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Being flexible through customization – The impact of incubator focus and customization strategies on incubatee survival and growth

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Abstract

Given the increased importance of flexibility in company development models, it is not surprising that start-up support structures such as business incubators give more attention to flexible service offerings. In this paper, we argue that an incubator's service customization strategy is ideal in situations with high incubatee need heterogeneity. Moreover, we examine how an incubator's industry segmentation efforts are related to its customization strategy, and examine its subsequent impact on incubatee survival and growth. Based on an empirical study using data from 166 Brazilian incubators, we find that service customization is a significant mediator through which an incubator's industry focus can influence incubatee survival and growth. Moreover, contrary to the common assumption that an industry focus automatically leads to a higher incubatee performance level, we fail to find any evidence for a significant direct relation between an incubator's industry segmentation and incubatee survival and growth.

Keywords

Business incubator; Service customization; Industry segmentation; Incubator performance; Incubatee survival; Incubatee growth

1. Introduction

The evolving challenges and needs companies face during company and product development resulted in a switch from using merely static models to frameworks combining structure and flexibility (Conforto and Amaral, 2016). Frameworks such as real options models for R&D planning, offering structured company development approaches (Wang et al., 2015), are extended with models focusing on collaborative New Product Development (Melander and Tell, 2014), flexibility, and competence acquisition (Malström et al., 2013). Indeed, models such as state-gate processes for technology development require both structure and flexibility

(Högman and Johannesson, 2013), and modular design schemas allow for mass customization (Lau, 2011).

In the context of the emergence of company development frameworks that simultaneously focus on structure and flexibility, company support structures have also started to shift their attention from offering “fixed” service blocks to allowing for flexibility through customized service offerings. Indeed, companies need access to diversity, various collaboration possibilities, and knowledge (Battistella et al., 2015). SMEs, and specifically start-ups, are disadvantaged compared to large firms (Battistella et al., 2015), facing liabilities in relation to smallness (Stinchcombe, 1965) and newness (Freeman et al., 1983). Recognizing these liabilities, combined with changing environmental challenges, implies that start-ups are in need of customized support.

One such support structure put forward by governments is the business incubator. Business incubators are organizations offering office space, administrative services, logistic facilities, business advice, and networking opportunities to young, generally early-stage, ventures (Aernoudt, 2004; Bergek and Norrman, 2008). Through incubator support, government agencies aim to foster company survival and growth, and as such, they wish to catalyze and accelerate economic development (Ratinho and Henriques, 2010). Indeed, incubators are expected to stimulate the development of innovative products and services by their incubatees (Schwartz and Hornyk, 2010), and increase start-up survival and growth rates. This incubator success is seen to enhance job creation and employment growth (Ferguson and Olofsson, 2004; Fonseca et al., 2001; Löfsten and Lindelöf, 2001, 2002; Schwartz and Göthner, 2009; Sherman, 1999).

In the incubator literature, the *structure-flexibility paradox* mainly has been examined focusing on one side of the coin: i.e., the “fixed” service blocks an incubator should offer. For example, Bruneel et al. (2012) state that, throughout the years, incubators evolved from being providers of office space to those also offering in-house business support and, eventually, preferred access to networks. Even though insights into the evolution of service offerings and value propositions are of great value to better understand incubator functioning, such studies

implicitly assume that the *type* of services being offered defines whether the incubator is able to attain its goal: i.e., help ventures to survive and grow.¹

Indeed, research that examines *which* services should be offered to start-ups (the so-called “structure” side of the coin) is ample, dating back to the 1980s. For example, Kuratko and LaFollette (1987) explain that incubator services are typically divided into the following three categories: offices and communication services, business services, and facilities and equipment services. Mian (1994) adds “networking” to these service blocks, reporting that (p.523) “*the typical incubator services such as shared office space, shared office services, business assistance, inside and outside networking, etc., were provided by all of the six facilities [in their study]”*”.

Interestingly, more recent studies pinpoint that it is not the *type* of services being offered that creates incubatee value, but rather that *the way* such services are offered ultimately defines the incubator’s value proposition. For example, Vanderstraeten and Matthyssens (2012) state that the one-on-one match of incubatee needs and an incubator’s offered services defines an incubator’s value proposition. Thus, it is not *which* services are offered, but instead the dyadic, flexible and customized relationship between service offerings and company needs that prevails (Rice, 2002). In the current paper, we follow this research stream. More specifically, we argue that in order to make progress in explaining incubator functioning and performance, insights into the antecedents and consequences of incubator customization are required. As such, we seek to further unravel the “flexibility” side of incubator support models. In this paper, we establish a definition of incubator service customization and argue that an incubator’s performance results (measured as start-up survival and growth, as will be explained below) largely depend on the degree of customization. Moreover, we argue that such customization results are largely driven by the degree of incubatee need heterogeneity, and propose that such need heterogeneity can be influenced by the incubator’s industry focus.

We address the following overarching research question: “*How does an incubator’s industry focus influence its customization strategy, and consecutive performance results?*” By framing the question in this way, we do not only advance research about the “flexibility” side

¹ We refer to the theoretical background section for a discussion on incubator performance measurement.

of the structure-flexibility paradox of business incubator models, but also unravel various determinants of incubator performance. Thus, we also address an appeal from policy and researchers to discover useful insights into the factors influencing incubator performance variation (Amezcuca, 2010; Bergek and Norrman, 2008; Mian, 1997).

Indeed, to date, contrasting research results (Amezcuca, 2010; Phan et al., 2005) and methodological, theoretical and empirical limitations (Yu and Nijkamp, 2009) fostered growing criticism about incubator performance studies. For example, von Zedtwitz and Grimaldi (2006) explain that (p. 459) “*even among the better managed incubators, many did not seem to have a clear understanding of what services were critical for the success of their start-ups and how they could be implemented successfully*”. Where traditional explanations mainly tended to emphasize the influence of the number and type of incubator services offered (Colombo and Delmastro, 2002; Fang et al., 2010; Löfsten and Lindelöf, 2001, 2002; Mian, 1996; Rothaermel and Thursby, 2005a, 2005b; Sherman, 1999), our study shifts from *describing* an incubator’s service offering to understanding *how* the internal incubation mechanisms work. More specifically, we will test how the relationship between an incubator’s industry focus and service customization strategy, and its incubatees’ performances, does look like. This will be tested through mediation, arguing that service customization is a necessary prerequisite (and thus, mediator) for an incubator’s industry focus strategy to achieve higher incubatee survival and growth rates.

Our third and final contribution to research involves our study design. In order to be able to mature further in a literature dominated by qualitative work (Hayes, 2012), the number of quantitative studies in the field must increase (Amezcuca et al., 2013). Our study introduces one of the first quantitative studies in which an incubator’s focus and customization strategies, along with its performance, are concurrently examined, applying sophisticated mediation (“how”) regression analyses. In so doing, we capture relevant variation that catalyzes the incubatees’ survival and growth (Aerts et al., 2007; Hackett and Dilts, 2008; Lalkaka, 1996).

Our research results help to advance knowledge on the added value of a focus strategy, providing evidence that a service customization strategy mediates the association between a focus strategy and incubatee survival and growth. Moreover, our results portray that – in contrast with the common assumption, but in line with recent studies (e.g., Schwartz and

Hornych, 2010; Vanderstraeten and Matthyssens, 2012) – the effect of a focus strategy on incubatee survival and growth is actually non-significant. With these results, we propose to practitioners and policymakers that, although incubators can certainly address incubatee need variation by focusing on a specific industry, a consecutive service customization strategy is required to attain higher incubatee performances.

2. Theoretical background and hypotheses

Multiple viewpoints on incubator performance

In the literature on incubators, there is an intense debate about incubator performance measurement.² In the following, we summarize the most important viewpoints. For structuring purposes, we classify incubator evaluation measures into the four widely-accepted approaches of organizational performance measurement (Daft, 2009): the goal, stakeholder, system resource and internal business process perspective. This paper addresses three of them by examining the impact and interplay of an incubator's customization and focus strategy (i.e., its internal business processes and system resource offerings) on incubatee survival and growth (i.e., its goal performance perspective).

