010 (0.017)	0.020 (0.019)	0.022 (0.019)
Size		0.013 (0.049)	-0.031 (0.054)	-0.033 (0.054)
Continent (North America)		-0.142 (0.105)	-0.073 (0.114)	-0.054 (0.114)
High technology		-0.037 (0.106)	-0.103 (0.113)	-0.077 (0.114)
Grow large		-0.034 (0.050)	-0.003 (0.053)	0.00003 (0.053)
Be acquired		-0.025 (0.067)	-0.003 (0.073)	-0.015 (0.073)
Make money		0.026 (0.035)	-0.007 (0.038)	-0.001 (0.038)
Training & coaching * Shareholder involvement			0.236 (0.358)	0.221 (0.359)
Financial resources * Incubation		-0.238** (0.085)	-0.265** (0.086)	
Physical resources * Incubation		-0.214** (0.068)	-0.186** (0.069)	
Training & coaching * Incubation		0.020 (0.079)	0.215 (0.112)	
Shareholder involvement * Incubation		0.013 (0.068)	0.347* (0.140)	
Networks * Incubation		-0.237** (0.079)	-0.237** (0.079)	
Legitimacy * Incubation		0.245** (0.090)	0.231* (0.090)	
Financial resources * Incubation: currently				-0.275** (0.100)
Financial resources * Incubation: past				-0.254 (0.116)
Physical resources * Incubation: currently				-0.195* (0.079)
Physical resources * Incubation: past				-0.167 (0.093)
Training & coaching * Incubation: currently				0.099 (0.132)
Training & coaching * Incubation: past				0.364* (0.151)
Shareholder involvement * Incubation: currently				0.267 (0.162)
Shareholder involvement * Incubation: past				0.439* (0.192)
Networks * Incubation: currently				-0.259** (0.091)
Networks * Incubation: past				-0.209 (0.110)
Legitimacy * Incubation: currently				0.146 (0.105)
Legitimacy * Incubation: past				0.349** (0.125)
Financial resources * Familiar with incubators		0.010	-0.0001	0.0003

(continued on next page)

(continued)

	<i>Dependent variable:</i>			
	<i>Incubator choice</i>			
	(1)	(2)	(3)	(4)
Physical resources * Familiar with incubators		(0.070)	(0.070)	(0.070)
		-0.030	-0.028	-0.028
		(0.056)	(0.057)	(0.057)
Training & coaching * Familiar with incubators		0.021	0.030	0.036
		(0.066)	(0.091)	(0.091)
Shareholder involvement * Familiar with incubators		0.090	0.090	0.094
		(0.056)	(0.118)	(0.118)
Networks * Familiar with incubators		0.145	0.142	0.144
		(0.067)	(0.067)	(0.067)
Legitimacy * Familiar with incubators		-0.138	-0.134	-0.130
		(0.074)	(0.074)	(0.074)
Financial resources * Investments raised		-0.156	-0.159	-0.158
		(0.079)	(0.080)	(0.080)
Physical resources * Investments raised		0.041	0.040	0.039
		(0.065)	(0.065)	(0.065)
Training & coaching * Investments raised		-0.035	-0.046	-0.038
		(0.076)	(0.103)	(0.103)
Shareholder involvement * Investments raised		-0.052	-0.038	-0.032
		(0.065)	(0.136)	(0.136)
Networks * Investments raised		0.208**	0.194**	0.194**
		(0.075)	(0.076)	(0.076)
Legitimacy * Investments raised		-0.168	-0.163	-0.159
		(0.086)	(0.087)	(0.087)
Financial resources * Start-up experience		-0.056	-0.037	-0.040
		(0.043)	(0.044)	(0.044)
Physical resources * Start-up experience		-0.028	-0.033	-0.034
		(0.034)	(0.034)	(0.034)
Training & coaching * Start-up experience		0.056	-0.006	-0.013
		(0.041)	(0.053)	(0.053)
Shareholder involvement * Start-up experience		-0.051	-0.178*	-0.183*
		(0.034)	(0.076)	(0.076)
Networks * Start-up experience		0.014	0.020	0.018
		(0.042)	(0.042)	(0.042)
Legitimacy * Start-up experience		-0.047	-0.043	-0.047
		(0.042)	(0.043)	(0.043)
Financial resources * University degree		0.019	0.020	0.020
		(0.066)	(0.066)	(0.066)
Physical resources * University degree		-0.059	-0.049	-0.044
		(0.053)	(0.053)	(0.054)
Training & coaching * University degree		-0.006	0.032	0.030
		(0.061)	(0.087)	(0.087)
Shareholder involvement * University degree		0.002	0.063	0.059
		(0.053)	(0.109)	(0.109)
Networks * University degree		-0.086	-0.081	-0.081
		(0.063)	(0.063)	(0.063)
Legitimacy * University degree		-0.088	-0.095	-0.092
		(0.070)	(0.071)	(0.071)
Financial resources * Industry experience		0.003	0.004	0.004
		(0.004)	(0.004)	(0.004)
Physical resources * Industry experience		0.007	0.007	0.007
		(0.004)	(0.004)	(0.004)
Training & coaching * Industry experience		0.007	0.005	0.004
		(0.004)	(0.006)	(0.006)
Shareholder involvement * Industry experience		0.001	-0.003	-0.004
		(0.004)	(0.007)	(0.007)
Networks * Industry experience		-0.004	-0.004	-0.004
		(0.004)	(0.004)	(0.004)
Legitimacy * Industry experience		-0.005	-0.005	-0.006
		(0.005)	(0.005)	(0.005)
Financial resources * Spinoff		-0.152*	-0.153*	-0.151*
		(0.063)	(0.064)	(0.064)
Physical resources * Spinoff		-0.002	0.005	0.005
		(0.049)	(0.050)	(0.050)
Training & coaching * Spinoff		0.006	0.092	0.094
		(0.058)	(0.084)	(0.085)
Shareholder involvement * Spinoff		0.016	0.125	0.129
		(0.050)	(0.102)	(0.102)
Networks * Spinoff		-0.019	-0.017	-0.019
		(0.058)	(0.058)	(0.058)
Legitimacy * Spinoff		0.105	0.101	0.103
		(0.066)	(0.066)	(0.066)
Financial resources * External investors		0.015	0.025	0.026

