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Individual and organizational inhibitors to the development of entrepreneurial competencies in universities

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ABSTRACT

Nascent academic entrepreneurs need to acquire entrepreneurial competencies to create successful spin-off ventures. In this article, we examine difficulties in this pursuit prior to venture formation and offer a systematic classification of inhibitors. We confirm, combine, and extend two previously identified inhibiting mechanisms into a relational inhibitor category, classify additional structural and cultural-cognitive inhibitors, and highlight how these inhibitors exist both at the individual and the organizational level. We then advance theoretical understanding of the interrelated, multilevel functions of inhibitors on the development of entrepreneurial competencies, and offer policy insights on how universities can mitigate their effects.

1. Introduction

Entrepreneurship theorists have long acknowledged that entrepreneurial competencies are linked to venture performance (Chandler and Jansen, 1992; Man et al., 2002). However, this insight has rarely been extended to understand the antecedent process of how entrepreneurial competencies are gained prior to venture formation (Rasmussen et al., 2011). To extend theory on entrepreneurial competencies, it is therefore important to focus on the early stage of the entrepreneurial journey (Chandler and Lyon, 2009; McMullen and Dimov, 2013).

Building on Man et al. (2002) and Rasmussen et al. (2011), we define entrepreneurial competencies as higher-level, improvable characteristics entailing personality traits, skills, and knowledge that bring about the ability to accomplish something through the use of resources. To become competent means, in the words of Hayton and Kelley (2006, p. 413), "to be able to behave effectively in a particular performance domain, occupation, or activity", which in the context of this article refers to the ability of an entrepreneur to identify and combine resources to start a venture. Understanding the dynamics shaping the development of entrepreneurial competencies raises theoretically intriguing questions as to how entrepreneurs gain competencies, and, more fundamentally, about the extent to which entrepreneurial competencies are the result of individual or contextual factors (Rasmussen et al., 2014, 2015).

We contribute to this line of research by examining the development of entrepreneurial competencies *prior* to venture formation. In so doing, we address an important gap in the entrepreneurship literature (Wright, 2014). While research has paid attention to competency development *post* venture formation (Baker et al., 2003; Chandler et al., 2005; Rasmussen et al., 2011), we know that key resource and asset-formation decisions (e.g., about human resources or business models) that have significant impacts on subsequent venture performance are often taken before a venture has begun (Chandler et al., 2005; Kaplan et al., 2009). Understanding the early process of competency development is hence crucial to our understanding of (later) entrepreneurial behaviors and venture performance.

To better comprehend the early process of competency development, we focus through the lens of a single case study university setting on the emergence of spin-off ventures (Mustar et al., 2006), which offer a particularly suitable context for such an investigation. This is because most university spin-offs are knowledge-based firms and require a rich set of resources and competencies to transform scientific findings into commercial entities (Baker et al., 2003; O'Shea et al., 2005; Vohora et al., 2004). Moreover, despite the positive economic impact of spin-offs for universities and society (Guerrero et al., 2015; Vincett, 2010), the dominantly non-commercial context of universities is not conducive to emerging spin-off ventures (Moray and Clarysse, 2005; Rasmussen and Wright, 2015; Siegel et al., 2003a). This presents a promising context in which to study the impact of contextual factors on the early

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process of competency development (Rasmussen et al., 2014; Rasmussen and Borch, 2010) and to generate policy recommendations.

In examining competency development among nascent academic entrepreneurs – i.e., academics who pursue the formation of a new, research-based venture (Dimov, 2010; Mosey and Wright, 2007) – we are particularly interested in developing the inhibitors perspective, which focuses on mechanisms constraining the development of entrepreneurial competencies and subsequent venture performance (Rasmussen et al., 2014). This approach is set against a policy backdrop strongly advocating the development of entrepreneurial knowledge and skills and the creation of university spin-offs (Lockett et al., 2005; Mustar and Wright, 2010; Siegel et al., 2003b; Wright, 2014). At the same time, however, recent data point to a puzzling downward trend in the creation of university spin-offs by academic entrepreneurs (Wright and Fu, 2015). For example, the number of spin-offs from the top 25% of universities in the United Kingdom (as ranked by UK University League Tables), which account for over 70% of all university spin-offs and contribute the most economic value (Guerrero et al., 2015), declined almost continuously in the period 2000–2012 (Wright and Fu, 2015). Indeed, during that period, the number of spin-offs reduced by almost half (Wright and Fu, 2015). This raises serious questions about the process of entrepreneurial competency development, and how universities influence nascent academic entrepreneurs and their spin-off activities (Wright, 2014).

By approaching entrepreneurial competencies from the inhibitors perspective, we focus on the competencies nascent academic entrepreneurs actively seek to develop prior to venture formation, but find difficult to obtain. In so doing, we are particularly interested in providing answers to the following question: 'What are individual and organizational inhibitors to the development of entrepreneurial competencies in a university and how do these inhibitors function?'

Based on extensive field research we offer grounded empirical insights into how nascent entrepreneurs do or do not develop entrepreneurial competencies. Our findings result in two main contributions: First, we classify inhibitors to the development of entrepreneurial competencies into relational, structural, and cultural-cognitive inhibitors, and show how these inhibitors exist both at individual and organizational levels. Second, we explicate the interrelated, multilevel functions of inhibitors. We provide emerging theoretical insights into how the three types of inhibitors together influence the development of entrepreneurial competencies in direct and indirect ways before venture formation. Based on our findings, we then highlight specific policy implications that suggest a more comprehensive yet decentralized approach for universities intending to enable and encourage the commercialization of research through entrepreneurial ventures by academic entrepreneurs. We conclude by outlining limitations of our work and potential future research opportunities.

2. Theoretical context

The theoretical context guiding our research on entrepreneurial competencies is structured along three questions and associated streams of literature, namely: *what* are entrepreneurial competencies, *why* are they important, and *how* do they develop?

2.1. What are entrepreneurial competencies?

The entrepreneurship literature commonly conceptualizes entrepreneurial competencies as encompassing aggregated clusters of knowledge, traits, attitudes, and skills (Chandler and Jansen, 1992; Hayton and Kelley, 2006; Man et al., 2002). From diverse angles, the concept of entrepreneurial competencies tries to capture the ability of an entrepreneur to start and grow a venture and successfully identify and combine a variety of resources (Penrose, 1959; Wright et al., 2012). Tangible and intangible resources, which the entrepreneurship literature has identified as important for the creation and performance of new ventures, include financial (Brinckmann et al., 2011; Wright et al., 2006), human capital (Vanaelst et al., 2006; Zucker et al., 1998), organizational, and routine-based (Di Gregorio and Shane, 2003; Jong, 2006; Lockett and Wright, 2005; Powers and McDougall, 2005; Wood, 2009), social network and social capital (Kreiser et al., 2013; Mosey and Wright, 2007; Newbert and Tornikoski, 2012; Nicolaou and Birley, 2003), and technological (Danneels, 2002; Heirman and Clarysse, 2004) resources.

What and how knowledge, traits, attitudes, and skills exactly fall under the umbrella of entrepreneurial competencies is less clear. Classifications differ in their scope, locus, and temporal assessment of entrepreneurial competencies, as summarized in Table 1. The articles listed in this table represent the most-cited contributions providing distinct classifications of entrepreneurial competencies. We identified these articles following several stages recommended in the systematic literature review procedure outlined by Tranfield et al. (2003). A comprehensive search of key terms in titles and abstracts allowed us to ascertain relevant, peer-reviewed articles related to entrepreneurial competencies. We then screened for and identified articles offering classifications of entrepreneurial competencies, and we subsequently ranked these classifications based on citations. In addition to the foundational paper by Chandler and Jansen (1992) and the almost equally well-cited paper by Man et al. (2002), four articles stand out. Each of these four articles was written in the past ten years and received over 100 citations as calculated as the arithmetic mean of citations provided by Google Scholar, Web of Science, and Scopus.

Table 1 highlights differences in scope between classifications. Classifications of entrepreneurial competencies range from six categories (Chandler and Jansen, 1992; Man et al., 2002) to three categories (Oosterbeek et al., 2010; Rasmussen et al., 2011), and there is, in various cases, little overlap between classifications with regard to the elements they entail. There are also differences in the locus of competencies; the majority of classifications locate competencies at the individual level (Chandler and Jansen, 1992; Hayton and Kelley, 2006; Man et al., 2002; Mitchelmore and Rowley, 2010; Oosterbeek et al., 2010), but some studies seek competences at the organizational level (Rasmussen et al., 2011). Finally, there are important differences in the temporal assessment of entrepreneurial competencies. While all studies highlight the development of competences as a longitudinal (but not necessarily continuous) process, some classifications focus on competencies required after a venture had been formed (Chandler and Jansen, 1992; Man et al., 2002; Mitchelmore and Rowley, 2010; Rasmussen et al., 2011), whereas other classifications focus on competencies prior to venture formation (Hayton and Kelley, 2006; Oosterbeek et al., 2010).