In the incubator literature, most researchers use incubatee survival and growth as indicators of incubator *goal performance* (Aerts et al., 2007; European Commission, 2002; Hackett and Dilts, 2008; Lalkaka, 1996). This is not surprising, given that governments aim to catalyze and accelerate economic development through business incubators (Ratinho and Henriques, 2010), and thus wish to stimulate incubatee survival and growth. Yet no unequivocal method exists to measure incubatee "growth". For example, as is the case in most company growth studies (Shepherd and Wiklund, 2009), incubator academics tend to employ

² Incubator performance measurement is not the only object of much discussion. Researchers and practitioners alike also question whether support structures such as incubators or science parks enhance a company's or region's economic performance (Link and Scott, 2003; Phan et al., 2005). Even though such a performance debate is undoubtedly of interest, the current paper cannot give any conclusive results about the impact of business incubators on economic development or growth or provide evidence as to whether the incubator can adjust for market failures. For this, we suggest that future researchers adopt a matched pairs sampling method, like Schwartz's (2013) study, in which a non-parametric matching approach is used to evaluate incubator performances. By searching companies located in and out of an incubator that possess similar characteristics, Schwartz (2013) investigated whether incubators really stimulate start-up survival. Schwartz found surprising results, with a study showing that companies receiving support from an incubator appeared to have significantly lower chances of survival than those not receiving such support.

growth measures interchangeably, including those of sales growth, profitability growth, or growth in the number of employees (Colombo and Delmastro, 2002; Löfsten and Lindelöf, 2002; Westhead and Storey, 1994). The definition of incubatee “success” is also unclear (Schwartz, 2009). Some researchers (Avnimelech et al., 2007, p. 1183) advocate the use of various success degrees and claim that high incubatee success refers to “*start-ups which had initial public offerings (IPOs) or were targets of significant acquisition*”, whereas moderate success features “*start-ups that did not have IPOs and were not targets of significant acquisition, but are still active*”.

Although most researchers equate incubatee success with incubator success, this link may be more nuanced (Hackett and Dilts, 2008). Specifically, Hackett and Dilts (2008) rightfully argue that incubatees terminating their activities with minimal losses can be incubator successes, because, even though incubators’ *raison d’être* is to support company development and growth, their aim is not to artificially keep struggling companies alive (Bergek and Norrman, 2008). If a company is not fit to survive, the incubator is expected to provide guidance to keep losses to a minimum during company closure (Hackett and Dilts, 2008). In parallel fashion, incubatees that have suffered large losses at their termination represent incubator failures. Hackett and Dilts (2008) employ similar reasoning in relation to incubatee survival: Only those incubatees that are profitable, or on a path toward profitability, are incubator successes, and those surviving but not profitable are incubator failures (Hackett and Dilts, 2008). Finally, although researchers recognize that incubatees undergo a development process through the incubator (Chan and Lau, 2005), no research explicitly links incubator evaluation to incubatee development milestones.

Incubator scholars drawing on a *stakeholder approach* acknowledge that an incubator is part of a wider entrepreneurial ecosystem (Etzkowitz, 2002; Hsu et al., 2003) and that there are various constituencies involved in incubator evaluation. However, there is no consensus on which stakeholders should be taken into account when assessing an incubator’s functioning. In general, two viewpoints emerge: Some researchers incorporate a wide stakeholder community (McAdam and Keogh, 2006), arguing that, for example, citizen opinions are pivotal (Mian, 1997), whereas others opt for a limited stakeholder set and advocate incorporating only the viewpoint of the most important stakeholders (Haapasalo and

Ekholm, 2004; Ratinho and Henriques, 2010; Sherman, 1999). Although most researchers argue that this stakeholder approach should involve the incubatee (Abduh et al., 2007; Bruneel et al., 2012; Chan and Lau, 2005; Jungman et al., 2004), some focus on incubator funders, such as venture capitalists (Jungman et al., 2004), the government (Haapasalo and Ekholm, 2004; Rice, 2002; Sherman, 1999), or universities (Patton and Marlow, 2011).

Many researchers adopt a *system resource approach*, looking at the incubator's office space, its shared logistic and administrative services, its business support, and its networking offerings (Bergek and Norrman, 2008; Bøllingtoft and Uihøi, 2005; Costa-David et al., 2002; Mian, 1997; Studdard, 2006; Tamásy, 2007). Some researchers examine the number of services offered (Chan and Lau, 2005; Smilor, 1987), whereas others focus on the incubator's resource and service quality. For example, incubatees tend to value incubator managers with a broad network (Bøllingtoft and Uihøi, 2005; Studdard, 2006) or considerable entrepreneurship experience (Costa-David et al., 2002; Mian, 1997). University connections (Tamásy, 2007), a broad professional service network (Lalkaka, 1996), government support (Lalkaka, 1996; Mian, 1994, 1997; Zablocki, 2007), and the incubator's prestige (Mian, 1997) also turned out to be important incubator resources.

Finally, as suggested by Lalkaka (1996, p. 270), "*careful planning and implementation of the incubation process*" defines optimal incubator functioning. Such studies argue that it is not the incubator facility or the number of services offered but the *internal incubation process* itself that determines incubator success (Adkins, 2001). Indeed, "*the adoption of a business-like approach to running incubators and monitoring clients*" (Costa-David et al., 2002, p. 8) drives incubator success. Even though studies reveal that an incubator's incubatee selection and monitoring, business assistance, resource munificence (Hackett and Dilts, 2008) and networking mediation processes (Bergek and Norrman, 2008) define its functioning, the link between such internal processes and incubator performance outcomes remains something of a "black box" (Hackett and Dilts, 2008).

Service customization as an incubator's strategic positioning option

Since the founding of the first incubator in the 1950s in Batavia, New York (see Arnoudt, 2004), the number of incubators has grown exponentially. Even though very recent figures are

not available, incubators became popular support structures worldwide. For example, the International Business Innovation Association (InBIA) reports a sharp increase in US incubators, going from only 12 incubators in 1980 to 950 in 2002 (Knopp, 2007), and to an impressive 1,250 incubators in 2012 (InBIA, 2016). Also in Brazil, a sharp increase in the number of incubators can be detected, with only two incubators in 1988, and an estimated 384 incubators in 2011 (Anprotec, 2016). Overall, the InBIA estimates that there are about 7,000 incubators worldwide (InBIA, 2016).

Given this increased number of incubators, they tend to compete with each other, and with other organizations in the incubation industry, to attract start-ups (Phan et al., 2005; Vanderstraeten and Matthyssens, 2012). Consequently, academics shifted their attention more and more from merely listing incubator services, to best practices and strategy formulation (Phan et al., 2005). Indeed, *“an incubator is a self-contained organization with an identity, set of routines, and a strategic core. It has an administrative center, a distinct mission, and interacts with the external environment as a unified entity. In many ways, the incubator [...] is really a company and is organized as such”* (Phan et al., 2005, p. 175).

It is thus not surprising that scholars devote more attention to an incubator’s strategic positioning options (e.g., Chan and Lau, 2005; Grimaldi and Grandi, 2005; Schwartz and Hornyk, 2008). For example, Grimaldi and Grandi (2005) suggest two strategic positioning incubator models: public business innovations centers (public BICs) and private incubators (i.e., corporate or independent incubators). According to these authors, one of the distinguishing characteristics of these two models is the level of involvement and commitment in the venture’s activities. The authors suggest that, due to private incubators having the incubator teams in question actually investing their own money, these investors are more closely involved in the ventures’ day-to-day operational activities and management decisions, and are able to offer customized support. In contrast, public incubators act more as “intermediaries”, connecting external experts and incubatees, after which external experts offer actual in-depth customized support.

The strategic importance of the incubator management–incubatee relationship has also been stressed by Bergek and Norrman (2008), who found that incubator management can opt for a “strong intervention” or “laissez-faire” attitude, or any position in between these two

extremes. Interestingly, they show that such attitudes are not – as compared to Grimaldi and Grandi’s (2005) suggestion – related to the incubator’s funding model. Moreover, they argue that (p. 26) *“in order to determine whether one or the other of these practices represents the most effective way to reach a certain goal, they need to be put in relation to relevant outcome indicators. Such an analysis may either result in the identification of one single best practice or in several equally effective practices”*. Examining the effectiveness of service customization is exactly what the current paper seeks to do, by linking the incubator’s service customization level to incubatee survival and growth (for a discussion on the incubator’s goal performance perspective, see above).

Building on the different strategic positioning possibilities with regard to incubator management–incubatee relationships, Rice (2002) argues that incubators can opt for different forms of co-production/service customization processes,³ ranging from passive environmental intervention, to reactive and episodic, proactive and episodic, or even continual and proactive counseling. This third type of counseling focuses on ongoing incubatee developmental needs and appears to be a major working point in the incubators of Rice’s (2002) study. Rice argues (p. 175) that *“all eight incubator managers in this study cited the need to improve their counseling efforts – particularly with the impact on the ongoing development of their companies”*. In this view, ongoing development involves company growth, measured as employee and sales growth.

Service customization, need heterogeneity and incubatee survival and growth

Customization requires two sub-processes: resource preparation and transaction activities (Jacob, 2006). The first involves the organization’s internal aspects such as personnel, equipment, or infrastructure. These resources provide the potential for customization when they are effectively organized and planned (Jacob, 2006). The second sub-process relates to transaction activities. Here, the customer provides external information such as individual needs and expectations. S/he becomes the interactor (Alam and Perry, 2002; Karpen et al.,

³ Etgar (2008) explains that co-production is directly linked to customization, and refers to Prahalad and Ramaswamy (2004) to make his point: *“the co-creation experience depends highly on individuals. Each person’s uniqueness affects the co-creation process”*. Thus, thanks to co-production, one-on-one marketing efforts are possible.