(continued on next page)

(continued)

	Dependent variable:			
	Incubator choice			
	(1)	(2)	(3)	(4)
Physical resources * External investors		(0.068) 0.009	(0.068) -0.002	(0.068) -0.005
Training & coaching * External investors		(0.055) 0.098	(0.056) 0.040	(0.056) 0.049
Shareholder involvement * External investors		(0.064) 0.015	(0.089) -0.084	(0.089) -0.076
Networks * External investors		(0.055) -0.018	(0.112) -0.019	(0.112) -0.021
Legitimacy * External investors		(0.065) 0.074	(0.065) 0.071	(0.066) 0.072
Financial resources * Gestation activities		(0.072) 0.011	(0.072) 0.012	(0.072) 0.013
Physical resources * Gestation activities		(0.011) -0.003	(0.011) -0.005	(0.011) -0.005
Training & coaching * Gestation activities		(0.009) -0.010	(0.009) -0.023	(0.009) -0.023
Shareholder involvement * Gestation activities		(0.010) -0.044***	(0.014) -0.069***	(0.014) -0.069***
Networks * Gestation activities		0.008 (0.010)	0.008 (0.010)	0.007 (0.010)
Legitimacy * Gestation activities		0.011 (0.011)	0.012 (0.011)	0.011 (0.011)
Financial resources * Size		-0.014 (0.031)	-0.017 (0.032)	-0.017 (0.032)
Physical resources * Size		-0.034 (0.025)	-0.027 (0.026)	-0.026 (0.026)
Training & coaching * Size		-0.003 (0.030)	0.051 (0.042)	0.049 (0.042)
Shareholder involvement * Size		0.125*** (0.025)	0.204*** (0.052)	0.203*** (0.053)
Networks * Size		-0.015 (0.030)	-0.011 (0.030)	-0.009 (0.030)
Legitimacy * Size		-0.042 (0.033)	-0.044 (0.034)	-0.042 (0.034)
Financial resources * Continent (North America)		0.121* (0.067)	0.131* (0.068)	0.131* (0.068)
Physical resources * Continent (North America)		0.108** (0.054)	0.097* (0.054)	0.096* (0.055)
Training & coaching * Continent (North America)		-0.010 (0.063)	-0.103 (0.088)	-0.113 (0.088)
Shareholder involvement * Continent (North America)		-0.049 (0.054)	-0.184 (0.111)	-0.192* (0.111)
Networks * Continent (North America)		0.033 (0.063)	0.034 (0.063)	0.031 (0.063)
Legitimacy * Continent (North America)		0.075 (0.071)	0.080 (0.071)	0.073 (0.071)
Financial resources * High technology		0.034 (0.067)	0.031 (0.068)	0.031 (0.068)
Physical resources * High technology		0.056 (0.054)	0.064 (0.055)	0.063 (0.055)
Training & coaching * High technology		-0.064 (0.063)	0.015 (0.086)	-0.0004 (0.087)
Shareholder involvement * High technology		-0.007 (0.054)	0.107 (0.111)	0.096 (0.112)
Networks * High technology		0.020 (0.064)	0.025 (0.064)	0.025 (0.065)
Legitimacy * High technology		0.046 (0.071)	0.042 (0.071)	0.031 (0.072)
Financial resources * Grow large		-0.054 (0.032)	-0.053 (0.032)	-0.055 (0.032)
Physical resources * Grow large		0.033 (0.025)	0.028 (0.026)	0.029 (0.026)
Training & coaching * Grow large		0.022 (0.030)	-0.021 (0.040)	-0.025 (0.040)
Shareholder involvement * Grow large		-0.060* (0.025)	-0.150** (0.053)	-0.153** (0.053)
Networks * Grow large		0.001 (0.029)	0.003 (0.030)	0.004 (0.030)
Legitimacy * Grow large		0.054 (0.033)	0.057 (0.034)	0.056 (0.034)
Financial resources * Be acquired		-0.096*	-0.089	-0.089

(continued on next page)

(continued)