Although the above conceptualizations of entrepreneurial competencies clearly provide a useful overview of the different types of competencies entrepreneurs may require to develop a new venture, there is a notable disconnect between the classifications that have examined competencies before venture formation and those that have examined them after. The resulting problem is that competencies are viewed in isolation and detached from the process of starting a new venture. In other words, research focusing on competencies before venture formation tends to examine the status quo of entrepreneurial competencies in a specific setting, such as classes of students (Oosterbeek et al., 2010) or companies (Hayton and Kelley, 2006), but does not examine if and how these competencies were gained to start a new venture – and possibly even more importantly, if they actually led to the formation of a successful one. Conversely, studies focusing on entrepreneurial competencies after venture formation do examine competencies in new and mostly successful ventures, but it remains unclear if those competencies were the same that led to the formation of the ventures in the first place. What is missing, therefore, are in-depth investigations reconciling these differences. We hence need studies focusing on how competencies are actively developed and gained by nascent entrepreneurs at the pre-venture formation stage while also

Table 1
Classifications of entrepreneurial competencies (ordered by year of publication).

Author(s)	Number of competencies	Competencies	Locus of competencies	Temporal assessment of competencies	Citations mean (GS, WoS, S)
Chandler and Jansen (1992)	6	1) opportunity competencies 2) intensive effort competencies 3) conceptual competencies 4) human competencies 5) political competencies 6) technical-functional competencies	Individual	After venture formation	450
Man et al. (2002)	6	1) opportunity competencies 2) relationship competencies 3) conceptual competencies 4) organizing competencies 5) strategic competencies 6) commitment competencies	Individual	After venture formation	426
Hayton and Kelley (2006)	4	1) innovating competencies 2) brokering competencies 3) championing competencies 4) sponsoring competencies	Individual	Before venture formation	129
Mitchelmore and Rowley (2010)	4	1) entrepreneurial competencies 2) business and management competencies 3) human relations competencies 4) conceptual and relationship competencies	Individual	After venture formation	140
Oosterbeek et al. (2010)	3	1) market awareness competencies 2) creativity competencies 3) flexibility competencies	Individual	Before venture formation	239
Rasmussen et al. (2011)	3	1) opportunity refinement competencies 2) leveraging competencies 3) championing competencies	Organization	After venture formation	105

taking into account insights from the post-venture formation stage. Although this presents methodological challenges (Rasmussen et al., 2011), it is a worthy approach to achieve a conceptually more encompassing framework of entrepreneurial competencies (Man et al., 2002). However, before considering the intricacies of such an approach, it is necessary to gain a firmer theoretical understanding of why a competency approach is a promising conceptual perspective and, crucially, what influences the development of entrepreneurial competencies.

2.2. Why are entrepreneurial competencies important?

The entrepreneurial competency approach provides a framework to help explain why and how entrepreneurs are able to combine and organize resources. It offers a distinct unit of analysis (Rasmussen et al., 2011) and a necessary analytical extension to entrepreneurship research that has focused on the relationship between (tangible and intangible) resources and entrepreneurial success (Chen et al., 1998; Mitchelmore and Rowley, 2010). As Penrose (1959) argued more than 50 years ago, resources are necessary but not sufficient to explain entrepreneurial success. Entrepreneurs also require the ability to identify and combine resources and develop unmet opportunities, an ability which can be a primary source of competitive advantage (Godfrey and Gregersen, 1999). Research focusing on entrepreneurial competencies therefore has the potential to contribute unique insights to our understanding of why some entrepreneurs succeed but others do not, despite similar institutional environments and resource endowments.

The entrepreneurial competency perspective extends the boundaries of resource-based entrepreneurship theory (Alvarez and Busenitz, 2001) and complements resource-oriented perspectives that have focused on the practice of combining resources, most notably bricolage (Lévi-Strauss, 1972). Whereas bricolage advances our understanding of the entrepreneurial practice of "making do by applying combinations of resources at hand to new problems and opportunities" (Baker and Nelson, 2005, p. 333), an entrepreneurial competencies framework allows us to ask how entrepreneurs gain the ability, knowledge, and skills to 'make do' and 'apply combinations of resources'.

Entrepreneurial learning is often experiential (Politis, 2005) and improvisational (Baker et al., 2003) before, during, and after a new venture has been launched. However, resource-based perspectives focusing on the practice of combining resources generally take for granted that entrepreneurs are already endowed with some knowledge and skills on how to seek and apply combinations of resources in the face of "penurious environments" (Baker and Nelson, 2005, p. 333). What is missing is a framework that helps explain how the initial knowledge and skills of entrepreneurs are created and formed (Rasmussen et al., 2011). An entrepreneurial competencies framework hence allows us to advance the applicability of resource-oriented theories to the antecedent process of how nascent entrepreneurs gain the early ability to combine resources and learn to develop their initial resource-based knowledge and skills in specific entrepreneurial contexts (Autio et al., 2014; Harrison and Leitch, 2005).

2.3. How do entrepreneurial competencies develop?

Given the importance of entrepreneurial competencies for venture formation and performance (Chandler and Jansen, 1992; Colombo and Grilli, 2005), entrepreneurship research has taken interest in studying how entrepreneurs gain competencies to start a venture and gain resources for venture development (Wright, 2014). Indeed, making progress in understanding the very process of how this happens has not only been identified as complex, but also as critical in understanding the future development path of new ventures (Rasmussen et al., 2011, 2014; Vohora et al., 2004). The entrepreneurship literature to date has approached the development of entrepreneurial competencies from two largely disparate perspectives, an individual and a contextual one,

which is a common dichotomy in entrepreneurship research (Sørensen, 2007). In what follows below, we review both perspectives and highlight how these motivated our investigation to make progress with a much-desired integrated perspective that takes into account individual and contextual factors (Autio et al., 2014; De Carolis and Saparito, 2006; Nelson, 2014; Zahra, 2007; Zahra et al., 2014).

2.3.1. Individual perspective

According to the individual perspective, competencies are individually created (Bird, 2002; Man et al., 2002). Competencies can be learned through experience or education (Sánchez, 2011; Souitaris et al., 2012), and the learning of entrepreneurial competencies can improve related knowledge, traits, and skills (Sánchez, 2011), and alter attitudes and perceptions of feasibility (Goethner et al., 2012; Krueger and Brazeal, 1994).

Conceptually, the individual perspective portrays the development of entrepreneurial competencies as the result of individual ability and effort, which in turn are linked to venture formation and performance (Chandler and Lyon, 2009). Hayter (2016a), for instance, argues that it is the individual ability to utilize information and resources provided by a network that contributes to entrepreneurial success. According to Hayter (2016a), individual-level factors mediate the relationship between networks and entrepreneurship, as evidenced by individual networking skills in the social capital view (Batjargal, 2010), individual network competence in the relational view (Ritter and Gemünden, 2003), or individual absorptive capacity in the knowledge spillover theory of entrepreneurship (Cohen and Levinthal, 1990). In a similar vein, Clarysse et al. (2011) find that the individually acquired competency to identify entrepreneurial opportunities is highly significant in explaining academic entrepreneurs' engagement with new ventures. They argue that individual differences therefore play a central role in explaining a broad range of entrepreneurial behaviors. This view is supported by research by Nicolaou et al. (2008) who find that the decision to become an entrepreneur is, first and foremost, influenced by genetic differences and professional experience, followed by social and environmental factors.

The wider entrepreneurship literature on motivations (Lam, 2011) and intentions (Lüthje and Franke, 2003; Souitaris et al., 2007) provides additional insights on individual drivers contributing to the decision to start a venture, though this literature does not explain how nascent entrepreneurs develop the knowledge to start and develop a venture. Individual drivers identified by entrepreneurship research include a variety of distinct yet often interrelated reasons (Hayter, 2015) such as self-efficacy (Prodan and Drnovsek, 2010), perceived control (Goethner et al., 2012), peer recognition (Stuart and Ding, 2006), career aspirations (Fini et al., 2009), a desire for commercial success (Minshall and Wicksteed, 2005), and monetary rewards (Rizzo, 2015).

The individual embedded nature of competencies may also explain why some new ventures seem to acquire missing competencies by hiring individuals who possess the desired capabilities to complement existing competencies, and the development of competencies in-house (Rasmussen et al., 2011). This view is supported by the finding that complementary competencies in founding teams positively affect the growth of technology-based firms (Chandler et al., 2005; Colombo and Grilli, 2005).