2012), and her or his input results in the provision of customized goods and services (Jacob, 2006). Contrary to the goods-dominant logic, where the customer is the target of value, s/he instead becomes the *co-producer* of value in the service-dominant logic (Vargo and Lusch, 2004).

In business-to-business service organizations like incubators, customers are actively involved in the service development and offering process (Ordanini and Pasini, 2008). They provide inputs for the whole value-generation process, which comprises not only value-in-use, but also value generation during the service development, processing and delivering process (Aarikka-Stenroos and Jaakola, 2012; Grönroos, 2011). Reciprocal interaction between clients and service deliverers can lead to (small) changes in the service development process and actual service offering (Aarikka-Stenroos and Jaakkola, 2012; Bitner et al., 1990). Interaction is key to increase service quality and organizational performance (Fornell et al., 1996; Ghobadian et al., 1994; Lewis and Entwistle, 1990; Menor and Roth, 2008; Ramani and Kumar, 2008), and fundamental for customer value creation (Aarikka-Stenroos and Jaakkola, 2012; Karpen et al., 2012; Wang et al., 2010). Through value co-creation, the service provider can develop a superior competitive advantage (Ghobadian et al., 1994) and differentiation position (Ramani and Kumar, 2008).

Customization efforts are ideal in situations where customer need heterogeneity is high. Even though segmentation lowers need heterogeneity by focusing on one or several customer segments (see more on this below), market research shows that, typically, about 50 per cent of the total customer need variation is left unaddressed after segmentation (Franke and von Hippel, 2003). Research also reveals that customers actively involved in modifying service offerings to their individual needs portray significantly higher satisfaction levels (Franke and von Hippel, 2003). Combining these two arguments – the high portion of unaddressed customer need variation, even after segmentation, and increased customer satisfaction due to individual need modifications – provides compelling evidence of the added value of customization efforts, particularly when need heterogeneity is high.

Business incubators usually have a rather low number of incubatees, averaging 32 incubatees (European Commission, 2002). Consequently, they can engage fairly easily in extensive, personal interactions with their clients (McAdam and McAdam, 2008), and

anticipate need heterogeneity through proactive and continual counseling (Rice, 2002). This is necessary, given that service needs vary from company to company. Indeed, a wide range of factors such as the entrepreneur's previous experience and aspirations, or environmental contingencies can impact need variations (Hannon, 2003).

Even though granular research on the impact of customized versus general support services is limited, prior work does indicate that the offering of individually adapted business services increases company survival and growth. For example, Mian (1994) finds incubatees reporting that, next to a number of general support services such as a photocopier or a conference room, particular customized support services can add major value, including business planning support, legal support, or help in obtaining grants or loans. Even though Mian's (1994) study does not make an explicit subdivision between the impact of general versus customized support services on incubatee survival and growth, this study does reveal sales and employment growth trends for most incubated firms.

Peña (2004) does provide a more fine-grained analysis, stating that the offering of business courses, individual counseling, and monitoring services positively relates to company employment growth. Interestingly, this researcher fails to find a significant effect from the incubator's networking platform (such as the possibility to interact or do business with other business owners in the incubator facility), or the use of tangible services (such as below market rental space) on incubatee growth. Peña (2004) suggests that the non-significant results of the networking possibilities might be the result of incubator managers not fully exploiting the potential of such services. Indeed, the argument is that networking and business coaching, in particular, explain observed differences in incubatee survival and growth rates (Allen and McCluskey, 1990; Bergek and Norrman, 2008; Hansen et al., 2000).

Finally, Frenkel et al. (2008) provide evidence that incubator services such as legal or strategic counseling, typically offered in a customized manner, are considered to be very important for incubatee success. In comparison, they find that a more general support service, such as suitable work space, is considered to be relatively unimportant for an incubated project's success. Drawing on this and the research results discussed above, we argue that service customization is expected to result in successful incubation (Scillitoe and Chakrabarti,

2010), and hypothesize that service customization is positively related to incubatee survival and growth.

Hypothesis 1: An incubator's service customization strategy positively relates to incubatee survival and growth.

Industry focus, need heterogeneity and incubatee survival and growth

Segmentation has been suggested as a tool to group customers with common needs (Freytag and Clarke, 2001). Moreover, it works as a strategic lens for managers, guiding them during operational and long-term company decisions. The added value of segmentation efforts has also been stressed in the business incubator literature. For example, a wide range (though not all; see below) of incubator researchers suggest that focused incubators are more effective than non-focused ones (Haapasalo and Ekholm, 2004). This finding is rooted in three arguments: (1) focused incubators are better equipped to offer a set of services tailored to their incubatees' core businesses; (2) focused incubators are better equipped to offer a transparent and easily accessible network of external actors; and (3) focused incubators are better equipped to stimulate cooperation among incubatees.

The first argument – that focused incubators offer services tailored to their incubatees' core businesses – is overarching, and comprises all types of service offerings, ranging from office facilities to networking opportunities. It is based on the observation that small start-ups can differentiate from their competitors by targeting niches that are not of value to the established incumbents (Bamford et al., 2009; Phillips-McDougall et al., 1994). For example, Gartner et al. (1998) examines insights and predictions from a large number of company experts, and find that new ventures pursuing a niche strategy are more likely to survive. Moreover, Luk (1996) shows that successful entrepreneurs perceive that specifically following a market niche strategy contribute to their ventures' success.

If incubators are able to strengthen their incubatees through support offerings in their specialized niches, thus offering support directly in their incubatees' core business and differentiation areas, then they are able to add value where it matters most. For example, incubators focusing on a specific industry cannot only provide network connections valuable for that industry, but also provide tailored infrastructure. An example is the *Mitteldeutsches*

Multimediazentrum Halle in Germany (Schwartz and Hornych, 2008). This incubator does not only offer specialized film and audio studios, but also industry-specific network connections and business knowledge.

The second argument relates to the claim that focused incubators can more easily offer a transparent and accessible network of external actors. Indeed, researchers such as Bruneel et al. (2012) and Phillimore (1999) argue that, compared to diversified incubators, focused incubators are better able to organize accessible linkages. For example, it is a straightforward matter of deciding which exact sector-centric federations and influential companies should be targeted when focusing on one industry. Moreover, it is argued that a transparent and well-organized network (Cooper et al., 2012) allows incubatees to easily find the connections they need (Rice, 2002). In this way, they can quickly locate the necessary resources through network opportunities and synergies (Cooper et al., 2012).

The third and final argument relates to internal networking activities. The European Commission (2002) proposes that cross-fertilization of advice, ideas and networking requires some degree of homogeneity among incubatees. Bøllingtoft (2012) explains that the European Commission (2002) suggests that (p. 307) “*a particular technology and/or business focus facilitates and enables business relationships to develop between incubator tenants.*”⁴ This has been corroborated by Chan and Lau (2005), who suggest that knowledge sharing is stimulated when incubatees are clustered in the same industry. Indeed, sufficient overlap of the incubatees’ knowledge base and core competences are assumed to be necessary in order to create a strong platform for cooperation (Mowery et al., 1998; Hansen et al., 2000; Tötterman and Sten, 2005). Consequently, it is expected that incubators focusing on one industry can more effectively stimulate cooperation (Haapasalo and Ekholm, 2004).

Therefore, although recent studies portray a somewhat ambivalent picture,⁵ the common assumption is that specialized incubators positively stimulate cooperation among incubatees

⁴ In incubator literature, the words “tenant” and “incubatee” are used interchangeably. This paper uses “incubatees”.

⁵ For example, Schwartz and Hornych’s (2010) empirical study does not support the common assumption that focused incubators can more effectively stimulate networking among incubatees and external actors. Moreover, they do not find that specialized incubators are better equipped to promote linkages with academic institutions than diversified ones. Also Vanderstraeten and Matthyssens (2012) suggest that both diversified and focused incubators can add major value to their incubatees. They base their argument on the strategic groups concept and suggest that both within “focused” and “diversified” strategic groups, incubators can differentiate themselves by

and with external actors, and that they can offer services right in their incubatees' core business and differentiation areas. We argue that offering such core value-creating services stimulates incubatee survival and growth. For example, the incubator in Rothaermel and Thursby's (2005) study mainly supports software and telecom companies. Even though their study is not intended to examine the impact of industry focus on incubatee survival, the results do illustrate that the software and telecom firms in their study are less likely to experience failure, suggesting that the incubator's focus has a positive impact on incubatee survival chances. To summarize, we hypothesize that incubators opting for an industry focus strengthen their incubatees through support offerings in specialized areas, and are able to create a transparent and easily accessible platform for cooperation with other incubatees and external experts, which positively stimulates incubatee survival and growth. Thus, we have

Hypothesis 2: An incubator's industry focus positively relates to incubatee survival and growth.

Need heterogeneity, service customization and industry focus

Thanks to segmentation efforts, incubators are expected to lower incubatee need heterogeneity and increase their degree of service customization. This is rooted in two arguments: (1) the capacity of segmentation efforts to lower information stickiness; and (2) its capacity to narrow service needs and ease customization processes. The first argument relates to the transfer of information, and the second to actions following such information transfer processes. In the following, we discuss both arguments.