	Dependent variable:			
	Incubator choice			
	(1)	(2)	(3)	(4)
Physical resources * Be acquired		(0.042) -0.064 (0.033)	(0.043) -0.068 (0.034)	(0.043) -0.067 (0.034)
Training & coaching * Be acquired		0.027 (0.038)	-0.002 (0.055)	0.002 (0.055)
Shareholder involvement * Be acquired		-0.025 (0.033)	-0.069 (0.068)	-0.067 (0.068)
Networks * Be acquired		0.053 (0.039)	0.054 (0.039)	0.055 (0.039)
Legitimacy * Be acquired		0.059 (0.045)	0.062 (0.045)	0.070 (0.045)
Financial resources * Make money		0.027 (0.022)	0.024 (0.022)	0.024 (0.023)
Physical resources * Make money		0.035 (0.018)	0.041* (0.018)	0.041* (0.018)
Training & coaching * Make money		-0.016 (0.021)	0.025 (0.029)	0.022 (0.029)
Shareholder involvement * Make money		-0.004 (0.018)	0.057 (0.037)	0.055 (0.037)
Networks * Make money		0.026 (0.021)	0.028 (0.021)	0.028 (0.022)
Legitimacy * Make money		-0.074** (0.024)	-0.077** (0.024)	-0.080** (0.024)
Training & coaching * Shareholder involvement * Incubation			-0.427** (0.161)	
Training & coaching * Shareholder involvement * Incubation: currently				-0.375 (0.186)
Training & coaching * Shareholder involvement * Incubation: past				-0.483 (0.218)
Training & coaching * Shareholder involvement * Familiar with incubators			-0.006 (0.135)	-0.009 (0.135)
Training & coaching * Shareholder involvement * Investments raised			-0.013 (0.156)	-0.018 (0.156)
Training & coaching * Shareholder involvement * Start-up experience			0.162 (0.087)	0.164 (0.087)
Training & coaching * Shareholder involvement * University degree			-0.078 (0.126)	-0.074 (0.126)
Training & coaching * Shareholder involvement * Industry experience			0.006 (0.008)	0.006 (0.009)
Training & coaching * Shareholder involvement * Spinoff			-0.144 (0.117)	-0.147 (0.118)
Training & coaching * Shareholder involvement * External investors			0.131 (0.130)	0.124 (0.130)
Training & coaching * Shareholder involvement * Gestation activities			0.032 (0.021)	0.032 (0.021)
Training & coaching * Shareholder involvement * Size			-0.106 (0.060)	-0.104 (0.061)
Training & coaching * Shareholder involvement * Continent (North America)			0.179 (0.128)	0.185 (0.128)
Training & coaching * Shareholder involvement * High technology			-0.150 (0.128)	-0.143 (0.129)
Training & coaching * Shareholder involvement * Grow large			0.115 (0.061)	0.119 (0.061)
Training & coaching * Shareholder involvement * Be acquired			0.055 (0.078)	0.056 (0.078)
Training & coaching * Shareholder involvement * Make money			-0.079 (0.043)	-0.078 (0.043)
Observations	14,960	14,960	14,960	14,960
R ²	0.018	0.033	0.035	0.036
Max. Possible R ²	0.987	0.987	0.987	0.987
Log Likelihood	-32,349.26	-32,237.62	-32,216.61	-32,213.49
Note*	*p**p***p < 0.01			

References

Ács, Z.J., Autio, E., Szerb, L., 2014. National systems of entrepreneurship: measurement issues and policy implications. *Resour. Pol.* 43, 476–494. <https://doi.org/10.1016/j.respol.2013.08.016>.

Adler, P.S., Kwon, S.-W., 2002. Social capital: prospects for a new concept. *Acad. Manag. Rev.* 27, 17–40.
 Adner, R., Helfat, C.E., 2003. Corporate effects and dynamic managerial capabilities. *Strat. Manag. J.* 24, 1011–1025.
 Aernoudt, R., 2004. Incubators: tool for entrepreneurship? *Small Bus. Econ.* 23, 127–135.