2.3.2. Contextual perspective

According to the contextual perspective, entrepreneurial competencies are intrinsically embedded in specific cultures and societies (Aldrich and Martinez, 2001). It stresses that entrepreneurial knowledge is not only individually shaped by learning or previous work experience, but also socially constructed by advice from experts, imitation, and copying (Erikson, 2003; Vesper, 1994). Rasmussen et al. (2011), for instance, identify specific pathways by which entrepreneurial competencies are built in university spin-offs. They find that competencies are developed in different ways and require inputs from different actors. Context, such as differences in initial departmental support, can therefore significantly impact on the evolution of entrepreneurial competencies (Rasmussen et al., 2014). This in turn highlights the importance of paying attention to inhibiting mechanisms that constrain the development of entrepreneurial competencies.

The contextual perspective emphasizes the need to better understand *how* context influences entrepreneurial competency development. However, even though the entrepreneurship literature has acknowledged contextual influences on entrepreneurial success for some time (Aldrich, 1999; Aldrich and Fiol, 1994; Thornton, 1999; Ucbasaran et al., 2001; Van De Ven, 1993; Welter, 2011), research on these is still considered a major gap in the literature (Autio et al., 2014; Pilegaard et al., 2010; Zahra and Wright, 2011). Based on an extensive review of contextualized views on entrepreneurship, Welter (2011) suggests that investigations considering difficult to operationalize impacts from institutional, social, or spatial contexts on entrepreneurial behavior are particularly lacking. While specific research into contextual influences on the development of entrepreneurial competencies is sparse, the wider entrepreneurship literature provides indicative evidence on how context influences academic entrepreneurship.

Academic entrepreneurship, the setting of our study, is characterized by its knowledge-intensive industry context and is particularly shaped by its institutional, organizational, and social contexts (Autio et al., 2014; Grimaldi et al., 2011). Researchers have studied institutional and organizational effects on academic entrepreneurship to better understand its antecedents (Grimaldi et al., 2011). Nelson (2014) finds that organizational context shapes both the decision to engage in entrepreneurship and the approach taken to commercialization. He describes how a university context led a team of academic entrepreneurs to place more emphasis on novelty and exploration, whereas the same team paid more attention to practical value and exploitation in a commercial spin-out context. There is also evidence that different internal university rules and regulations affect entrepreneurial intentions of academics (Huyghe and Knockaert, 2015) and spin-off activities (Nosella and Grimaldi, 2009). University rules and regulations include internal policies granting academics leave to start a new venture (Caldera and Debande, 2010), the availability of entrepreneurial support in the form of guidelines for business-plan preparation (Muscio et al., 2016), and inventor ownership (Kenny and Patton, 2008). However, as Fini et al. (2017) show, changes in institutional framework conditions do not always lead to the desired results. They find that top-down institutional changes at national and university levels to promote commercialization tend to increase the quantity of spin-offs, but not necessarily their quality. Goldfarb and Henrekson (2003) come to a similar conclusion and question the overall effectiveness of top-down institutional changes to stimulate academic entrepreneurship, especially if universities are faced with conflicting incentives and academic entrepreneurs are exposed to disincentives in their university environment. Other scholars highlight the protracted and dynamic process of institutionalizing commercialization practices in universities (Clark, 1998; Lockett et al., 2005). Institutional and organizational contexts can therefore have both facilitating and constraining effects on entrepreneurship (Dobrev and Barnett, 2005; Ucbasaran et al., 2001; Welter and Smallbone, 2011).

Researchers have also explored how multiple layers of social context influence academic entrepreneurship. Academic entrepreneurship is affected by a region's knowledge and resources infrastructure (O'Shea et al., 2005; Stam, 2007; Van De Ven, 1993), including the availability of business schools (Wright et al., 2009), science parks (Caldera and Debande, 2010; Phan et al., 2005), venture capital (Di Gregorio and Shane, 2003), and local industry composition (Baldini, 2010). Social networks, in particular, are viewed as critical to entrepreneurship and entrepreneurial performance (Mosey and Wright, 2007; Murray, 2004; Nicolaou and Birley, 2003). However, as Hayter (2016a) points out, there is a need to better understand how social context enables or constrains entrepreneurship, and how networks impact entrepreneurial

activities at critical junctions of the entrepreneurial journey. In the context of academic spin-offs, for instance, Kenney and Goe (2004) find that being embedded in a department with a supportive entrepreneurial culture can help to counteract disincentives created by less-supportive university environments. As Hayter (2016a) reminds us, entrepreneurs may be in the "right" network, but they might not necessarily receive sufficient information or resource flows. He also points out that, while social networks may initially benefit spin-off formation, they might later constrain its development if they have not evolved with the venture. Similarly, the position and role of technology transfer offices (TTOs) in stimulating and supporting venture creation at universities must be taken with a grain of salt. While well-performing TTOs at leading universities can support spin-out companies (Lockett et al., 2003), TTOs' effectiveness is plagued by divergent interests (O'Kane et al., 2015) and they only seem to play a marginal role in driving academics to start a venture (Clarysse et al., 2011).

From a conceptual point of view, it follows that contextual factors provide nascent entrepreneurs both with opportunities and boundaries, and can exert direct and indirect influences (Autio et al., 2014; Welter, 2011). Considering contextual factors not only draws attention to their potentially intertwined nature, but also highlights what Welter (2011, p. 171) terms the "dark sides of context". This observation refers to tendency in entrepreneurship research to focus primarily on the positive effects of context, but to ignore contradictory or negative effects. For example, socio-spatial embeddedness may facilitate trust at the local level, but could also result in closed local networks (Johannisson and Wigren, 2006). While the wider entrepreneurship literature has made some good progress in exploring positive and negative effects of context on academic entrepreneurship, context remains "some kind of kitchen sink dumping ground" (Pollitt, 2013, p. 95). What is lacking is scholarly work that investigates not only key contextual factors on the development of entrepreneurial competencies, but also research that recognizes their interrelationships and potentially contradictory (Aldrich and Martinez, 2001; Welter, 2011; Zahra et al., 2014) and inhibiting effects (Rasmussen et al., 2014).

In summary, the entrepreneurship literature highlights the need to better understand how entrepreneurial competencies develop. However, it presently falls short in explaining, empirically and conceptually, how individual and contextual factors work together as new ventures evolve and develop (Welter, 2011; Zahra et al., 2014). The imperative to better understand these influences not only necessitates a more detailed description of key factors influencing the development of entrepreneurial competencies, but it also requires a framework explaining how individual and contextual factors jointly shape competency development. Only if their impact on entrepreneurial competency development is better understood can research make progress in developing a more integrated perspective of the entrepreneurship process (Autio et al., 2014; De Carolis and Saparito, 2006; Nelson, 2014; Zahra, 2007; Zahra et al., 2014).

3. Research methods

As is typical for grounded approaches to theory building (Suddaby, 2006), we entered the field with an understanding of preliminary theory on our focal phenomenon – in this case, the development of entrepreneurial competencies. At the same time, we were also aware of the dynamic and challenging process of field research as new patterns emerge during data collection and analysis (Edmondson and Mcmanus, 2007). In recognizing the need for creative and novel research that studies the focal phenomenon in its natural contextual setting (Zahra et al., 2014), we chose to pursue our examination inductively relying on an interpretative approach. Interpretive research focuses on building an emergent theory from a perspective that gives voice to the interpretations of those living an experience (Van Maanen, 2011). As we examined the process of entrepreneurial competencies development, the interpretation of meaning by social actors is paramount, making a multi-method qualitative case-study theory building approach (Eisenhardt, 1989; Yin, 1994) "most suited […] to understand the process by which actors construct meaning out of intersubjective experiences" (Suddaby, 2006, p. 634). Qualitative data afforded us the opportunity to gain a rich understanding of context, and to focus our efforts on the questions of "how" and "why" (Langley, 1999) – specifically, how and why (or rather why not) does the process of entrepreneurial competency development occur in academic settings?

3.1. Research context

As we are interested in the interrelated dynamics of individual and contextual processes shaping entrepreneurial competencies, intimate knowledge of institutional contexts and social practices were important. This is why we chose the University of Oxford as a setting for our examination, since it not only allowed us to observe the creation of new ventures, but also because we understood its culture and social practices. The university is an insightful and "particularly revelatory" case (Eisenhardt and Graebner, 2007, p. 27) due to the fact that it was one of the first to adopt a comprehensive IP policy in the United Kingdom, a country regarded as a European leader in research commercialization (Fini et al., 2017). As we will explain below, the University of Oxford has been increasingly active in research commercialization and the creation of spin-out companies over the past 20 years (Smith and Ho, 2006). In its 2008/09–2012/13 strategic plan the university describes itself as having "arguably one of the most successful technology transfer operations in Europe".