With regard to the first argument, market researchers established that information processes from customers to producers are often very costly because of information "stickiness" (Franke and von Hippel, 2003). This means that the cost to transfer information from one place to another, and in a form that service providers can easily distract the provided information, is often very high (von Hippel, 1998). This is problematic, in particular because fast-changing economic environments erode competitive advantages and force companies to manage their knowledge repertoires more tightly. Hence, effective and efficient knowledge

offering value-adding services. The key is that the incubator addresses the critical success factors prevailing in its strategic group.

transfer is one of the basic functions to be performed by any organization (Collins and Hitt, 2006).

Von Hippel (1998, p. 630) explains that there are a number of reasons why information stickiness might be high, and argues that “*the three largest contributors to information stickiness in that sample [a sample from Szulanski, 1996] were a lack of absorptive capacity by the recipient, incomplete or poorly encoded information, and a laborious and distant relationship between the information source and recipient*”. In particular, this last argument might be less relevant due to an incubator’s segmentation efforts, since the incubator management team is expected to be equally experienced as their incubatees, in this scenario.

Indeed, Costa-David et al. (2002) argue that a particular technology or business focus (p. 7) “*enables incubator managers to develop specialized knowledge and skills*”, which implies that knowledge providers (in this case, the incubatees) and recipients (in this case, the incubator management team) are both knowledgeable about the same industry. Researchers such as Lin et al. (2005) suggest that if two parties have asymmetric and incomplete information about each other, or each other’s action domains, knowledge flows are often impeded. Moreover, a low level of mutual understanding or a diversion of (cultural) expectations might hamper collaboration efforts, as portrayed in a study about technology transfer offices attempting to facilitate successful knowledge transfer from academics to practitioners (Siegel et al., 2004). Thanks to segmentation efforts, an incubator can facilitate a healthy relationship between the incubator management team and the incubatees. Consequently, information “stickiness” can be lowered.

The second argument relates to the interpretation of the provided information, and the incubator’s subsequent actions – in our case, its service customization efforts. Here, it has been argued that focused strategies allow for higher customization and customer service levels than diversified ones (Dess and Davis, 1984; Phillips-McDougall et al., 1994). The argument is that a narrower focus makes it easier for an organization to understand customer expectations. This is mainly rooted in the idea that a focused strategy allows an organization to allocate its resources to only one industry. Particularly when resources are limited or scarce, a strong focus can allow for higher and better tailored service levels (Phillips-McDougall et al., 1994). This is certainly the case for incubators, which are often deeply

embedded in a non-profit culture (Aernoudt, 2004) and frequently struggle to stay financially afloat (Zablocki, 2007).

Accordingly, incubators focusing on a specific industry are able to allocate their resources to deeply invest in developing a better understanding of their “narrow” incubatee segment. This makes it easier for them to attain high customization levels, implying that customization will thrive. Following the two above-mentioned arguments – the stickiness and information interpretation argument – it is not surprising that segmentation efforts are expected to be positively related to service customization. Consequently, we suggest

Hypothesis 3: An incubator’s industry focus positively relates to its degree of service customization.

Service customization, industry focus and incubatee survival and growth

Service organizations such as business incubators are confronted with the structure-flexibility paradox, due to a simultaneous need for cost-efficient and individually-adapted services.

Because of high incubatee need heterogeneity, incubators are forced to provide customized services (e.g., Frenkel et al., 2008; Peña, 2004), though offering such services is very costly, in particular for organizations that are mainly non-profit driven (Aernoudt, 2004). One mechanism that simultaneously allows for the use of “fixed” service blocks, lowering costs, and the addressing of individual customer needs, is that of mass-customization. Indeed,

“mass-customization relates to the ability to provide customized products or services through flexible processes in high volumes and at reasonable low costs” (Da Silveira et al., 2001, p.

1). Through mass-customization, the structure-flexibility paradox can thus be addressed, either through very close collaboration between producers and users, or through clearly differentiated roles, such as the Ikea co-creation model, where users take part in the manufacturing process (Rayna et al., 2015). As is typical for any mass-customization model, flexibility through client interactions is required to be able to attain high customer value utilizing “fixed” building blocks. For example, in 3D printing platforms, users are involved in various steps of the production process, from co-design to the actual printing (Rayna et al., 2005).

One could argue that incubators focusing on a specific industry already offer customized services to some degree, providing, for example, infrastructure tailored to the incubator's industry, or useful personal connections to industry federations. Kotler (1989), however, explains that even segmented markets require customization efforts, because they are still too broad to permit for an organization to adopt real focus strategies. Moreover, it has been established that even after segmentation, about 50 per cent of the total customer need variation is left unaddressed (Franke and von Hippel, 2003).

Furthermore, even though segmentation efforts are thus considered to work as a strategic lens for managers, this practice does hold some challenges related to the segment's stability (e.g., Kotler, 1994; Wedel and Kamakura, 2002). In particular, segment instability can cause problems in regard to the need heterogeneity lowering capabilities of segmentation, which is actually one of the main reasons to opt for market segmentation (Steenkamp and Hofstede, 2002; Wedel and Kamakura, 2002). Indeed, markets increasingly become dynamic and turbulent, with changing customer needs and preferences as noteworthy key drivers for such rapid changes (D'Aveni, 1995; Joshi and Campbell, 2003). Interestingly, scholars like Dickson (1994) and Mitchell and Wilson (1998) suggest that particularly in business-to-business settings (e.g., business incubators) segment instability is more pronounced (Blocker and Flint, 2007). As a consequence, organizations are forced to further search for ways to address individual customer needs and increase customer value.

Summarizing the above argumentation results in the expectation that an incubator's customization strategy mediates the relationship between its industry focus and incubatee performance. Here, the underlying logic is thus that an incubator's segmentation efforts subsequently require the development of customized services tailored at the target incubatee group. In other words, customization efforts address segment instability and need variation, and are thus a prerequisite for segmentation efforts to thrive. As a result, we expect that incubator services sit at the highest possible level of incubatee survival and growth rates when customization catalyzes segmentation efforts. Therefore, we formulate

Hypothesis 4: An incubator's service customization mediates the association between an incubator's industry focus and incubatee survival and growth

Combining the above-mentioned hypotheses results in the conceptual model visualized in Figure 1.

[INSERT FIGURE 1 ABOUT HERE]

3. Methodology

3.1 Target population

For the empirical study of this paper, we collected data in Brazil, which is the largest Latin-American country by far, with an area of 8,500,000 km² and a population of approximately 200 million. The sprawling Federal Republic of Brazil consists of 26 states and one federal district. Expected variance for our model across Brazilian states is summarized in Table 1. Here we see that, for example, GDP varies widely across Brazilian states.

We sent out a questionnaire to Brazilian incubators to test our hypotheses. Because a publicly-available list of Brazil-based incubators does not exist, we first developed our own incubator database by combining an incubator list provided by Sebrae (the Brazilian Service of Support for Micro and Small Enterprises) with information available on the Internet. We searched for incubators on the publicly-available Anprotec website (the National Business Incubator and Science Park Association), along with references in popular media, reports and other documents. To ensure that all Brazilian incubators were included, we systematically searched for incubators in each Brazilian state, and for each incubator encountered, we noted the contact details of the incubator manager and the secretariat. These activities resulted in a contact database of 332 incubators, with 68 being omitted due to a non-active status or preliminary start-up phase. Our final contact database therefore consisted of 264 operational incubators.

The incubator managers were our main target for questionnaire completion. However, to avoid problems with common-method variance (CMV) (Brannick et al., 2010; Chang et al., 2010), we also asked a second respondent to independently complete parts of the incubator manager questionnaire: namely, we asked a second incubator employee to respond to incubatee performance questions. This method allowed us to compare incubatee performance data provided by the incubator managers with the data given by incubator employees.

3.2 Data gathering and sample representativeness

We applied the following data gathering procedure to increase the response rate. First, we stressed that our research was supported by a university (Fox et al., 1988), mentioning one of the leading Brazilian business schools in all of our communications. Second, we used a pre-notification strategy (Fox et al., 1988), with one of the researchers participating in the annual business incubator and science park conference organized by Anprotec, giving the researcher the opportunity to introduce our study. Third, we e-mailed a personalized cover letter to all incubator managers from our contact list, requesting their participation and providing a link to access the questionnaire online. Fourth, we carried out follow-up telephone calls to the incubator managers, as suggested by Chiu and Brennan (1990) and Dillman (1972). When incubator managers agreed to participate, we explained to her or him that, for methodological reasons, we also wanted to ask some questions to the incubator's employees. We asked the incubator managers to indicate a colleague with knowledge of incubatee performance, and this indicated employee ultimately also received follow-up telephone calls.