- Aerts, K., Matthyssens, P., Vandenbempt, K., 2007. Critical role and screening practices of European business incubators. *Technovation* 27, 254–267. <https://doi.org/10.1016/j.technovation.2006.12.002>.
- Aguinis, H., Bradley, K.J., 2014. Best practice recommendations for designing and implementing experimental vignette methodology studies. *Organ. Res. Methods* 17, 351–371.
- Aldrich, H., Fiol, M., 1994. Fools rush in? The institutional context of industry creation. *Acad. Manag. Rev.* 19, 645–670. <https://doi.org/10.5465/AMR.1994.9412190214>.
- Alexy, O.T., Block, J.H., Sandner, P., Ter Wal, A.L.J., 2012. Social capital of venture capitalists and start-up funding. *Small Bus. Econ.* 39, 835–851. <https://doi.org/10.1007/s11187-011-9337-4>.
- Alvarez, S.A., Busenitz, L.W., 2001. The entrepreneurship of resource-based theory. *J. Manag.* 27, 755–775. <https://doi.org/10.1177/014920630102700609>.
- Amezcuca, A.S., Grimes, M.G., Bradley, S.W., Wiklund, J., 2013. Organizational sponsorship and founding environments: a Contingency view on the survival of business-incubated firms, 1994–2007. *Acad. Manag. J.* 56, 1628–1654. <https://doi.org/10.5465/amj.2011.0652>.
- Amit, R., Schoemaker, P.P.J.H., 1993. Strategic assets and organizational rent. *Strat. Manag. J.* 14, 33–46.
- Argote, L., Eppler, D., 1990. Learning curves in manufacturing. *Science* (80-), New Series 247, 920–924. <https://doi.org/10.2307/2873885>.
- Bandura, A., 1977. *Social Learning Theory*. Prentice Hall, Englewood Cliffs, N.J.
- Barabási, A.-L., Albert, R., 1999. Emergence of scaling in random networks. *Science* 286, 509–512.
- Barbero, J., Casillas, J., Wright, M., Ramos Garcia, A., 2013. Do different types of incubators produce different types of innovations? *J. Technol. Tran.* 1–18. <https://doi.org/10.1007/s10961-013-9308-9>.
- Barney, J.B., 2001. Resource-based theories of competitive advantage: a ten-year retrospective on the resource-based view. *J. Manag.* 27, 643–650. <https://doi.org/10.1177/014920630102700602>.
- Barney, J.B., 1991. Firm resources and sustained competitive advantage. *J. Manag.* 17, 99–120.
- Barrow, C., 2001. *Incubators: a Realist's Guide to the World's New Business Accelerators*. UK.
- Baum, J.R., Locke, E.A., 2004. The relationship of entrepreneurial traits, skill, and motivation to subsequent venture growth. *J. Appl. Psychol.* 89, 587.
- Becker, M.C., 2004. Organizational routines: a review of the literature. *Ind. Corp. Change* 13, 643–677.
- Ben-Akiva, M., Morikawa, T., Shiroishi, F., 1991. Analysis of the reliability of preference ranking data. *J. Bus. Res.* 23, 253–268.
- Bergek, A., Norrman, C., 2008. Incubator best practice: a framework. *Technovation* 28, 20–28. <https://doi.org/10.1016/j.technovation.2007.07.008>.
- Bergh, P., Thorgren, S., Wincent, J., 2009. Entrepreneurs learning together: the importance of building trust for learning and exploiting business opportunities. *Int. Enterpren. Manag. J.* 7, 17–37. <https://doi.org/10.1007/s11365-009-0120-9>.
- Betsch, T., Haberstroh, S., Molter, B., Glöckner, A., 2004. Oops, I did it again—relapse errors in routinized decision making. *Organ. Behav. Hum. Decis. Process.* 93, 62–74.
- Bjørngum, Ø., Sørheim, R., 2015. The funding of new technology firms in a pre-commercial industry—the role of smart capital. *Technol. Anal. Strat. Manag.* 27, 249–266.
- Böllingtoft, A., Ulhøi, J.P., 2005. The networked business incubator—leveraging entrepreneurial agency? *J. Bus. Ventur.* 20, 265–290. <https://doi.org/10.1016/j.jbusvent.2003.12.005>.
- Bruneel, J., Ratinho, T., Clarysse, B., Groen, A., 2012. The Evolution of Business Incubators: comparing demand and supply of business incubation services across different incubator generations. *Technovation* 32, 110–121. <https://doi.org/10.1016/j.technovation.2011.11.003>.
- Bruton, G.D., Ahlstrom, D., Li, H.L., 2010. Institutional theory and entrepreneurship: where are we now and where do we need to move in the future? *Enterpren. Theor. Pract.* 34, 421–440.
- Bryman, A., 2013. *Social Research Methods*, third ed. Oxford University Press, Oxford.
- Carpenter, R., Petersen, B., 2002. Capital market imperfections, high-tech investment, and new equity financing. *Econ. J.* 112, 54–72.
- Chan, K.F., Lau, T., 2005. Assessing technology incubator programs in the science park: the good, the bad and the ugly. *Technovation* 25, 1215–1228. <https://doi.org/10.1016/j.technovation.2004.03.010>.
- Clarysse, B., Wright, M., Lockett, A., Van de Velde, E., Vohora, A., 2005. Spinning out new ventures: a typology of incubation strategies from European research institutions. *J. Bus. Ventur.* 20, 183–216.
- Cohen, M.D., Bacdayan, P., 1994. Organizational routines are stored as procedural memory - evidence from a laboratory study. *Organ. Sci.* 5, 554–568.
- Cohen, S.L., Bingham, C.B., Hallen, B.L., 2018. The role of accelerator designs in mitigating bounded rationality in new ventures. *Adm. Sci. Q.* <https://doi.org/10.1177/0001839218782131>, 0001839218782131.
- Cohen, W.M., Levinthal, D.A., 1990. Absorptive capacity: a new perspective on and innovation learning. *Adm. Sci. Q.* 35, 128–152.
- Cooper, A.C., Folta, T.B., Woo, C., 1995. Entrepreneurial information search. *J. Bus. Ventur.* 10, 107–120.
- Cooper, C.E., Hamel, S.a., Connaughton, S.L., 2010. Motivations and obstacles to networking in a university business incubator. *J. Technol. Tran.* 37, 433–453. <https://doi.org/10.1007/s10961-010-9189-0>.
- Crossan, M., Lane, H., White, R., 1999. An organizational learning framework: from intuition to institutions. *Acad. Manag. Rev.* 24, 522–537.
- Davidsson, P., 2008. *The Entrepreneurship Research Challenge*. Edward Elgar Publishing, Cheltenham.
- De Clercq, D., Fried, V.H., Lehtonen, O., Sapienza, H.J., 2006. An entrepreneur's guide to the venture capital galaxy. *Acad. Manag. Perspect.* 20, 90–112. <https://doi.org/10.5465/AMP.2006.21903483>.