While the University of Oxford is one of the oldest universities in the world with a strong tradition in and emphasis on teaching and research, institutionalized research commercialization and entrepreneurship have emerged only relatively recently in the university's long history, a development which is true for most universities in the United Kingdom. This is reflected in the 2008/09–2012/13 strategic plan of the University of Oxford that emphasized, first and foremost, the University's mission to "achieve and sustain excellence in every area of its *teaching and research*" (emphasis added). Research commercialization and entrepreneurship are considered auxiliary activities and only included as parts of the University's wider objective to "make further significant contributions to society, regionally, nationally and internationally, through the fruits of its research and the skills of its graduates, its *entrepreneurial activities* and policy leadership, and its work in continuing education" (emphasis added).

The relatively recent interest in research commercialization is reflected in the number of spin-out companies from the university. Between 1988 and 1997, only eight companies had been spun-out – less than one company per year. A decade later, this number increased almost sevenfold to 54 new ventures between 1998 and 2007. There was no year with fewer than four newly created companies during this period. Since 2008, this rate has remained stable, with an additional 20 spin-outs founded until 2012. Nonetheless, the formation of a new venture at the University of Oxford remains a relatively rare occurrence given the University's resources and number of staff. Per annum, less than 0.5% of academic staff decide to create a spin-out, which is comparable with findings from other universities in the United Kingdom and the United States (Harrison and Leitch, 2005; Shane, 2004).

3.2. Data collection

One of the key challenges of studying the development of entrepreneurial competencies in the field, prior to venture formation, is to identify nascent entrepreneurs. As no spin-out company has been created yet, nascent entrepreneurs – initially – can only be identified based on their self-reported intentions. Intentions are suitable proxies and predictors of planned behavior when "behavior is rare, hard to observe, or involves unpredictable time lags" (Krueger et al., 2000, p. 411). If

such conditions are present, intentions can offer critical insights and offer an opportunity to explain and predict entrepreneurial activity (Ajzen, 1991; Krueger et al., 2000; Zhao et al., 2010). Given the small number of spin-out companies created at the University of Oxford each year, and the associated involvement of only a limited number of staff, entrepreneurial intentions seemed reasonable indicators in our setting. Furthermore, because we are interested in how individual and organizational levels interrelate, we sought data from multiple sources and levels, thereby allowing triangulation (Singleton and Straits, 2010). We were able to collect data from both the entrepreneurs and the organization in which these entrepreneurs worked (and, due to the college system, also often lived) by using three techniques: (1) semi-structured, one-on-one interviews, (2) written and electronic documentation, and (3) participant and non-participant observation. All three sources of data were important to our approach and understanding, as these allowed us to triangulate individual accounts and the meaning of events (Jick, 1979; Miles and Huberman, 1994).

3.2.1. Semi-structured interviews

A first source of data was semi-structured interviews conducted with 55 people involved with entrepreneurship at the University of Oxford in 2009 and 2010 (c.f., Tables 2 and 3). We conducted in-depth interviews to gain insights into how individuals viewed and experienced the process of obtaining entrepreneurial competencies (Heyl, 2001; Spradley, 1979). Self-assessment of competencies has been found to be a useful indicator of entrepreneurial competencies (Chandler and Jansen, 1992). 28 of the interviewees were nascent entrepreneurs with the self-reported intent of pursuing the formation of a spin-off venture. 16 of the interviewees were experienced (i.e., formerly nascent) academic entrepreneurs who had progressed to establish at least one spin-off company. 11 interviewees were people supporting entrepreneurship within the university (e.g., administrators or employees of the TTO). This selection of interviewees allowed us to obtain insights about entrepreneurial competency development from multiple perspectives and temporal stages: those who intend to create a spin-off company, those who have done it, and those who support this pursuit.

Access to the interviewees was obtained through multiple avenues. We obtained access to participants by deeply embedding ourselves in the organization's entrepreneurial culture and attending events and workshops pertaining to entrepreneurship. We also asked friends and colleagues at the University of Oxford if they knew of any staff working on a business idea for a spin-off company, subsequently adopting a snowball sampling technique. Furthermore, the heads of ten departments sent our request for interviews to their staff, which allowed participants to approach us directly. Finally, through the TTO, we were able to get in contact with all 54 spin-off companies founded at the University between 1999 and 2008 and interviewed experienced entrepreneurs from 16 of these companies. Taken together, the 55 interviews varied in duration but averaged 45 min in length. Each interview was either recorded and transcribed verbatim, or involved extensive note-taking during the interview.

3.2.2. Archival documents

A second source of data was internal and external publications by nascent entrepreneurs, departments, the university, the TTO, and the spin-out companies. This included strategic plans, annual reports, course notes, presentations, and guidelines pertaining to entrepreneurship. In total, the secondary data amounted to about 4000 pages. These data were useful as we explored the resources and competencies that were sought by and provided to nascent and experienced entrepreneurs. The data also allowed us to compare accounts and perceptions from interviewees with university policies and guidelines, and hence better comprehend and depict the university context.

3.2.3. Observations

A third source of data was gleaned from our participation in networking events, conferences, and courses organized for entrepreneurs by the university, the TTO, and entrepreneurial grassroots movements at the University of Oxford. We attended four events between 2009 and 2010. Two of the four events lasted for one day each, one program took place over three days, and one course, organized by the Oxford Centre for Entrepreneurship and Innovation, spanned four months. We logged observations in a research journal and compared observations with our other data sources. We observed in situ what was taught and how content was delivered, along with existing organizational structure and culture. The ability to systematically observe actors in various events reduced chance findings and increased reliability (Adler and Adler, 1994). Participant observation deepened our understanding of nascent entrepreneurs, allowed us to observe how they act, and enabled us to better contextualize the data that we collected (Douglas, 1976).

3.3. Data analysis

In analyzing the data, we employed a theory-building approach, which comprised several stages and followed established procedures for analyzing qualitative data (Charmaz and Mitchell, 2001). By using a constant comparison technique (Glaser and Strauss, 1967), we were able to analyze data and also determine sampling and content foci of

Table 2
Overview of interviews.

Number of interviews	Classification	Positions (number)	Departments (number)	Identified through (number)
28	Nascent	(Sen.) Lecturer/Fellow (23) Professor (3) D.Phil. Candidate (2)	Chemistry (5) Engineering (5) Medicine (4) Pharmacology (4) Genetics (3) Physics (3) Zoology (3) e-Research Centre (1)	Experienced entrepreneurs (12) Head of Department emails (8) Nascent entrepreneurs (5) Entrepreneurship events (3)
16	Experienced	Professor (11) (Sen.) Lecturer/Fellow (4) D.Phil. Candidate (1)	Chemistry (4) Pharmacology (3) Engineering (2) Genetics (2) Medicine (2) Zoology (2) Physics (1)	Technology Transfer Office spin-off list (16)
11	Support	Professor (2) (Sen.) Lecturer/Fellow (3) Manager/Administrator (6)	Technology Transfer Office (3) Centre for Entrepreneurship (3) University administrator (3) Entrepreneurship professor (2)	Entrepreneurship events (3) Website profile (3) Recommendation by entrepreneurship professor (3) Recommendation by TTO manager (2)

Table 3
Interview structure.

Section	Theme	Example question types	Insights particularly for
1	Spin-off venture	When, how, and why are entrepreneurial ventures planned/pursued? What difficulties are experienced?	Structural inhibitors
2	Knowledge & skills	What kind of entrepreneurial knowledge is considered to be needed for the spin-off process? What are difficulties in its acquisition?	Structural & Relational inhibitors
3	Social context	What kind of help is sought and received? How? Is it institutionalized? Are there barriers?	Relational inhibitors
4	Institutional context	How does the department and the university handle entrepreneurial ventures?	Cultural-cognitive & Relational inhibitors
5	Academic entrepreneurship	What is the role of academic entrepreneurship in academia and what should it be?	Cultural-cognitive inhibitors

subsequent data collection efforts. Data analysis progressed in three rounds of coding through what is commonly referred to as the Gioia methodology (Corley and Gioia, 2004; Gioia et al., 2013), beginning with individual and situated patterns and advancing to universal themes and theoretical insights. The first round of coding during fieldwork developed descriptive categories through an open coding process across collected data, with a focus on how and why entrepreneurial competency development occurred. We were surprised by the fact that our interviewees frequently mentioned challenges, difficulties, and impediments that we had not seen conceptualized in the literature. Through a creative leap (Langley, 1999), we realized the significance of why entrepreneurial competency development may *not* occur. Given the limited scope of research on barriers to entrepreneurial competency development, an inductive and interpretive approach became particularly suitable.