In total, 187 incubator managers and 113 incubator employees returned the questionnaire, resulting in a response rate of 70.8% and 42.8%, respectively. Compared to other quantitative studies on incubators found in the literature, these response rates are quite high. For example, Aerts et al. (2007) obtained a response rate of 27.7% in their study on European incubators. Our high response rate can most likely be attributed to our strategy of pre-notifications, university sponsorship, and follow-up telephone calls. Missing data analyses revealed that seven cases missed 60% or more of the variables in the incubator manager questionnaire; these cases were without data on all dependent variables. Hair et al. (2006) state that deleting cases with missing data on the dependent variables avoids an artificial increase in relationships with independent variables. After deleting these cases, our final incubator manager database consisted of 180 cases. The remaining missing data was MCAR (Missing Completely at Random), which means that the missing data pattern is random (p value = .252 > .05; thus the null hypothesis that missing data are MCAR could not be rejected). In the incubator employee database, one case actually missed 91% of the data. This case was deleted, resulting in a final incubator employee sample of 112 cases. We examined the representativeness of our incubator sample in terms of number of incubators per state, year of

operation, and number of incubatees. We compared our sample with Anprotec's results, which contained data up to 2006, being based on a yearly panorama of Brazilian incubator characteristics (Anprotec, 2005, 2006). Paired samples *t* tests indicate that there are no significant differences ($\alpha = .01$) between the distributions in the number of incubators per state, the number of incubatees, and the year of operation.

3.3 Questionnaire

The questionnaire instrument was first developed in English, after which we translated all items to Brazilian Portuguese. Capturing the same meaning in each language is a complex process (Douglas and Craig, 2007), and to check the accuracy of the translation, *back translation* is a widely-used method (Brislin, 1970), which involves the translation of a document that has already been translated into a foreign language back to the original language. Although back translation results in a correct literal translation, it does not reveal problems regarding different meanings in another context, such as those resulting from cultural biases (Douglas and Craig, 2007). To address this, we followed Douglas and Craig's (2007) collaborative and iterative translation method, applied by researchers such as Danis et al. (2010) and Ha et al. (2010).

Incubatee survival and growth

Incubatee survival and growth (Allen and McCluskey, 1990; Ferguson and Olofsson, 2004; Schwartz and Göthner, 2009; Sherman, 1999) are frequently referred to as the most important effectiveness indicators for incubators. This is not surprising, given the fact that survival and growth measures are often used to evaluate venture success (Brush and Vanderwerf, 1992; Cooper et al., 1994; Hmieleski and Baron, 2008; Westhead and Storey, 1995), both squarely fitting within the external stakeholders' interests. Moreover, evaluating growth measures such as job creation gives one the opportunity to examine long-term incubator impacts, instead of short-term outcomes like occupancy rate (Costa-David et al., 2002).

We used three performance measures, all integrated into one scale. We first asked the incubator manager to indicate how many incubatees graduated or transitioned from the incubator in the last three years. For these graduates, we asked them how many incubatees were surviving (that is, active) at the date they left the incubator, how many had grown in

number of employees, and how many had grown in terms of sales revenue. This information allowed us to create a composite measure combining the percentage of active graduates, the percentage of incubatees that experienced employee headcount growth, and the percentage of incubatee growth in terms of sales revenue. Both the incubator employee and the incubator manager filled out these incubatee performance questions. Exploratory factor analyses show that the performance measures in the two samples both load onto one factor. The Cronbach alphas are similar, and very high: .938 for the incubator employee database, and .933 for the incubator manager database. This makes us confident that we did not have any problems regarding CMV for the performance measures. A paired samples *t* test ($\alpha = .01$) confirms that there are no significant differences between the distribution of the performance measures provided by the incubator employees and those of the incubator managers. For further analysis, we use the performance data from the incubator manager database.

Service customization

Service customization is measured using a scale developed and applied by Skaggs and Huffman (2003) and Skaggs and Youndt (2004). We employed a seven-point Likert scale with choices ranging from “I strongly disagree” to “I strongly agree”. Based on in-depth interviews with incubator managers and experts, the items were adapted to the business incubator context. For example, we asked the incubator manager whether they follow standard incubation procedures (see Appendix A for all the items). A five-item service customization scale emerged (Cronbach alpha = .693). The items also conceptually load onto this factor, confirming face validity, which is in line with previous research, and showing Cronbach alphas reaching .70 (Skaggs and Huffman, 2003).

Our qualitative pre-test suggested that Brazilian incubators follow a service customization strategy, but combined with some elements typically attributed to service standardization. Incubator managers and experts indicated that (a) although standard incubation procedures are followed and similar service types are offered to all incubatees, (b) the incubator consults each incubatee about her or his needs, requires a great deal of information from the companies for service development, and changes the way the services are offered. Therefore, we see that, in Brazil, incubators blend a customization strategy with some standardization aspects, the result

being a hybrid strategy that mainly, but not exclusively, focuses on customization. This is in line with service logic literature that argues that service customization requires procedures and planning, typically attributed to standardization, as well as customer interaction (Jacob, 2006). Indeed, factor analysis confirms that all five items load onto one factor, and that reverse coding is not appropriate.

Industry focus

To measure whether the incubator focuses on a specific industry, we used an item developed and applied by Skaggs and Huffman (2003). These researchers measured “service focus” through a four-item scale, which also measures other forms of service focus, such as the type of clients or the type of services offered. Given the heated debate in incubator literature regarding the added value of focused versus diversified incubators (e.g., Schwartz and Hornych, 2010; Vanderstraeten and Matthyssens, 2012), we decided to focus solely on the item probing for industry niche.⁶ After fine-tuning this item to the incubator context through in-depth interviews with incubator managers and experts, we formulated the following scaled question: “The incubator offers services that focus on a specific industry niche (e.g., IT, biotechnology, creative sector, etc.)”. We employed a seven-point Likert scale ranging from “I strongly disagree” to “I strongly agree”.

Control variables

We include control variables at the incubator and the state level. For the incubator level, we add the incubator’s age, size and occupancy rate. Prior research posits that organizational size and age influence performance (Aldrich and Auster, 1986; Stinchcombe, 1965). Likewise, incubator literature suggests that incubator size and age affect incubatee survival rate and growth measures (Aerts et al., 2007; Allen and McCluskey, 1990; Schwartz, 2008). Following extant research on incubators, incubator size is measured by examining the incubator’s surface, subdivided into seven categories: 1=1-1000 m²; 2=2001-2000 m²; 3=2001-4000 m²; 4=4001-6000 m²; 5=6001-8000 m²; 6=8001-10,000 m²; and 7≥10,000 m². To calculate the

⁶ We thank the anonymous reviewers for this valuable suggestion.

incubator's age, we employ the year that the incubator started its operations (Schwartz, 2008). Occupancy rate offers a proxy for the incubator's possibility to generate income (Costa-David et al., 2002) and its consecutive resources for strategy implementation, and we measure this through ten categories: 1=0-10%, 2=11-20%; 3=21-30%; 4=31-40%; 5=41-50%; 6=51-60%; 7=61-70%; 8=71-80%; 9=81-90%; and 10=91-100%.

Control variables at the incubator's state level are GDP, the percentage of high-growth companies, and education quality. Although the usefulness of GDP to indicate social welfare and human progress has been questioned (van den Bergh, 2009), it is widely employed in entrepreneurship studies that include measures of entrepreneurial activities (Peterson, 2008; Valliere and Peterson, 2009). Examples include studies into the differences in entrepreneurship rates (Peterson, 2008; Pinillos and Reyes, 2011) and entrepreneurial types (Valliere and Peterson, 2009). The percentage of high-growth companies indicates the type of entrepreneurship in the relevant state. State-level institutional aspects such as property rights and contracting influence high-growth aspirations (Troilo, 2011), with other research pointing to high-growth businesses impacting knowledge spillovers and economic growth (Sternberg and Wennekers, 2005).

Finally, education is expected to influence entrepreneurial activities (Verheul et al., 2002), influencing access to resources and capabilities needed for venture creation (Chandler and Jansen, 1992). To measure Brazilian education levels, we combine the IDEB quality rank developed by the federal government (MEC, 2013) with the weighted percentage of students who reached the relevant educational level, but dropped out afterwards. More specifically, we calculate:⁷ Education quality = $a \cdot IDEB_1 + b \cdot IDEB_2 + c \cdot IDEB_3$. Here, a = % of students graduating from the initial years of primary school, and dropping out afterwards; b = % of students graduating from the final years of primary school, and dropping out afterwards; c = % of students graduating from high school; $IDEB_1$ = Index of Basic Education Development for the initial years of primary school; $IDEB_2$ = Index of Basic Education Development for the final years of primary school; and $IDEB_3$ = Index of Basic Education Development for high school.

⁷ We also added an illiteracy measure to our analysis, but decided to omit this control variable because of a very high correlation with the education quality measure (-.736).