- Dombrowsky, V., Paalзов, A., Rastrigina, O., 2011. Latvia: panel study of entrepreneurial dynamics overview. In: Reynolds, P., Curtin, R. (Eds.), *New Business Creation: an International Overview*. Springer, New York, pp. 143–174.
- Donders, A.R.T., van der Heijden, G.J.M.G., Stijnen, T., Moons, K.G.M., Heijden, G. van der, 2006. Review: a gentle introduction to imputation of missing values. *J. Clin. Epidemiol.* 59, 1087–1091. <https://doi.org/10.1016/j.jclinepi.2006.01.014>.
- Drover, W., Wood, M.S., Fassin, Y., 2013. Take the money or run? Investors' ethical reputation and entrepreneurs' willingness to partner. *J. Bus. Ventur.* <https://doi.org/10.1016/j.jbusvent.2013.08.004>.
- Elfring, T., Hulsink, W., 2003. Networks in entrepreneurship: the case of high-technology firms. *Small Bus. Econ.* 21, 409–422.
- Engel, Y., Kaandorp, M., Elfring, T., 2017. Toward a dynamic process model of entrepreneurial networking under uncertainty. *J. Bus. Ventur.* 32, 35–51.
- Eurostat, 2013. Economic statistics on high-tech industries and Knowledge Intensive Services at the national level (from 2008 onwards. NACE Rev. 2) [WWW Document]. URL http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=htec_eco_sbs2&lang=en.
- Evald, M.R., Bager, T., 2008. Managing venture team relationships in corporate incubation: a case study of network dynamics and political rivalry in a high-tech incubator. *Int. Enterpren. Manag. J.* 4, 349–364.
- Eveleens, C.P., Van Rijnsoever, F.J., Niesten, E.M.M.I., 2017. How network-based incubation helps start-up performance: a systematic review against the background of management theories. *J. Technol. Tran.* 42, 676–713. <https://doi.org/10.1007/s10961-016-9510-7>.
- Fang, S.-C., Tsai, F.-S., Lin, J.L., 2010. Leveraging tenant-incubator social capital for organizational learning and performance in incubation programme. *Int. Small Bus. J.* 28, 90–113. <https://doi.org/10.1177/0266242609350853>.
- Foss, N.J., Klein, P.G., Kor, Y.Y., Mahoney, J.T., 2008. Entrepreneurship, subjectivism, and the resource-based view: towards a new synthesis. *Strateg. Entrep. J.* 2, 73–94. <https://doi.org/10.1002/sej.41>.
- Fritsch, N., Schilder, D., 2008. Does venture capital investment really require spatial proximity? An empirical investigation. *Environ. Plann.* 40, 2114–2131.
- Gassmann, O., Becker, B., 2006. Towards a resource-based view of corporate incubators. *Int. J. Innovat. Manag.* 10, 19–45. <https://doi.org/10.1142/S1363919606001387>.
- Gimmon, E., Levie, J., 2010. Founder's human capital, external investment, and the survival of new high-technology ventures. *Resour. Pol.* 39, 1214–1226.
- Global Entrepreneurship Monitor, 2017. GEM 2016/2017—Global Report 2016/17. Global Entrepreneurship Monitor.
- Global Entrepreneurship Monitor, 2015. Key indicators [WWW Document]. URL <http://www.gemconsortium.org/data/key-indicators>. (Accessed 30 October 2016).
- Gompers, P., Lerner, J., 2001. The venture capital revolution. *J. Econ. Perspect.* 15, 145–168. <https://doi.org/10.1257/jep.15.2.145>.
- Gonzalez-Uribe, J., Leatherbee, M., 2017. The effects of business accelerators on venture performance: evidence from start-up Chile. *Rev. Financ. Stud.* 31, 1566–1603.
- Groen, A.J., Wakkee, I.A.M., De Weerd-Nederhof, P.C., 2008. Managing tensions in a high-tech start-up: an innovation journey in social system perspective. *Int. Small Bus. J.* 26, 57–81. <https://doi.org/10.1177/0266242607084659>.
- Hall, P.A., Soskice, D.W., 2001. *Varieties of Capitalism: the Institutional Foundations of Comparative Advantage*. Oxford University Press, New York.
- Hallen, B.L., Bingham, C.B., Cohen, S., 2014. Do accelerators accelerate? A study of venture accelerators as a path to success? In: *Academy of Management Proceedings*, vol. 10510. Academy of Management Briarcliff Manor, NY, p. 12955.
- Hannan, M.T., Freeman, J., 1989. *Organizational Ecology*. Harvard University Press, Cambridge, Massachusetts, MA.
- Hansen, M.T., Chesbrough, H.W., Nohria, N., Sull, D.N., 2000. Networked incubators. *Hothouses of the new economy*. *Harv. Bus. Rev.* 78, 74–84.
- Harkness, J., 2016. Smart capital: the case for seeking start-up funding from investors who lend their smarts [WWW Document]. *Dyn. Bus.* URL <https://www.dynamicbusiness.com.au/featured/smart-capital-the-case-for-seeking-start-up-funding-from-investors-who-loan-their-smarts.html>. (Accessed 7 December 2018).
- Heirman, A., Clarysse, B., 2007. Which tangible and intangible assets matter for innovation speed in start-ups? *J. Prod. Innovat. Manag.* 24, 303–315.
- Helfat, C.E., Peteraf, M.A., 2003. The dynamic resource-based view: capability lifecycles. *Strat. Manag. J.* 24, 997–1010.
- Hensher, D., Rose, J., Greene, W., 2005. *Applied Choice Analysis: A Primer*. Cambridge University Press, Cambridge.
- Huber, G.P., 1991. Organizational Learning: the contributing processes and the literatures. *Organ. Sci.* 2, 88–115.
- Ias, 2004. IAS 38 - Intangible assets. *Int. Account. Stand.* URL [WWW Document]. <https://www.iasplus.com/en/standards/ias/ias38>.
- Ireland, R.D., Hitt, M.A., Sirmon, D.G., 2003. A model of strategic entrepreneurship: the construct and its dimensions. *J. Manag.* 29, 963–989. [https://doi.org/10.1016/S0149-2063\(03\)00086-2](https://doi.org/10.1016/S0149-2063(03)00086-2).
- Kauffman Foundation, 2017. Kauffman index of entrepreneurship series [WWW Document]. URL <http://www.kauffman.org/microsites/kauffman-index/>. (Accessed 1 August 2018).
- Kløjgaard, M.E., Bech, M., Sogaard, R., 2012. Designing a stated choice experiment: the value of a qualitative process. *J. Choice Model.* 5, 1–18.
- Kristandl, G., Bontis, N., 2007. Constructing a definition for intangibles using the resource based view of the firm. *Manag. Decis.* 45, 1510–1524.
- Lai, W.-H., Lin, C.-C., 2015. Constructing business incubation service capabilities for tenants at post-entrepreneurial phase. *J. Bus. Res.* 68, 2285–2289.