Reading through our transcriptions and notes, we searched for depictions of challenges, barriers, difficulties, and impediments. We hence recoded the data to identify descriptive categories such as the lack of access to skills and knowledge. A second round of coding then sought to develop more conceptual themes, allowing us to refine the data into six inhibitor categories such as 'distance' and 'mistrust' experienced by nascent entrepreneurs developing entrepreneurial competencies. During the third round of coding using an iterative process, we looked for relationships and comparative themes between the lower order concepts (Langley, 1999) so that we could categorize them into higher-level theoretical themes through axial coding (Corbin and Strauss, 2015). Three dimensions emerged strongly from our data: (1) structural inhibitors, (2) relational inhibitors, and (3) cultural-cognitive inhibitors. These cross-group themes were then developed into theoretical narratives (Golden-Biddle and Locke, 1997) and connected to the relevant literature on entrepreneurial competencies.

4. Findings

Our engagement with the data revealed three emerging inhibitors to the acquisition of entrepreneurial competencies for nascent academic entrepreneurs: relational, structural, and cultural-cognitive inhibitors. These inhibitors aggravate the ability to identify and refine opportunities, the development and integration of resources and skills necessary to nurture the venture, and the building of a broad support group. Table 4 and Fig. 1 offer an illustrative guide to our data structure leading to these categories. A key insight from our findings is that these inhibitors exist at both the individual and the organizational level, and that both levels shape the development of entrepreneurial competencies. In what follows below, we share these findings and highlight how the inhibitors influence competency development of nascent academic entrepreneurs. From there we move onto a discussion of the theoretical implications of our findings and explore how our emergent framework might generalize beyond our setting and, thus, how our theorizing on inhibitors to entrepreneurial competency development advances the entrepreneurship literature more broadly.

4.1. Relational inhibitor

The first inhibitor we identified is relational and consists of dis- & misconnection and distance. At the individual level, it relates to the difficulty nascent academic entrepreneurs experience in identifying the 'right' people. This understanding of 'right' refers to trusted sources outside the organization. It is of particular importance, as scholars simply lack prior engagement with certain professions and their practices, yet such interaction is of direct relevance for the development of entrepreneurial competencies. At the organizational level, nascent entrepreneurs feel distant from experienced entrepreneurs, who could guide nascent entrepreneurs outside their area of expertise to help them obtain entrepreneurial competencies.

4.1.1. Dis- & misconnection

Bad connectivity was identified in two ways, as inability to find the right contacts and protection from bad ones. Nascent academic entrepreneurs feel that they do not know whom they should talk to about entrepreneurship. They emphasize that they do not have access to the right networks both in terms of the different professions and the selection within professions. To this effect, a nascent academic entrepreneur remarked:

> "I simply have no clue where the people are that I should talk to. I mean the venture capitalists, the lawyers, the marketing people. I am not even entirely sure who should be on this list. It's like a double unknown. What kind of people should I talk to? What are the right kind of people?"

Experienced academic entrepreneurs accentuate the importance of protecting nascent academic entrepreneurs from bad contacts. This highlights the process dimension of entrepreneurial competency development, as this insight was largely missing among nascent academic entrepreneurs but had been learned by experienced academic entrepreneurs. Experienced academic entrepreneurs stress the different mindsets of various professions and the importance of finding competent and trustworthy investors, lawyers, and accountants, as illustrated by the following statement:

> "…in that transition period when you have a good idea and when you actually commercialize it, there are a lot of traps for the unwary and the inexperienced which of course scholars and academics generally are. There are lots of people around that will try and gobble you up, bite of a lot of flesh to write a business plan or whatever it is. […] So there are a lot of people around that appear to be helping you, but actually know that you as a scientist entrepreneur are very naïve…"

There seems to be a notable distrust, at times almost hostility, towards people and professions outside the organization. We found that informants displayed a strong sense of 'us versus them'. They feel threatened and deceived by people and professions operating on principles they do not understand or share. During our fieldwork, this sentiment came through quite explicitly and was manifested in statements such as: "I think the legal profession basically is running a scam"

Table 4
Characteristics of inhibitors and illustrative quotes.

Inhibitors	Characteristics	Illustrative quotes
Relational inhibitor	Barrier to reach right people, lack of protection from harmful contacts, and lack of organized linkages.	**Dis- & misconnection**: "On the whole, I think, my experience of entrepreneurship that I have gained is that there are an awful lot of people who charge an awful lot of people for doing fuck all." (Experienced academic entrepreneur) **Distance**: "I could not tell you today, right now, who of my colleagues are working on a potential spin-out company." (Nascent academic entrepreneur)
Structural inhibitor	Difficulty to obtain skills/process knowledge and to systematically integrate entrepreneurship into academic remit.	**Non-access**: "Academics lack expertise to sustain a business and venture skills to grow a company." (Support staff) **Non-integration**: "I have not seen a [university] model. It looks to me as though the risk is on the academic. […] If it doesn't work, you are kind of screwed for your career." (Nascent academic entrepreneur)
Cultural-cognitive inhibitor	Impediment to share insights into venture due to potential for financial loss or harm to academic career.	**Mistrust**: "Academics face a dilemma of sharing versus secrecy. As scholars, they wish to share their findings. As entrepreneurs, they may need to hide them." (Support staff) **Skepticism**: "The view is: academics on the whole are in the business of teaching and fundamental research, they are not in the business of being entrepreneurs. Full stop. It is a sideline at best." (Experienced academic entrepreneur)

or "venture capitalists are bastards". Importantly, some experienced entrepreneurs included the TTO in their criticism describing it as "a bit greedy", "trying to get that money a little bit early", and having a "Janus face", because it represents both the academic and the University at the same time. Similar criticism was mentioned informally at two events. Experienced academic entrepreneurs therefore want not only to help nascent entrepreneurs to find contacts – a need also acknowledged by nascent academic entrepreneurs – but also to prevent nascent entrepreneurs from connecting with bad contacts. These difficulties serve as relational inhibitors because nascent entrepreneurs do not know how to proceed and whom to approach. Experienced academic entrepreneurs sometimes bridge these inhibitors by opening up their own networks to nascent academic entrepreneurs interested in pursuing a venture. As an informant states:

> "I have done things like help them [nascent academic entrepreneurs] find a management team, I put them into contact with people I know who have been in other spin-out companies."

Many informants stress the need for further means to connect entrepreneurs, to institutionalize exchanges, and to systematically share experiences. They suggest email exchange, user groups, regular meetings, a forum, and informal and formal networks. One person put it like this:

> "It would be really good if there was some form of informal University network between people who are doing spin-outs and things like this because from that point of view seeing what is out there […] So, a sort of informal entrepreneurs' network within the University would be quite useful."

4.1.2. Distance

Academics who have pursued entrepreneurial ventures are seen as an important source of support to provide knowledge, contacts, and motivation to develop entrepreneurial competencies. Interviewees seek help, guidance, encouragement, and mentoring. One informant states:

> "Five minutes with someone who has done it before would pretty much summarize that up. […] From someone who has been through it rather than from someone who just knows the literature back to front."

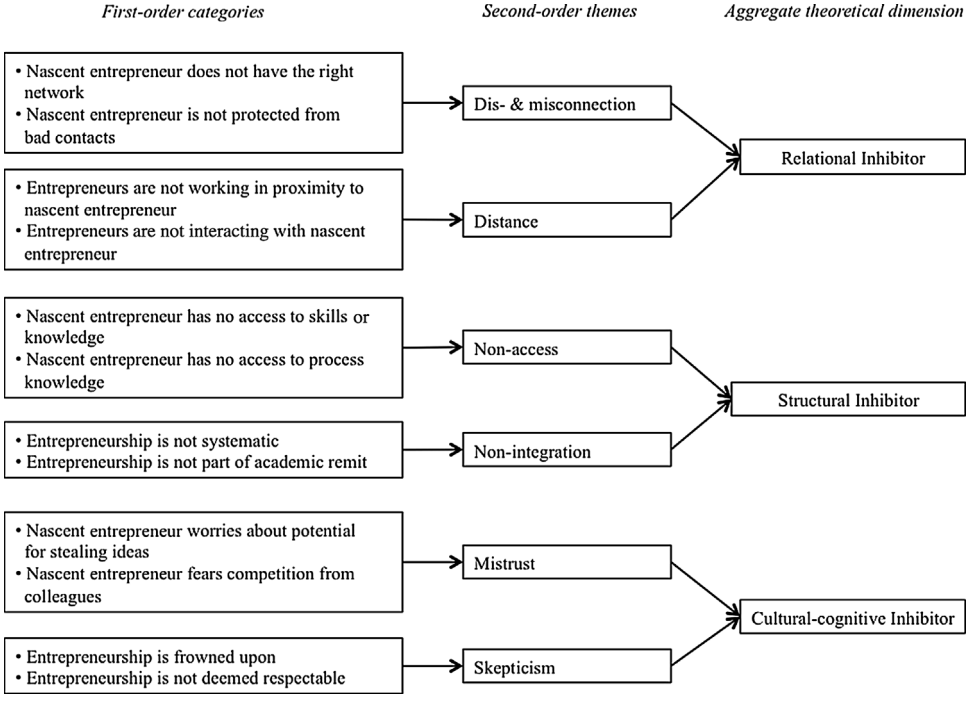

Fig. 1. Data structure.