3.5 Regression analysis

Data are analyzed using Hayes's (2012) PROCESS macro for mediation modeling (Cole et al., 2008). In so doing, we can gain insights into the relative importance of and relationship amongst independent variables in their prediction of the dependent variable (Hair et al., 2006). Maintaining power at .80 and obtaining generalizability of results requires a ratio of observations to independent variables of at least 5:1, with preferably a ratio of 15:1 (Hair et al., 2006). Given that we work with a maximum of eight variables (two independent variables and six control variables; see below), the required number of observations is a minimum of 40 and, preferably, 120 incubator responses. The number of cases in our incubator manager database is 180, with 166 cases providing valid information (listwise) on all variables used in our model.

Because regression analysis can be sensitive to outliers (Stevens, 1984), we execute univariate and multivariate detection of possible outliers (Hair et al., 2006). For multivariate detection, we use Cook's distance and interpret the residuals (Field, 2009). Applying the standardized residuals rule shows that there are no standardized residuals with an absolute value greater than 1.96, which indicates that the model is a good representation of the actual data. Because all of Cook's distances are smaller than 1, there is actually no individual case that influences the model as a whole. For univariate detection, we apply standardized scores (z scores), following Tabachnick and Fidell (2007), employing an upper limit of 3.29 ($p < .001$). Univariate detection suggests that the outliers detected for "size" and "high-growth companies" are interesting cases for robustness analyses. The outliers detected for "size" are the only incubators with a surface of 8,000 m² or more, which is expected to influence an incubator's financial independence (Zablocki, 2007). For the variable "high-growth companies", it is apparent that Amazonas is the state that has an outlier, with a relatively high percentage of 2.98% of high-growth companies. This state happens to receive a fairly high level of government incentives for company development, in an effort to ensure that economic activity is supported in the rain forest areas. Therefore, we also perform robustness checks without using those cases located in the state of Amazonas.

[INSERT TABLE 1 ABOUT HERE]

To reduce the risk of multicollinearity, only independent variables with a bivariate correlation of maximum .7 are included (Tabachnick and Fidell, 2007). The correlation matrix of the independent variables can be found in Table 1. To identify possible multicollinearity issues, we report the variance inflation factors (VIFs) in the results section. Homoskedasticity and linearity have been checked by plotting the standardized predicted values against the standardized residuals. There is no sign of a “tooter” shape, which makes us confident that there are no heteroskedasticity problems and there is also no sign of a non-linear relationship. Finally, the Histogram and the Normal P-P plot of the standardized residuals show that the errors are normally distributed. For ease of interpretation, all independent variables are mean centered (Cohen et al., 2003).

4. Empirical results

Table 2 presents our findings. We observe a significant positive direct effect of industry focus on service customization ($B = .187; p < .001$; i.e., path coefficient a), a significant positive direct effect of service customization on incubatee survival and growth ($B = .556; p < .05$; i.e., path coefficient b), and a non-significant negative direct effect of industry focus on incubatee survival and growth ($B = -.154; p > .1$; i.e., path coefficient c'). Thus, we find support for Hypothesis 1 and for Hypothesis 3, but not for Hypothesis 2. Moreover, model 3 gives the total effect of industry focus on incubatee survival and growth, without taking into account the service customization mediator. This effect is non-significant ($B = -.049; p > .1$; i.e., path coefficient c).

Baron and Kenny (1986) advocate that a variable should only be considered to be a mediator if (1) the independent variable significantly predicts the dependent variable (i.e., our path coefficient c), (2) the independent variable significantly predicts the mediator (i.e., our path coefficient a), and (3) the mediator significantly predicts the dependent variable, controlling for the independent variable (i.e., our path coefficient b). However, Preacher and Hayes (2004) provide a more sophisticated analysis method. More specifically, they explain that the Sobel (1982) test suggested by Baron and Kenny (1986) to test for the indirect effect frequently violates the assumption that the sampling distribution of $a*b$ is normal. The Sobel

test is a direct test of the indirect effect, defined as the product of the path coefficients a and b .⁸

Preacher and Hayes (2004) provide a bootstrapping method to test for the indirect effect and argue that (1) testing the significance of the indirect effect is a requirement for mediation, even though Baron and Kenny (1986) did not formally list this requirement in their stepwise procedure, (2) employing bootstrapping allows one to bypass the common problem of non-normality of the distribution of $a*b$, which often leads to the erroneous conclusion of non-mediation (Type II error), because the Sobel test turned out to be non-significant, and (3) if the total effect is non-significant, bootstrapping can still reveal a significant indirect effect, and mediation is therefore still possible.

Indeed, Preacher and Hayes (2004) explain that bootstrapping (p. 722) “*makes no assumptions about the shape of the distribution of the variables or the sampling distribution of the statistic*”. Furthermore, it can be applied to smaller samples, since it is not based on large-sample theory. To interpret the results, the researcher should examine the confidence intervals: if zero is not in the confidence interval, he or she can conclude that the indirect effect is significantly different from zero. Moreover, researchers solely following the Baron and Kenny (1986) criteria would erroneously conclude that there is no mediation effect, when the total effect is actually non-significant. Preacher and Hayes (2004) show that also if the total effect is non-significant, bootstrapping can reveal a significant indirect effect.⁹ Zhao et al. (2010) concur with this reasoning, and provide a transparent and very useful decision tree to establish and classify mediation, starting from evaluating the significance of the indirect effect. They show that in cases where the indirect effect $a*b$ is significant and the path coefficient c is non-significant, indirect-only mediation is established. Moreover, they suggest that in such models, the (p. 201) “*mediator identified [is] consistent with [the] hypothesized theoretical framework*” and that an omitted mediator is unlikely.

⁸ Please note that Preacher and Hayes (2004) show that the Sobel test, although suggested by Baron and Kenny (1986), is rarely used in practice. Most researchers only test the previously-discussed stepwise procedure and conclude that, if the effect of the independent variable on the dependent variable (that is, step 1 in their stepwise procedure) decreases to zero with the inclusion of the mediator (that is, step 3 in their stepwise procedure), there is perfect mediation. In addition, when the effect of the independent variable on the dependent variable decreases (but not to zero) there is partial mediation.

⁹ Please note that also other researchers argued that an indirect effect can exist, even without a significant path coefficient c (see, for example, Shrout and Bolger, 2002).

In our study, we find evidence of a significant positive indirect effect of industry focus on incubatee survival and growth, through service customization ($B = .104$; $p < .1$; i.e., path coefficients $a*b$), with both bootstrapped 90% confidence intervals around the indirect effect above zero (.022; .213). We also find a non-significant path coefficient c (that is, the total effect). Thus, we can conclude that service customization mediates the association between an incubator's industry focus and incubatee survival and growth, and that the total effect of such an industry focus on incubatee survival and growth is non-significant. Because Hypothesis 4 receives support and Hypothesis 2 does not, we can conclude that there is indirect-only mediation, and that an omitted mediator is unlikely (Zhao et al., 2010).¹⁰

[INSERT TABLE 2 ABOUT HERE]

5. Discussion and conclusion

In this paper, we addressed the “flexibility” side of the structure-flexibility paradox of start-up support organizations. More specifically, we argued that the way services are offered deserves additional attention in studies on business incubators, and hypothesized that incubatee survival and growth largely depend on the degree of service customization. We put forward incubatee need heterogeneity as a central concept in explaining the relationship between an incubator's industry focus, its service customization efforts, and the survival and growth of its incubatees. In sum, we addressed the following research question: “*How does an incubator's industry focus influence its customization strategy, and consecutive performance results?*” By doing so, we not only helped unravel the relationships between service customization and an incubator's industry focus, but also addressed a strong demand in both the academic and business communities for additional insights into the factors influencing incubator performance variation (Amezcuca, 2010; Bergek and Norrman, 2008). In the following, we discuss our study's results in relation to existing research. Our results provide three overarching contributions to literature, suggesting a few practical and theoretical implications.

First, our study adds fuel to a growing debate on the effectiveness of a specific industry focus for incubators. We find no evidence that opting for an industry directly enhances

¹⁰ As a robustness check, we also tested for moderation. Our results show that there is no significant interaction effect of service customization and industry focus. The results table can be provided upon request.

incubatee performance, and suggest two explanations for this. The first is that both diversified and specialized incubators may be able to attain a competitive advantage, and the second that a mediating variable is necessary for an incubator's industry focus to actually result in higher incubatee performances. In the following, we discuss them both.

The argument that both diversified and specialized incubators may be able to attain a competitive advantage implies that not only those incubators adopting an industry focus are able to increase incubatee survival and growth, but diversified ones as well. Although additional research focusing on the difference between focused and diversified incubators still has to confirm this, the implication is that the positive effect of networking activities on venture performance (Colombo et al., 2009; Gans and Stern, 2003) holds true for both. This is in line with recent work from Schwartz and Hornych (2010), which reveals that networking activities are effective in both focused and diversified incubators. Similarly, Vanderstraeten and Matthyssens (2012) argue that both generalist and specialist incubators can create value for their incubators through service offerings. Such findings are in line with studies in strategy literature, where it has been argued that both a focused (e.g., Singh et al., 2007) and a diversified (e.g., Nath et al., 2010) strategy can result in high performances.