- Lasrado, V., Sivo, S., Ford, C., O'Neal, T., Garibay, I., 2016. Do graduated university incubator firms benefit from their relationship with university incubators? *J. Technol. Tran.* 41, 205–219.
- Lefebvre, V.M., Raggi, M., Viaggi, D., Sia-Ljungström, C., Minarelli, F., Kühne, B., Gellynck, X., 2014. SMEs' preference for innovation networks: a choice experimental approach. *Creativ. Innovat. Manag.*
- Lewin, A.Y., Weigelt, C.B., Emery, J.D., 2004. Adaptation and selection in strategy and change: perspectives on strategic change in organizations. In: Poole, M.S., Van de Ven, A.H. (Eds.), *Handbook of Organizational Change and Innovation*. Oxford University Press, Oxford, NY, pp. 108–160.
- Leyden, D.P., Link, A.N., Siegel, D.S., 2014. A theoretical analysis of the role of social networks in entrepreneurship. *Resour. Pol.* 43, 1157–1163.
- Li, Y.-R., Chen, Y., 2009. Opportunity, embeddedness, endogenous resources, and performance of technology ventures in Taiwan's incubation centers. *Technovation* 29, 35–44.
- Liao, J., Welsch, H., 2008. Patterns of venture gestation process: exploring the differences between tech and non-tech nascent entrepreneurs. *J. High Technol. Manag. Res.* 19, 103–113. <https://doi.org/10.1016/j.hitech.2008.10.003>.
- Lichtenstein, B.M.B., Brush, C.G., 2001. How do "resource bundles" develop and change in new ventures? A dynamic model and longitudinal exploration. *Enterpren. Theor. Pract.* 25, 17–36. <https://doi.org/10.1017/CBO9781107415324.004>.
- Lockett, A., Wright, M., 2005. Resources, capabilities, risk capital and the creation of university spin-out companies. *Resour. Pol.* 34, 1043–1057.
- Louviere, J., Flynn, T., Carson, R., 2010. Discrete choice experiments are not conjoint analysis. *J. Choice Model* 3, 57–72. <https://doi.org/10.1016/j.jcm.2010.03.003>.
- Louviere, J.J., Woodworth, G., 1983. Choice allocation consumer experiments: an approach aggregate data. *J. Mar. Res.* 20, 350–367.
- Lukes, M., Longo, M.C., Zouhar, J., 2019. Do business incubators really enhance entrepreneurial growth? Evidence from a large sample of innovative Italian start-ups. *Technovation* 82, 25–34. <https://doi.org/10.1016/j.technovation.2018.07.008>.
- Mandakovic, V., Cohen, B., Amorós, J.E., 2015. Entrepreneurship policy and its impact on the cultural legitimacy for entrepreneurship in a developing country context. In: *Entrepreneurship, Regional Development and Culture*. Springer, pp. 109–125.
- Massini, S., Lewin, A.Y., Greve, H.R., 2005. Innovators and imitators: organizational reference groups and adoption of organizational routines. *Resour. Pol.* 34, 1550–1569.
- Mcadam, M., Marlow, S., 2007. Building futures or stealing secrets?: entrepreneurial cooperation and conflict within business incubators. *Int. Small Bus. J.* 25, 361–382. <https://doi.org/10.1177/0266242607078563>.
- McAdam, M., McAdam, R., 2008. High tech start-ups in University Science Park incubators: the relationship between the start-up's lifecycle progression and use of the incubator's resources. *Technovation* 28, 277–290. <https://doi.org/10.1016/j.technovation.2007.07.012>.
- McFadden, D., 1974. Conditional logit analysis of qualitative choice behavior. In: Zarembka, P. (Ed.), *Frontiers in Economics*. Academic Press, New York, pp. 105–142.
- Mian, S., Lamine, W., Fayolle, A., 2016. Technology Business Incubation: an overview of the state of knowledge. *Technovation* 50, 1–12.
- Mian, S.A., 1996. Assessing value-added contributions of university technology business incubators to tenant firms. *Resour. Pol.* 25, 325–335.
- Moors, E.H.M., Cohen, A.F., Schellekens, H., 2014. Towards a sustainable system of drug development. *Drug Discov. Today* 1–10. <https://doi.org/10.1016/j.drudis.2014.03.004>.
- Morgan, S., Grootendorst, P., Lexchin, J., Cunningham, C., Greyson, D., 2011. The cost of drug development: a systematic review. *Health Pol.* 100, 4–17.
- Murphy, C.B., 2018. How do tangible and intangible assets differ? [WWW Document]. Investopedia. URL <https://www.investopedia.com/ask/answers/012815/what-difference-between-tangible-and-intangible-assets.asp>.
- Murray, K.B., Haubl, G., 2007. Explaining cognitive lock-in: the role of skill-based habits of use in consumer choice. *J. Consum. Res.* 34, 77–88.
- NESTA, 2014. *Startup Accelerator Programmes: a Practical Guide*. London, UK.
- Nicholls-Nixon, C.L., Cooper, A.C., Woo, C.Y., 2000. Strategic experimentation: understanding change and performance in new ventures. *J. Bus. Ventur.* 15, 493–521. <https://doi.org/10.1111/1468-0262.00022>.
- Nowak, M.J., Grantham, C.E., 2000. The virtual incubator: managing human capital in the software industry. *Resour. Pol.* 29, 125–134.
- Ocasio, W., 1997. Towards an attention-based view of the firm. *Strat. Manag. J.* 18, 187–206.
- Patton, D., 2014. Realising potential: the impact of business incubation on the absorptive capacity of new technology-based firms. *Int. Small Bus. J.* 32, 897–917.
- Patton, D., 2013. Realising potential: the impact of business incubation on the absorptive capacity of new technology-based firms. *Int. Small Bus. J.* <https://doi.org/10.1177/0266242613482134>.
- Patton, D., Marlow, S., 2011. University technology business incubators: helping new entrepreneurial firms to learn to grow. *Environ. Plann. C Govern. Pol.* 29, 911–926. <https://doi.org/10.1068/c10198b>.
- Patton, D., Warren, L., Bream, D., 2009. Elements that underpin high-tech business incubation processes. *J. Technol. Tran.* 34, 621–636. <https://doi.org/10.1007/s10961-009-9105-7>.
- Pauwels, C., Clarysse, B., Wright, M., Hove, J. Van, 2015. Understanding a new generation incubation model: the accelerator. *Technovation*. <https://doi.org/10.1016/j.technovation.2015.09.003>.
- Penrose, E.T., 1959. *The Theory of the Growth of the Firm*. M. E. Sharpe, White Plains, NY, NY.