However, informants report difficulties in finding experienced entrepreneurs. This is somewhat surprising, because at Oxford University academics are typically not only embedded in a department but also in a college. There are 38 colleges at the University of Oxford and all teaching staff and students studying for a degree at the University must belong to one of the colleges. Each college is an autonomous, self-governing entity within the university and not only provides houses of residency but also has substantial teaching responsibilities. Given that academics at Oxford are members of both a department and a college, their social network should be reasonably wide. A wide network per se might not necessarily be relevant for entrepreneurial competency development. There is also a strong (albeit small) entrepreneurial scene at Oxford, which again raises questions as to why nascent academic entrepreneurs find it difficult to identify and approach experienced entrepreneurs. Informants emphasize that interactions often happen serendipitously:

> "I am in a fortunate position in that I am particularly close to someone who is an extremely successful serial entrepreneur. For people that work in an area like mine that didn't have that provision it would be much, much harder."

Nascent academic entrepreneurs have difficulty in identifying other entrepreneurs and building a conversation with these entrepreneurs. They regard it as difficult to know who and where academic entrepreneurs are. They find that they have no way of identifying who an academic entrepreneur is apart from asking people directly to possibly name an academic entrepreneur. A nascent entrepreneur noted:

> "If I knew that there were people out there who kind of opening themselves up, and saying I would like to advise people in the same situation I was a few years ago. I would like people to benefit from my experience. That is the biggest help I think I could have. It is just knowing that this person is expecting to be asked questions about how they set themselves up as an entrepreneur and how they made a success of it. Maybe I am just a bit too shy, but I find it quite difficult to approach people. It would be nice to just know that there are people out there who make themselves available to that kind of questions."

Even though our informants consider the role of other entrepreneurs as guides, mentors, or advisers as helpful for the pursuit of their entrepreneurial activity, only a limited exchange takes place. The process of entrepreneurial competency development of nascent entrepreneurs through learning from experienced entrepreneurs therefore becomes serendipitous at best.

4.2. Structural inhibitor

The second inhibitor is structural and consists of lack of access and integration. At the individual level, nascent academic entrepreneurs emphasize their difficulty in accessing important knowledge and skills, such as information about entrepreneurial finance and strategy, and negotiation and communication skills to develop entrepreneurial competencies. At the organizational level, they experience ambiguity about the role of entrepreneurship within their department. This creates unease, which inhibits their ability and desirability of an entrepreneurial pursuit and the development of entrepreneurial competencies.

4.2.1. Non-access

Informants emphasize the lack of access to entrepreneurial skills and knowledge about the entrepreneurial process. Within their departments, they often feel isolated from entrepreneurial practices and pursuits. They stress the importance and difficulty of accessing and learning certain skills such as negotiation, marketing, management, communication and presentation skills, as well as acquiring the ability to identify and refine entrepreneurial opportunities. While nascent entrepreneurs are aware of their need for entrepreneurial skills, they feel unable to develop entrepreneurial competencies, given the structural constraints of their settings. As one informant puts it after attending an event on entrepreneurship:

> "An academic needs a skill set and an entrepreneur needs a skill set and these are not the same. […] I am here to learn the skills I need to become a successful entrepreneur. You know, how to negotiate with investors, how to present my business project, and so on."

Nascent academic entrepreneurs are uncertain about the specific process of an entrepreneurial venture, particularly within an organization largely devoted to research and teaching. Their challenge is to integrate learning about entrepreneurship into their work as well as develop a solution in terms of resources, time, focus, and commitment to pursue an entrepreneurial venture within their work settings. The resulting uncertainty about the acquisition of entrepreneurial skills and development of entrepreneurial competencies is expressed in the complaint of this informant:

> "I'd like to do some kind of business with my research, to build a startup. But how? I have read about how to write a business plan and so, but I still feel I lack something to put this theory into practice. I don't really know what steps to take, what to do next. [pause] What business model to take as an academic!"

4.2.2. Non-integration

Our informants sense that entrepreneurship has an ambiguous position within the organization in which they work. For them, the role, significance, and integration of entrepreneurship within their work and career at the University of Oxford is not well specified. The Centre for Entrepreneurship, for instance, is physically and institutionally based within the business school – rather than integrated across departments – and focuses primarily on students. This concern is expressed as follows:

> "In American universities entrepreneurship is much more integral. It would be part of their [professors'] remit, I get grants, I teach students, I spin out companies. […] Here, it is a bit of an add-on. It's nice to have. It is seen as a money-spinner."

They would like to see a more prominent and systematic role, especially as they believe that entrepreneurship may have a directly positive and complementary impact for other organizational goals such as research irrespective of its financial return. This is expressed, for example, as follows:

> "What it should be, it should be much more systematic and seen as a core function of universities, which is to put their knowledge into practice – some people would probably disagree with that."

Different perceptions of academic entrepreneurship amongst scholars impede entrepreneurial competency development, as scholars do not know what role entrepreneurship could and potentially should have in their academic careers. It may, for example, support career progression or serve as a complement to teaching and research, but at the same time it could also be a hindrance. Informants are unsure about how to manage entrepreneurship in addition to existing demands. It is conceived as an addition to, and not a substitute for, other tasks of administration, teaching, and research.

4.3. Cultural-cognitive inhibitor

The third inhibitor is cultural-cognitive. At the individual level, it entails mistrust towards colleagues who might take insights and use them for their own entrepreneurial or academic pursuits. At the organizational level, there is skepticism about academics doing entrepreneurship. Both mistrust and skepticism aggravate openness and transparency as well as dialogue, feedback, and exchange about the entrepreneurial venture, which inhibits the development of

entrepreneurial competencies.

4.3.1. Mistrust

We found that some informants did not interact with other academics within their department interested in entrepreneurship if they were particularly close to their own research, because they were concerned about potential misuse of information. Patents, for example, put a barrier between sharing information, as this academic mentions:

> "Patents are a real control about how much you can say; [not having a patent] inhibits you from talking to people."

Potential competition may constrain the sharing of possibly lucrative entrepreneurial applications of research. There was effectively a two-sided competition: On the one hand, the worry that ideas may be taken to pursue a competing entrepreneurial venture. On the other hand, a concern that other academics might take ideas and publish them as part of their research outputs, hence complicating or even undermining intellectual property (IP) strategies of entrepreneurial pursuits. Proximity of interests therefore does not automatically result in higher levels of trust as a basis for exchange and the development of entrepreneurial competencies. On the contrary, proximity may create mistrust if colleagues sense competing interests:

> "[O]r whether they are weary of competing with me. Because, obviously, the people that I know, the people that have very similar skills, because we work in the same departments and on the same kind of issues."

4.3.2. Skepticism

While mistrust is based on potential competition and intellectual theft between academics interested in commercializing their research, skepticism is based on a potential conflict of values among academics interested in entrepreneurship and those who are not. We found that informants perceive skepticism among some of their colleagues about entrepreneurship within the organization. This is illustrated, for example, in this quote from a nascent academic entrepreneur who is considering pursuing an entrepreneurial venture:

> "It is basically generally frowned upon in the University and certainly in the department. I think, it [having an active interest in entrepreneurship] has not helped me at all and it has really hindered me. Because people just think, you just did that to start a company. I mean, it is very negative kind of vibes I generally get. And you don't get taken seriously as an academic."

Entrepreneurship is considered "impure", as something as part of which "you are selling your soul". It does not seem integrated with and aligned towards the multiple objectives of the organization, but rather conceived as outside the scope of academia. As one informant states:

> "I don't know who is currently an academic entrepreneur and those don't like to say, because it is not respectable."

As a result, nascent academic entrepreneurs attempt to maintain secrecy and do not ask for special allowances, like fewer administrative responsibilities, alternative requirements for tenure, or more flexible or lower teaching loads. Both mistrust and skepticism inhibit entrepreneurial competency development because nascent academic entrepreneurs are less able to discuss their potential ventures with others, and hence receive less feedback and support.

In conclusion to this section, our analysis emphasizes the critical role of relational, structural, and cultural-cognitive inhibitors in shaping the development of entrepreneurial competencies among nascent academic entrepreneurs. The reactions of these entrepreneurs highlight how both individual and organizational levels interrelate in influencing the process of entrepreneurial competency development, with potentially unintended consequences.