In line with this argumentation, Gulati et al. (2011) refer to the concept of "reach", which revolves around determining a network's potential value. It refers to (p. 207) "*how wide-ranging and heterogeneous the organization's network [connections] are*", and encompasses three elements: distance, difference, and diversity. Only difference and diversity are interesting in relation to an incubator's industry focus, with difference examining how different the potential network partners are from the focal organization, and diversity examining how diverse the partner set is, without looking at the focal organization's attributes. Both relate to dissimilarities such as institutional or cultural differences (Lavie and Miller, 2008) or diverse industry foci and geographic locations. Such differences are directly related to access to novel resources and can thus have a positive impact on high value creation (Gulati et al., 2011). Gulati et al.'s (2011) arguments show that there should be "some kind" of diversity/difference, implying that an industry focus is not the only way to create high value.

The second argument is that there might not be a direct effect of an incubator's focus strategy on the performance of its incubatees. Instead, focused incubators can only increase incubatee survival and growth when they also follow a service customization strategy. Our study's results show evidence of such a complementary effect, allowing us to develop a deeper level of understanding vis-à-vis previous studies that do not consider such mediation effects (e.g., Löfsten and Lindelöf, 2002). The results are in line with Vanderstraeten and Matthyssens' (2012) suggestion that focused incubators should offer industry-tailored business support services in order to create superior incubatee value, and should thus differentiate. Moreover, they explain Peña's (2004) non-significant networking effects and provide evidence of this researcher's suggestion that the non-significant results might be explained by the incubator's ineffective use of networking opportunities. More specifically, our study results suggest that service customization is necessary to effectively utilize industry networking opportunities and allow incubatees to thrive.

Our findings also provide evidence that, even though an incubator opting for an industry focus can capture incubatee need heterogeneity, there still remains a large portion of unaddressed need variation. We argued that such unaddressed customer need variation (Franke and von Hippel, 2003) and segment instability (e.g., Kotler, 1994) can be tackled through service customization, and our results confirm this. Because our study applies quantitative analysis methods, it generates a higher level of generalizability than earlier, mainly qualitative research in which an incubator's service offering strategy, industry focus and performance outcomes are examined concurrently (e.g., Vanderstraeten and Matthyssens, 2012). Moreover, it is in line with company development models such as mass-customization frameworks (e.g., Da Silveira et al., 2001), where the added value of a simultaneous focus on structure and flexibility is stressed. In such models, organizations shift their approach towards the users, investigating "*each potential customer with his specific needs*". The users "*can design their own product by selecting a permutation of a given set of factors and level*" (Franke and von Hippel, 2003, p. 8). This is exactly what an incubator can attain by pursuing a focused strategy (that is, by offering "fixed" service blocks), followed by further service customization.

Our second contribution to literature relates to the unraveling of the underlying relationships of the mediation effect: i.e., the direct relationship between an incubator's focus strategy and its customization efforts, on the one hand, and service customization and incubatee performance, on the other hand. We find that following a service customization strategy positively influences the performance of incubatees, and that there is a positive association between an industry focus and customization efforts. In the following, again, we discuss them both.

Our hypothesized positive relationship between an incubator's customization efforts and its incubatees' performances relies on the argument that if the customer is actively involved in an organization's service development, processing and delivery process (Grönroos, 2011), service co-creation and customization can be obtained (Jacob, 2006). As such, the organization is able to fulfill individual customer demands (Jacob, 2006) and develop a superior competitive advantage. Particularly in business-to-business service organizations, where need heterogeneity is high, the active involvement of customers during service development and offering tends to thrive (Ordanini and Pasini, 2008). Addressing need heterogeneity through service customization is associated with an increase in survival and growth rates, as also suggested by Mian (1994), Peña (2004) and Frenkel et al. (2008). For example, Peña (2004) explained that (p. 234) "*the only significant variable positively associated with firm growth was the management training and assistance services provided by the incubator*". According to this researcher, these tailored service offerings fulfill an incubatee's individual human capital needs. Supporting this, Wynarczyk and Raine (2005) explain that there was only one incubator in their study that reached a ratio of 12 jobs per business, while, as a comparison, the incubators in Wynarczyk and Raine's study reached an average ratio of 3 jobs per business. Interestingly, it was the incubator with the most comprehensive business support infrastructure, and therefore the highest capability of customized service offerings, that reached the highest ratio.

We also find a positive association between an incubator's focus strategy and its customization efforts. This result confirms our argumentation that customization can thrive in situations where segmentation efforts have the effect of lowering information stickiness, and service needs are narrowed. Indeed, Costa-David et al. (2002) show that an industry focus

allows the incubator management team to develop skills relevant for the incubatees' core needs, implying a lowering of information asymmetry and incompleteness (e.g., Lin et al., 2005). The relationship between information providers and recipients is less laborious and distant in cases where both partners are knowledgeable about the same topic. Moreover, an industry focus allows incubators to more efficiently use their limited resources to allocate to service offerings in one industry.

Our third and final contribution to the literature relates to our increased understanding of the determinants of an incubator's performance variation. Indeed, understanding the determinants of business incubator performance has been a key goal of many incubator researchers (e.g., Mian, 1997; Udell, 1990; Voisey et al., 2006). The present study adds to this body of knowledge by assessing the degree to which an incubator's service customization strategy and industry focus affect incubatee performance. As such, we further opened the incubator's "black box" (Hackett and Dilts, 2008), providing evidence that company survival and growth thrives due to the way services are offered (that is, the incubator's customization level). Insights in an incubator's internal functioning is highly needed: for example, Lai and Lin (2005) argue that (p. 2286) "*although BIs can provide these aforementioned services [the authors listed services such as business planning or networking opportunities as possible incubator services] to startups, few BIs understand how to provide the right assistance to tenants to overcome barriers*". Our paper builds on this gap by focusing on the impact of an incubator's service focus and customization efforts. Baraldi and Havensvid (2016) also stresses the importance of an incubator's internal functioning, while M'Chirgui (2012) argues that an incubator's resource offering is a significant predictor of the formation of its incubatees.

5.1 Implications for practice and policy

Entrepreneurial activities are seen as the engine of economic growth (Audretsch et al., 2007; van Stel et al., 2005) and employment changes (Baptista et al., 2008). Indirect effects of new business formation for the economy have also been widely documented, such as increased innovative activities (Giarratana, 2004), technological development (Licht and Nerlinger,

1998) and increased competitiveness (Fristch and Mueller, 2004).¹¹ Despite the stimulating effects of new businesses on the economy, liabilities of newness and smallness (Freeman et al., 1983; Stinchcombe, 1965) provoke high start-up failure rates. For example, start-ups often lack legitimacy and the necessary connections, while also having fewer resources or limited access to knowledge than their established counterparts. Such externalities can lead to market failure (Audretsch et al., 2007). Figures showing 30 to 40 per cent of start-ups not surviving their first year of existence (OECD, 2002; Shepherd et al., 2000) can stimulate the government to try to correct for market failures. Indeed, policymakers and practitioners attribute increasing attention to seeding and accelerating entrepreneurship (Mian et al., 2016).

One type of government intervention is the nurturing of start-ups in business incubators (Peña, 2004), though practitioners and policymakers are unfortunately limited by the lack of in-depth knowledge about these organizations. Scholars have “*just begun to scratch the surface of [this] phenomenon*” (Hackett and Dilts, 2004, p. 55), and insights into an incubator’s internal functioning mechanisms are particularly limited (Hackett and Dilts, 2008). It is not surprising that an incubator’s internal service offering is often referred to as part of a “black box” (Hackett and Dilts, 2008). Through this study, we are able to further open this black box as a means of providing insights into the relationships between an incubator’s industry focus and its degree of service customization. More specifically, our analysis indicates that a stand-alone focus strategy does not result in increased incubatee survival and growth rates. Rather, increased performance can only really be achieved if the incubator successively implements a service customization strategy. This suggests to incubator managers that not only the incubator’s target audience is of importance, but also a subsequent one-on-one tailoring of service offerings; both are required for focused incubators to thrive. Incubator managers and incubator support organizations might use this information to simultaneously decide upon the incubator’s scope and its service offering strategy.

¹¹ Please note that researchers like Fritsch and Mueller (2004), van Stel and Storey (2004) and Baptista et al. (2008) argue that time lags can explain the often ambiguous research results regarding the impact of start-up formation on employment or economic growth. Moreover, Anokhin and Wincent (2012) nuance the widely accepted belief that start-up rates positively relate to innovation. Their research shows that this relationship is only positive in developed countries, and that it becomes negative in countries in early development stages. Also, van Stel et al. (2005) provide evidence that a country’s economic development stage influences the impact of entrepreneurial activities on economic growth.

Through our study, we thus show to practitioners and policymakers that offering the “right” assistance is pivotal for increased incubatee survival and growth rates, a finding also suggested by Lai and Lin (2005). Service customization allows for flexible service offerings in business-to-business relations where segment instability is typically more pronounced (Blocker and Flint, 2007). Indeed, customization is indispensable in environments where markets increasingly become dynamic and turbulent (D’Aveni, 1995; Joshi and Campbell, 2003). The results of our paper act as a practical guide to practitioners and policymakers, mirroring Baraldi and Havenvid’s (2016) suggestion that incubators should (p. 1) “*take more of a strategic perspective rather than focusing only on the established components of their operations*”.