- Quoracom, 2013. Which incubators take less than 6 percent equity? [WWW Document]. <https://www.quora.com/Which-incubators-take-less-than-6-percent-equity>. (Accessed 11 January 2018).
- Rao, R.S., Chandy, R.K., Prabhu, J.C., 2008. The fruits of legitimacy: why some new ventures gain more from innovation than others. *J. Market.* 72, 58–75. <https://doi.org/10.1509/jmk.72.4.58>.
- Rasmussen, E., Mosey, S., Wright, M., 2011. The evolution of entrepreneurial competencies: a longitudinal study of university spin-off venture emergence. *J. Manag. Stud.* 48, 1314–1345. <https://doi.org/10.1111/j.1467-6486.2010.00995.x>.
- Redditcom, 2016. How much equity do incubator programs usually take from startups? [WWW Document]. https://www.reddit.com/r/startups/comments/48zxfk/how_much_equity_do_incubator_programs_usually/. (Accessed 11 January 2018).
- Rice, M.P., 2002. Co-production of business assistance in business incubators: an exploratory study. *J. Bus. Ventur.* 17, 163–187. [https://doi.org/10.1016/S0883-9026\(00\)00055-0](https://doi.org/10.1016/S0883-9026(00)00055-0).
- Rotger, G.P., Gortz, M., Storey, D.J., 2012. Assessing the effectiveness of guided preparation for new venture creation and performance: theory and practice. *J. Bus. Ventur.* 27, 506–521.
- Rothaermel, F.T., Thursby, M., 2005a. Incubator firm failure or graduation?: the role of university linkages. *Resour. Pol.* 34, 1076–1090.
- Rothaermel, F.T., Thursby, M., 2005b. University-incubator firm knowledge flows: assessing their impact on incubator firm performance. *Resour. Pol.* 34, 305–320. <https://doi.org/10.1016/j.respol.2004.11.006>.
- Rubin, T.H., Aas, T.H., Stead, A., 2015. Knowledge flow in technological business incubators: evidence from Australia and Israel. *Technovation*. <https://doi.org/10.1016/j.technovation.2015.03.002>.
- Rumelt, R.P., 1984. Toward a strategic theory of the firm. In: Lamb, R. (Ed.), *Competitive Strategic Management*. Prentice-Hall, Englewood Cliffs, NJ, pp. 556–570.
- Sá, C., Lee, H., 2012. Science, business, and innovation: understanding networks in technology-based incubators. *R D Manag.* 42, 243–253.
- Sagath, D., van Burg, E., Cornelissen, J.P., Giannopapa, C., 2019. Identifying design principles for business incubation in the European space sector. *J. Bus. Ventur.* Insights 11, e00115.
- Schwartz, M., Hornych, C., 2008. Specialization as strategy for business incubators: an assessment of the Central German Multimedia Center. *Technovation* 28, 436–449. <https://doi.org/10.1016/j.technovation.2008.02.003>.
- Scillitoe, J.L., Chakrabarti, A.K., 2010. The role of incubator interactions in assisting new ventures. *Technovation* 30, 155–167.
- Shane, S., Cable, D., 2002. Network ties, reputation, and the financing of new ventures. *Manag. Sci.* 48, 364–381.
- Shepherd, D.A., 2011. Multilevel entrepreneurship research: opportunities for studying entrepreneurial decision making. *J. Manag.* 37, 412–420. <https://doi.org/10.1177/0149206310369940>.
- Shepherd, D.A., Zacharakis, A., 1999. Conjoint analysis: a new methodological approach for researching the decision policies of venture capitalists. *Ventur. Cap.* 1, 197–217. <https://doi.org/10.1080/136910699295866>.
- Singh, J.V., Tucker, D.J., House, R.J., 1986. Organizational legitimacy and the liability of newness. *Adm. Sci. Q.* 31, 171–193. <https://doi.org/10.2307/2392787>.
- Sirmon, D.G., Hitt, M.A., Ireland, R.D., Gilbert, B.A., 2010. Resource orchestration to create competitive advantage: breadth, depth, and life cycle effects. *J. Manag.* 37, 1390–1412. <https://doi.org/10.1177/0149206310385695>.
- Soetanto, D.P., Jack, S.L., 2013. Business incubators and the networks of technology-based firms. *J. Technol. Tran.* 38, 432–453. <https://doi.org/10.1007/s10961-011-9237-4>.
- Steinz, H.J., Van Rijnsoever, F.J., Nauta, F., 2015. How to green the Red Dragon: a start-ups' little helper for sustainable development in China. *Bus. Strat. Environ.* 25. <https://doi.org/10.1002/bse.1899>.
- Stokan, E., Thompson, L., Mahu, R.J., 2015. Testing the differential effect of business incubators on firm growth. *Econ. Dev. Q.* 29, 317–327. <https://doi.org/10.1177/0891242415597065>.
- Storey, D.J., Tether, B.S., 1998. New technology-based firms in the European Union: an introduction. *Resour. Pol.* 26, 933–946.
- Sullivan, D.M., Marvel, M.R., Wolfe, M.T., 2020. With a little help from my friends? How learning activities and network ties impact performance for high tech startups in incubators. *Technovation* 102209.
- Sullivan, R., 2000. Entrepreneurial learning and mentoring. *Int. J. Entrepreneurial Behav. Res.* 6, 160–175. <https://doi.org/10.1108/13552550010346587>.
- Ter Wal, A.L.J., Alexy, O., Block, J., Sandner, P.G., 2016. The best of both worlds: the benefits of open-specialized and closed-diverse syndication networks for new ventures' success. *Adm. Sci. Q.* <https://doi.org/10.1177/0001839216637849>.
- Theodorakopoulos, N., Kakabadse, N., McGowan, C., 2014. What matters in business incubation? A literature review and a suggestion for situated theorising. *J. Small Bus. Enterprise Dev.* 21, 602–622. <https://doi.org/10.1108/JSBED-09-2014-0152>.
- Tornikoski, E.T., Newbert, S.L., 2007. Exploring the determinants of organizational emergence: a legitimacy perspective. *J. Bus. Ventur.* 22, 311–335.
- Tötterman, H., Sten, J., 2005. Start-ups: business incubation and social capital. *Int. Small Bus. J.* 23, 487–511. <https://doi.org/10.1177/0266242605055909>.
- Van de Ven, A., 2005. Running in packs to develop knowledge-intensive technologies. *MIS Q.* 29, 365–378.
- van Rijnsoever, F.J., 2020. Meeting, mating, and intermediating: how incubators can overcome weak network problems in entrepreneurial ecosystems. *Resour. Pol.* 49, 103884. <https://doi.org/10.1016/j.respol.2019.103884>.
- Van Rijnsoever, F.J., Kempkes, S.N., Chappin, M.M.H., 2017a. Seduced into collaboration: a resource-based choice experiment to explain make, buy or ally