5. Discussion

Our findings have a number of implications for our comprehension of entrepreneurial competencies and their development, particularly but not exclusively in academia. In this section, we will explain how our insights contribute towards a classification of inhibitors to the development of entrepreneurial competencies. We will then discuss the multilevel functions of the inhibitors and how our findings contribute to a better understanding of entrepreneurial competency development prior to venture formation. Finally, we will outline the policy implications of our insights, limitations, and future research opportunities.

5.1. Toward a classification of key inhibitors

While entrepreneurship research has made substantial progress in identifying and classifying entrepreneurial competencies (Chandler and Jansen, 1992; Hayton and Kelley, 2006; Man et al., 2002; Mitchelmore and Rowley, 2010; Oosterbeek et al., 2010; Rasmussen et al., 2011), a similar effort in identifying and classifying inhibitors to entrepreneurial competencies has been missing. This is troubling because we know from the entrepreneurship literature that the motivation and decision to start a new venture, as well as subsequent venture development, are shaped by both individual and contextual factors (Clarysse et al., 2011; Gartner, 1985; Gümüsay, in press; Nelson, 2014). At present, however, we only have limited understanding as to which inhibitors affect the development of entrepreneurial competencies, and how this inhibiting process unfolds. This is problematic, not least because research on competencies highlights the intertwined relationship between competencies, such as when the brokering competency enables the discovery of new information on which the innovating competency, in turn, can then draw on (Hayton and Kelley, 2006). Given that entrepreneurial competencies, in addition to individual predisposition and venture contexts, are essential for entrepreneurs to successfully start and grow a venture (Chandler and Jansen, 1992; Man et al., 2002; Rasmussen et al., 2011), making progress in understanding inhibitors to entrepreneurial competencies is therefore crucial. Importantly, entrepreneurial competencies are invariably linked to individual predispositions and venture contexts, but are recognized as a distinct unit of analysis due to their knowledge-based nature which is both individually learned and shaped by context (Danneels, 2002; Rasmussen et al., 2011).

We are contributing a systematic classification of key inhibitors to entrepreneurial competency development. Our classification builds on research that has recognized the importance of inhibitors to entrepreneurial competencies, notably Rasmussen et al. (2014), who identify two mechanisms constraining the development of competencies. They note that "departments did not provide access to academics with prior industrial experience with whom inventors could explore the potential commercial applications of their technologies" (Rasmussen et al., 2014, p. 99). Our findings reveal similar difficulties, which we term 'distance', and support their argument. Second, Rasmussen et al. (2014, p. 99) mention a lack of relationship building with industry actors. We extend this view by including protection from working with bad contacts. We term this mechanism 'dis- & misconnection'. As our findings reveal, distance and bad connectivity can be subsumed under relational inhibitors. These are inhibitors that complicate access and connectivity to key people who could provide help in the development of entrepreneurial competencies.

In addition to relational inhibitors, we classify structural and cultural-cognitive inhibitors as key factors to the development of entrepreneurial competencies. Structural inhibitors are those that aggravate the acquisition of necessary resources to develop entrepreneurial competency. This is because it is difficult to obtain these resources as well as hard to integrate them within the structural constraints set by the organization. Cultural-cognitive inhibitors, in contrast, hinder openness, sharing, and exchange, thereby impeding

Table 5
Classification of inhibitors at individual and organizational levels.

Inhibitor	Individual level	Organizational level
Relational	Dis- & misconnected	Distance
Structural	Non-access	Non-integration
Cultural-cognitive	Mistrust	Skepticism

feedback and support in the development of entrepreneurial competencies. This is because of mistrust and skepticism due to the difficulty of securing IP particularly in early research stages, and a skeptical attitude towards academic entrepreneurship and spin-off ventures in departments.

Our findings reveal how the relational inhibitor entails bad connectivity to various professions at the individual level and a distance problem to experienced entrepreneurs at the organizational level. The structural inhibitor consists of lack of access to skills and process knowledge at the individual level and non-integration of entrepreneurship at the organizational level. The cultural-cognitive inhibitor is composed of mistrust towards colleagues at the individual level and skepticism about the value of entrepreneurship at the organizational level. Table 5 presents our classification of the three inhibitors at individual and organizational levels.

Our classification addresses a significant gap in the literature by providing clarity on key inhibitors affecting the development of entrepreneurial competencies. A lack of focus on inhibiting contextual effects and a more systematic investigation of key contextual factors have been identified as notable weaknesses in the entrepreneurship literature (Pollitt, 2013; Welter, 2011; Zahra et al., 2014). Our classification provides the basis for an organizing framework linking context to entrepreneurial competencies. By considering contextual inhibitors at both individual and organizational levels, we extend contributions that have modeled organizational context as unidirectionally affecting entrepreneurial competencies (Rasmussen et al., 2014).

5.2. Explicating the multilevel functions of inhibitors

Our findings allow us to contribute emerging theoretical insights on how inhibitors to the development of entrepreneurial competencies interrelate at individual and organizational levels. While each type of inhibitor influences the development of entrepreneurial competencies in a different way, our contribution reveals how the three types of inhibitors function together, which is summarized in Table 6.

The relational mechanism impacts on the structural and cultural-cognitive ones. Specifically, the inability to identify like-minded people impedes the ability to form coalitions for cultural-cognitive and structural changes. Relational inhibitors make it difficult to obtain templates and networks to maneuver around existing structures and to build coalitions to change views and perceptions of entrepreneurship. These findings contribute in particular to research examining the role of social networks in providing entrepreneurial competencies for university spin-offs (Rasmussen et al., 2015). Entrepreneurship research emphasizes the importance of belonging to the "right" network (Hayter, 2016a) and building ties that can be transformed for different competency-enhancing purposes during the venture formation process (Rasmussen et al., 2015). However, our findings suggest that relational and structural inhibitors together restrain nascent academic entrepreneurs from forming networks in the first place to develop their entrepreneurial competencies. Furthermore, relational inhibitors reinforce cultural-cognitive barriers to hinder changes in how entrepreneurship is perceived by nascent entrepreneurs within a university. Our findings advance Nelson's (2014) argument that academic entrepreneurs' perception of a university's presumed explorative role substantially affects their venturing behavior. We show that by reinforcing each other, relational and cultural-cognitive barriers make it difficult to change this perception, which in turn makes it difficult for both the academic entrepreneurs and the organization to switch from explorative to exploitative modes (March, 1991).

The structural inhibitors reinforce relational inhibitors by constraining the ability and incentive to identify and build relationships with professions and experienced entrepreneurs. They also work together with cultural-cognitive inhibitors to hinder the acquisition of resources and the building of alliances to drive perceptual change, which could bring about overall cultural legitimacy. These findings contribute in particular to research that stresses the positive role experienced entrepreneurs can play for nascent entrepreneurs in developing their competencies (Mosey and Wright, 2007). Although it makes considerable sense for nascent entrepreneurs to reach out to experienced entrepreneurs and specialized professions outside academia (Franklin et al., 2001), reinforcing inhibitors offer an explanation for why nascent academic entrepreneurs struggle with such an approach.

The cultural-cognitive inhibitors reinforce relational inhibitors to hinder the identification of relevant relationships to build entrepreneurial competencies, as nascent academic entrepreneurs fear competing interests from colleagues, and cultural-cognitive inhibitors work with structural inhibitors to limit the ability to challenge existing structures that negatively impact on the development of entrepreneurial competencies. These findings contribute to research showing rising levels of secrecy among academics in universities, due to an increasing focus on patenting and commercial outcomes, which impedes cooperation and information sharing (Hong and Walsh, 2009; Walsh and Huang, 2014). Interestingly, our findings suggest that cultural-cognitive and relational inhibitors together make it particularly difficult to develop entrepreneurial competencies. By avoiding proximity with colleagues and people with relevant expertise, who have potentially competing interests, nascent academic entrepreneurs potentially hinder their own entrepreneurial competency development. In other words, secretive behavior not only harms academic results as argued by Hong and Walsh (2009), but also the development of entrepreneurial competencies. Hence secretive behavior might backfire and also restrain entrepreneurial success, rather than promoting it. A similar dynamic seems to unfold in how cultural-cognitive and

Table 6
Inhibitor mechanisms.

To:	Relational	Structural	Cultural-cognitive
From:			
Relational	Aggravates introduction to beneficial contacts	Limits coalition building and networks to overcome structural barriers	Limits coalition building and networks to overcome views and perceptions of entrepreneurship
Structural	Limits identification potential of beneficial contacts, in particular experienced entrepreneurs at the university	Hinders integrative structures and knowledge access, which impedes systematic inclusion of entrepreneurship	Restricts incentives and resources to change attitudes
Cultural-cognitive	Discourages relationship identification and building	Reduces capability and interest to challenge existing structures	Promotes lack of transparency across and between individual and organizational levels

structural inhibitors work together in weakening organizational support for entrepreneurship. These inhibitors lead nascent academic entrepreneurs to avoid asking for special allowances (e.g., fewer administrative responsibilities, alternative requirements for tenure) to meet traditional Mertonian norms about the separation of science from commerce (Lam, 2011). A less vocal commitment to entrepreneurship, however, seems to manifest itself in less organizational support for the development of entrepreneurial competencies.