5.2 Limitations and directions for future research

In addition to the limitations and future research avenues discussed above, six additional limitations of the current study merit special attention. First, our research study only focuses on Brazilian incubators. Even though the lack of empirical evidence on developing/emerging markets (Nagano et al., 2014) certainly warrants an in-depth investigation of organizational practices in such environments, our focus on Brazil also has its downsides. Specifically, the institutional context of emerging markets is not uniform (Khanna and Palepu, 1997), and differs considerably from the context in developed economies (Manolova et al., 2008). Furthermore, the Brazilian incubator movement is a rather atypical case in Latin America. Etzkowitz et al. (2005, p. 412) argue that “*the Brazilian incubator movement represents a new direction in Latin American science, technology and industrial policy*”. Anprotec, the coordinating business incubation and science park association, played a particularly important entrepreneurial role in “*disseminating the idea, convincing universities and institutions to participate in incubation, and persuading various governmental and industrial institutions to support the incubators*” (Etzkowitz et al., 2005, p. 418). Though our research provides a better understanding of an incubator’s internal functioning mechanisms, both Brazil’s specific incubator situation, along with its differing institutional context, impede us from blindly transferring our results to other economies. Hence, further work in other countries is definitely needed.

Second, our study includes incubator and state-level variables, but not more detailed information about the incubator's incubatees. However, because we employ incubatee survival and growth as incubator outcome effectiveness, it is very likely that incubatee characteristics, such as incubatee size, age, or sector, exert an influence on our model's relationships. Although our data did not allow the inclusion of these variables, future research may well do so. Researchers could, for example, depart from Bøllingtoft and Ulhøi's (2005), and Bøllingtoft's (2012) argumentation that internal networking activities initiated by incubatees stimulate a new incubator phenomenon: the bottom-up incubator. Future researchers might examine how an incubator's service customization efforts during internal networking, in such a bottom-up incubator, are influenced by incubatee characteristics.

Third, our focus on business incubator programs concurrently offering office space and business coaching allows us to deepen our understanding of this type of incubation program, but also raises questions regarding the performance of *other* incubation programs. For example, Malek et al. (2014) explain that *accelerators* can also boost company development. Compared to incubators, accelerator programs are much shorter, with new ventures generally following an intensive coaching program for three to four months, compared to the several years normally spent in business incubators. It is very likely that the incubation period greatly impacts the program's strategic positioning possibilities, including the focus and customization strategies examined in this paper. Further research can uncover such typicalities.

Fourth, although our quantitative approach offers the opportunity to examine a large number of Brazilian incubators, implying that we can attain higher levels of generalizability than qualitative studies, this approach also has a downside. It forces us to cherry-pick a limited number of incubator variables, and omit a large number of potentially interesting influencers. For example, incubators scoring high on entrepreneurial orientation might focus on innovative services, which in turn may result in higher incubatee performance. It has also been suggested that high levels of incubator manager education positively influence incubator functioning (Zhang and Sonobe, 2011). To summarize, we suggest future quantitative research that elaborates upon our model and includes additional incubator variables. Moreover, qualitative researchers may examine the functioning and outcome effectiveness of

a few (Brazilian) incubators through in-depth case studies, taking into account a wide(r) range of possible influencers.

Our fifth limitation relates to the range of possible influencers examined in this paper. More specifically, it has been extensively argued that “*entrepreneurial behavior needs to be interpreted in the context in which it occurs*” (Welter and Smallbone, 2011, p. 107). Examining the influence of the environment is particularly interesting in settings featuring high levels of uncertainty, ambiguity, and turbulence (Welter and Smallbone, 2011). For example, Wright et al. (2005, p. 11) argue that there is a need for a deeper understanding as to “*how institutional factors and the environmental dynamics in emerging economies impact on strategic choices of managers in domestic firms*”. Furthermore, studies taking institutional variables into account show that transparent patent rules positively influence technological development (Van de Ven, 1993) and that unexpected changes in regulations impede innovations (Sanchez and McKinley, 1998). To examine the incubator’s wider ecosystem, future researchers may want to start from the vast body of research on regional innovation systems (Cooke, 2005), such as the triple-helix model (Etzkowitz and Leydesdorff, 2000), Brännback et al.’s (2008) bottom-up double helix framework, or Villareal and Calvo’s (2015) Global Open Innovation model. In such models, the added value of various stakeholders has been stressed, allowing for deeper insights into a wide variety of environmental contingencies.

Our sixth and final limitation relates to the financial risks an incubator bears when opting for an industry focus.¹² Lai and Lin (2005) discuss changing incubatee needs over time, arguing that (p. 2289) “*BIs should improve their projects’ service capabilities to fulfill tenants’ requirements with the changing times, rather than being institutions with only office facilities*”. Even though this argumentation naturally holds for any kind of incubator, those incubators focusing on a specific industry are expected to search for differentiation possibilities in business support and networking services (Vanderstraeten and Matthyssens, 2012), which typically follow the pace of fast-changing business models or dynamic customer demands. Vanderstraeten and Matthyssens (2012) show that diversified incubators can differentiate themselves through the offering of in-depth secretarial services, which are

¹² We would like to thank the anonymous reviewers for this valuable suggestion.

typically more stable service offerings. These findings suggest that focused incubators are more likely to encounter high financial expenses when seeking to keep up with the fast-changing service needs, which can be quite problematic for organizations experiencing constant financial struggles (Zablocki, 2007).

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APPENDICES

Appendix A: Measurement scales

Table A.1: Measurement scales for independent variables

Variable	Items
Service customization	The incubator has standard incubation procedures For each client company, the incubator changes the way each incubator service is offered The services offered by the incubator are similar for each client company The incubator consults the company about her needs, before developing a service The incubator requires a great deal of information from each client company before developing the services offered to that company
Industry focus	The incubator offers services that focus on a specific industry niche (e.g., IT, biotechnology, creative sector, etc.)

TABLES

Table 1: Means, standard deviations, maximum, minimum and bivariate correlations

	M	SD	Min	Max	1	2	3	4	5	6	7	8
1. Incubatee survival and growth	5.51	3.47	0	10								
2. Industry focus	3.68	1.75	1	7	-.082							
3. Service customization	5.59	1.02	1.6	7	.180**	.261***						
4. Year of operations	2001.71	5.20	1984	2011	-.307***	.044	-.006					
5. Size (m ²)	1.61	1.09	1	7	.134*	-.176**	.045	-.219**				
6. Occupancy rate	7.33	2.78	1	10	.290***	-.072	.117	-.237***	.125			
7. GDP (Brazilian Real)	375966	389186	4883	996717	.136*	-.073	.089	-.057	.212**	.309***		
8. High-growth companies	1.61	.30	1.28	2.98	-.044	.006	.053	.115	.129*	-.080	-.095	
9. Education quality (IDEB)	3.56	.49	2.30	4.01	.213**	.009	.064	-.085	.085	.261***	.528***	-.490***

Variables are not mean centered. * < .05; ** p < .01; and *** p < .001. Two-tailed significance.

Table 2: Hierarchical linear regression for mediation, with path model coefficients

Outcome	Model 1	Model 2	Model 3	
	DIRECT effect	DIRECT effect	TOTAL effect	
	SC	IncP	IncP	
	B	B	B	
Constant	.003 (.079)	5.540*** (.251)	5.542*** (.253)	
CONTROL VARIABLES				
<i>Incubator level</i>				
Year operations	.001 (.017)	-.181** (.064)	-.180** (.064)	
Size (m ²)	.075 (.099)	.042 (.262)	.083 (.251)	
Occupancy rate	.039 (.031)	.207* (.110)	.228* (.105)	
<i>State level</i>				
GDP (Brazilian Real)	.000 (.000)	.000 (.000)	.000 (.000)	
High-growth companies	.289 (.290)	1.149 (1.171)	1.310 (1.188)	
Education quality (IDEB)	.112 (.198)	1.678** (.682)	1.741** (.696)	
DIRECT and TOTAL EFFECTS				
Industry focus	a .187*** (.044)	c' -.154 (.152)	c -.049 (.145)	
Service customization		b .556* (.253)		
F-statistic	3.192**	5.760***	4.985***	
R ²	.347	.205	.180	
INDIRECT effect of Industry focus on Incubatee survival and growth through Service customization				
	B	LL 90% CI	UL 90% CI	p (Normal theory test)
	a*b .104 (.059)	.022	.213	.055

+ < .1; * < .05; ** p < .01; *** p < .001. IncP is Incubatee survival and growth. SC is Service customization. One-tailed significance. Standard errors in parentheses. Listwise. Unstandardized coefficients. Sample size = 166. VIF is max. 1.999.

FIGURES

Figure 1: Conceptual and path coefficients of the mediation model