- strategies of SMEs. *Technol. Forecast. Soc. Change* 120, 284–297. <https://doi.org/10.1016/j.techfore.2017.03.015>.
- Van Rijnsoever, F.J., Meeus, M.T.H., Donders, A.R.T., 2012. The effects of economic status and recent experience on innovative behavior under environmental variability: an experimental approach. *Resour. Pol.* 41, 833–847. <https://doi.org/10.1016/j.respol.2012.02.005>.
- Van Rijnsoever, F.J., van Weele, M.A., Eveleens, C.P., 2017b. Network brokers or hit makers? Analyzing the influence of incubation on start-up investments. *Int. Entrepren. Manag. J.* 13, 605–629. <https://doi.org/10.1007/s11365-016-0416-5>.
- van Stijn, N., van Rijnsoever, F.J., van Veelen, M., 2018. Exploring the motives and practices of university–start-up interaction. Evidence from Route 128. *J. Technol. Tran.* 43, 674–713. <https://doi.org/10.1007/s10961-017-9625-5>.
- van Weele, M.A., Steinz, H.J., van Rijnsoever, F.J., 2018a. Start-up communities as communities of practice: shining a light on geographical scale and membership. *Tijdschr. Econ. Soc. Geogr.* 109, 173–188. <https://doi.org/10.1111/tesg.12277>.
- van Weele, M.A., Van Rijnsoever, F.J., 2017. Between a soft landing and a hard place: how silicon valley software and life sciences business incubators facilitate learning. In: Cunningham, J.A., O’Kane, C. (Eds.), *Technology Based Nascent Entrepreneurship*. Palgrave Macmillan, London.
- van Weele, M.A., van Rijnsoever, F.J., Eveleens, C.P., Steinz, H.J., van Stijn, N., Groen, M., 2018b. Start-EU-up! Lessons from international incubation practices to address the challenges faced by Western European start-ups. *J. Technol. Tran.* 43, 1161–1189. <https://doi.org/10.1007/s10961-016-9538-8>.
- van Weele, M.A., van Rijnsoever, F.J., Nauta, F., 2017. You can’t always get what you want: how entrepreneur’s perceived resource needs affect the incubator’s assertiveness. *Technovation* 59, 18–33. <https://doi.org/10.1016/j.technovation.2016.08.004>.
- Visser, P.S., Krosnick, J.A., Marquette, J., Curtin, M., 1996. Mail surveys for election forecasting? An evaluation of the Columbus Dispatch poll. *Publ. Opin. Q.* 60, 181–227.
- Vohora, A., Wright, M., Lockett, A., 2004. Critical junctures in the development of university high-tech spinout companies. *Resour. Pol.* 33, 147–175. [https://doi.org/10.1016/S0048-7333\(03\)00107-0](https://doi.org/10.1016/S0048-7333(03)00107-0).
- Wadhwa, V., Freeman, R., Rissing, B., 2008. *Education and Tech Entrepreneurship*. Kansas City, Missouri.
- Wang, C.L., Chugh, H., 2014. Entrepreneurial learning: past research and future challenges. *Int. J. Manag. Rev.* 16, 24–61.
- Wasserman, N., 2008. The founder’s dilemma. *Harv. Bus. Rev.* 86, 102–109.
- WEF, 2015. *Leveraging Entrepreneurial Ambition and Innovation : A Global Perspective on Entrepreneurship, Competitiveness and Development*. Davos.
- Wernerfelt, B., 1995. The resource-based view of the firm: ten years after. *Strat. Manag. J.* 16, 171–174.
- Wernerfelt, B., 1984. A resource-based view of the firm. *Strat. Manag. J.* 5, 171–180.
- Westhead, P., Storey, D.J.D., 1997. Financial constraints on the growth of high technology small firms in the United Kingdom. *Appl. Financ. Econ.* 7, 197–201.
- Wright, M., Stigliani, I., 2012. Entrepreneurship and growth. *Int. Small Bus. J.* 31, 3–22. <https://doi.org/10.1177/0266242612467359>.