5.3. Implications for policy

In the past 20 years, public policies in the United Kingdom and elsewhere have put expectations and pressures on universities to become more entrepreneurial and strategic (Deiaco et al., 2012; Grimaldi et al., 2011; Minshall et al., 2016; Siegel and Wright, 2015). Universities are asked to generate and demonstrate "impact" (HEFCE, 2015; Nature, 2013) and create and capture income from their intellectual activities (Hughes and Kitson, 2012; Shane, 2004; Siegel and Wright, 2015). Spin-offs represent not only a particularly visible form of academic entrepreneurship and a formal IP right vehicle (HEFCE, 2016), but they also play an important economic role. The problem is, however, that spin-off activities by academic entrepreneurs, both from the top 25% and the top 50% of universities in the United Kingdom, have been declining for the best part of the last 15 years (Wright and Fu, 2015). While some academic spin-off activities may deliberately (Perkmann et al., 2015) or accidentally (Huyghe et al., 2016) bypass universities' transfer practices and take place outside the bounds of academic organizations, the data still raise questions as to universities' ability to stimulate, support, and grow spin-off activities. There seems to be, in short, a notable discrepancy between ambition and reality when it comes to spin-off activities at universities (Harrison and Leitch, 2005; Siegel and Wright, 2015).

It is in this context that our contribution offers new insights for policy. As Autio et al. (2014) as well as Zahra and Wright (2011) highlight, given that policy action seeks to influence entrepreneurial activity by manipulating the contexts in which individuals choose to act or not (Audretsch et al., 2007), it is surprising that contextual influences have been relatively neglected by the literature on entrepreneurial competencies. Our study highlights that policy makers seeking to support academic entrepreneurship need to appreciate inhibitors to the development of entrepreneurial competencies at universities. Policies aimed at enabling and encouraging the commercialization and dissemination of research through entrepreneurial ventures have to address both individual and organizational levels as well as structural, relational, and cultural-cognitive challenges. Two policy areas in particular benefit from our research, namely efforts to upskill and decentralize entrepreneurial competency development, and efforts to comprehensively incentivize nascent academic entrepreneurs.

5.3.1. Decentralizing entrepreneurial competency development

Research by Huyghe et al. (2016) suggests that less than half of the academics in their sample of 3250 researchers from 24 European universities were aware of the TTO at their university. From a policy point of view this is troubling because TTOs are one of the most prevalent initiatives at university level to support spin-out creations (Lockett and Wright, 2005). They are also considered a primary locus of entrepreneurial competencies (Fini et al., 2017), though their capabilities (Clarysse et al., 2005) and legitimacy (O'Kane et al., 2015) are subject to some debate. Given the mixed evidence on TTOs' ability to develop entrepreneurial competencies, Fini et al. (2017, p. 379) recommend that universities should "develop capabilities within their entire organization and surrounding ecosystem" to support high-quality spin-offs. An example would be decentralized and coordinated knowledge intermediaries like an entrepreneurship ombudsman across a university ecosystem (Hayter, 2016b). Our findings contribute to this line of thought by highlighting how nascent academic entrepreneurs try to locate and access entrepreneurial skills and knowledge across and outside their university. We show and explain some of the struggles nascent entrepreneurs experience in connecting with actors within and outside the university (e.g., investors, lawyers, business advisors).

A policy implication that follows from these insights is that wider access to entrepreneurial competencies must be accompanied by the unambiguous integration of entrepreneurship across organizational levels. This may require different forms of engagement from universities and their TTOs. Most TTOs are currently positioned as entrepreneurial competency hubs. A hub model, however, is a relatively centralized form of intermediating information and interactions. It places considerable demands on a relatively small number of TTO staff, which potentially creates bottlenecks and complicates interaction between nascent academic entrepreneurs and external actors (Lockett et al., 2003). An alternative arrangement could be a more distributed model, akin to innovation-inspired platforms (Gawer and Cusumano, 2014). External and complementary actors could be authenticated by and affiliated with a common university platform, but their interactions with academics would not be directly controlled and managed by TTO staff. Such a distributed model would ease dependency on the capabilities of the TTO (Clarysse et al., 2005), attenuate TTO identity problems (O'Kane et al., 2015), and grow a university's entrepreneurial competency ecosystem by bringing on board a wider range of specialized and market-based actors, which would help with visibility issues (Huyghe et al., 2016) and support high potential venture formation (Shane, 2009).

5.3.2. Incentivizing nascent academic entrepreneurs

Our findings show that mistrust is an important cultural-cognitive inhibitor, which results in secretive behaviors and impedes the development of entrepreneurial competencies. The concern that academic entrepreneurship negatively impacts on openness and public scientific activities has occupied researchers and policy makers for some time (Haeussler, 2011; Heller and Eisenberg, 1998; Owen-Smith, 2003; Powell and Owen-Smith, 1998; Shore and McLauchlan, 2012). However, it remains difficult for policy makers to discern how different enablers and inhibitors affect the behavior of academic entrepreneurs and the development of entrepreneurial competencies. IP rights are a case in point. On the one hand, Van Looy et al. (2011) find that publication outputs are positively correlated with spin-offs, contract research, and patenting. Technology development activities, in turn, have been found to positively correlate with publications (Carayol, 2003; Van Looy et al., 2006), potentially indicating some form of Matthew effect (Merton, 1968). Findings by Gans et al. (2017) suggest that IP rights and races for priority can lead to more disclosure and openness in science, even in commercial settings. On the other hand, even though inventor-ownership is considered conducive to academic entrepreneurship (Bramwell and Wolfe, 2008; Kenney and Patton, 2009, 2011), Goldfarb and Henrekson (2003) put forth the argument that IP incentives are not sufficient for academic entrepreneurship if individuals face disincentives at university level. Recent findings by Walter et al. (2016) seem to support this view. Based on survey and patent data they suggest that organizational norms detrimentally affect academic entrepreneurs' patenting behavior if the university lacks appropriate IP capabilities.

Our findings extend these policy insights by providing a multi-dimensional view of how inhibitors at individual and organizational levels interact. We show that individual fears of IP theft or misuse are accompanied by an awareness of organizational cultures that disapprove of entrepreneurship, which together hamper the development of entrepreneurial competencies and academics' endeavors to commercialize their research. From a policy stance, this gives credence to the view that incentives at the individual level must be consistent with contextual factors at the university level. While university policies tend to support spin-offs, we know that organizational structures and cultures are often not well aligned (Haeussler and Colyvas, 2011;

Perkmann et al., 2013). As inhibitors are mutually reinforcing, however, effective policies do require a comprehensive approach to encourage and enable entrepreneurial competency development.

5.4. Limitations and future research

A focus on inhibitors, and the effects those have, provides new insights into the process of entrepreneurial competency development in particular, but not exclusively, in academia. As Lincoln and Guba (1985) remind us, theory emerging from interpretative research can be transferred to contexts sharing key characteristics. In this sense, we believe our setting is transferrable to and representative of other large organizations both within and outside academia, and that our theoretical framework can serve as a springboard for more theorizing on the process of entrepreneurial competency development. For further validation and refinement, we recommend, first, that inhibitors should be examined in other university, industry, and national settings. Future research should also delve into the contextual specificities of these inhibiting mechanisms and the policies that target them.

Second, we have argued that organizational and individual-level mechanisms underpin the development of entrepreneurial competencies. Interestingly, some of these mechanisms unfold in unexpected ways, almost as side effects with unintended consequences. For example, patents are an important commercialization instrument used by the university and many spin-out companies to protect and capture value from inventions (Teece, 2006). Yet, as we discussed, the need to patent inventions also negatively affects nascent entrepreneurs as it creates mistrust and complicates entrepreneurial competency development. A next research step is to pay closer attention to these unintended, almost paradoxical, consequences and the trade-offs they create.

Third, nascent entrepreneurs' awareness of inhibitors to competency development – prior to experiencing those themselves – may deter (or in some cases encourage) them to pursue entrepreneurial endeavors. Future research investigating this effect therefore has the potential to make important contributions to our understanding of other antecedent processes of entrepreneurial competency development.

6. Conclusion

In this article, we have classified inhibitors to the development of entrepreneurial competencies into relational, structural, and cultural-cognitive inhibitors, shown how these inhibitors exist both at individual and organizational levels, and also explicated the multilevel functions of inhibitors to the development of entrepreneurial competencies. These insights highlight the need for a considerate and comprehensive approach by practitioners and policy makers to challenge inhibitors and facilitate entrepreneurship – particularly in university settings.

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