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# Colocation of Entrepreneurs and New Firm Survival: Role of New Firm Founder's Experiential Relatedness to Local Entrepreneurs

**Sam Tavassoli** (sam.tavassoli@rmit.edu.au)
RMIT University, Melbourne, 3000 VIC, Australia
CIRCLE, Lund University, Sweden
**Viroj Jienwatcharamongkhol** (viroj.jienwatcharamongkhol@bth.se)
Blekinge Institute of Technology, Karlskrona, Sweden

**Pia Arenius** (pia.arenius@rmit.edu.au)
RMIT University, Melbourne, 3000 VIC, Australia

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# Colocation of Entrepreneurs and New Firm Survival:

## Role of New Firm Founder's Experiential Relatedness to Local Entrepreneurs

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**Sam Tavassoli** [a,b*], **Viroj Jienwatcharamongkhol** [c], and **Pia Arenius** [a]

[a] School of Management, College of Business & Law, RMIT University, Melbourne, Australia
[b] Centre for Innovation Research (CIRCLE), Lund University, Sweden
[c] Department of Industrial Economics, Blekinge Institute of Technology, Karlskrona, Sweden

** Corresponding Author: Sam.Tavassoli@rmit.edu.au, +61 3 9925 1455*

**Abstract**

Geographical clustering (colocation) influences new firm survival; however, not all new firms within a cluster are impacted equally. In this paper, we elaborate on how the colocation of local entrepreneurs may have different influences on new firm founder's learning depending on his/her *fit*, in terms of his/her experiential relatedness, to that of local entrepreneurs. We then associate such founder's learning with the higher survival of his/her new firm. We test our hypotheses using a matched founder-firm dataset that covers the population of the knowledge-intensive business service sector in Sweden during 2001-2012. We find support for our propositions concerning the relatedness of new firm founders' experiential background to that of local entrepreneurs. Specifically, we find that high level of relatedness to local entrepreneurs enhances the survival rate of a new firm started by a novice founder, whereas intermediate level of relatedness suits better for a new firm started by an experienced founder.

***Keywords*:** Colocation; Entrepreneurial learning; New firm survival; Experiential relatedness; Entrepreneurial performance

## 1. INTRODUCTION

The new firm environment has been recognized as an important factor for new firm survival since the seminal work of Stinchcombe (1965). According to the social-environmental perspective, external factors such as institutional, political, technological, and locational (e.g., clustering) factors all influence new firm survival (Soto-Simeone et al, 2020). Of these, the effects of geographical clustering (i.e., the colocation of economic actors) have been studied particularly in entrepreneurship research and the field of economic geography (Pe'er & Keil, 2013; Wennberg & Lindqvist, 2010; Fritsch et al, 2006; Acs et al, 2007).

Studies consistently show that geographical clustering poses a paradox for entrepreneurship because while the firm birth rate is higher in clusters, the new firm survival rate is lower (McCann & Folta, 2008). Most studies, particularly those concerning new firm survival, have tried to explain this by focusing on the colocation of established firms, competition and congestion effects (Sorenson & Audia, 2000; Staber, 2001; Strotmann, 2007; Plummer et al, 2020). Although insightful, the theoretical lens of the literature remains narrowly defined, i.e., emphasizing established and 'anchor' firms (Feldman, 2003), which has left the effect of the colocation of other cluster actors, such as local entrepreneurs, understudied. Moreover, such (over)emphasis on studying the colocation of established firms might have also driven the extant and dominant view about the negative effect of clustering on new firm survival (e.g., Brixy & Grotz, 2007). We propose that while new firm survival can be negatively affected by the colocation of established firms, due to competition and congestion effects (Sorenson & Audia, 2000), it can be positively affected by the colocation of individual entrepreneurs due to *localized learning* effects. We argue that a new firm founder continues to learn from other local entrepreneurs during the post-emergence stage of his/her new firm, particularly knowledge and skills concerning entrepreneurial processes (Autio et al, 2018). This type of knowledge is distinct from the much studied technological knowledge stemming from established and large firms in clusters (Audretsch & Keilbach, 2007), and it is particularly important for the survival of new firms, as it helps founders anticipate and overcome the challenges inherent in venture development processes (Spigel & Harrison, 2018).

Moreover, while most studies have found negative effects of clustering on new firm survival (e.g., Sorenson & Audia, 2000), some have found positive effects (e.g., Wennberg & Lindqvist, 2010). This inconclusive evidence suggests that the effect of geographical clusters on new firm survival may be dependent upon specific contingencies. Subsequent studies have shown that the clustering effect is indeed contingent on the new firm's internal resources and capabilities (Pe'er & Keil, 2013), the industry in which a new firm is founded (Renski, 2015), and regional factors

(Plummer et al, 2020). However, the contingent effect of the new firm's founder, particularly his/her human capital in terms of experiential background, has received limited attention, despite the rich literature on the direct effect of a founder's human capital on new firm survival (Brüderl et al, 1992; Geroski et al, 2010). We theorize that a *fit* between a founder and his/her local learning environment in terms of *experiential background relatedness* is an important factor that can enhance the founder's learning and can hence positively affect the survival of his/her new firm. Building on learning theories (e.g., Novak & Gowin, 1984; Nooteboom, 2000), we then theoretically and empirically distinguish among different levels of such relatedness. In this way, we elaborate the extent to which the (lack of) relatedness between a founder's experiential background and his/her local learning environment, specifically the cluster of other local entrepreneurs, is (detrimental) conducive to his/her entrepreneurial learning and the survival of his/her new firm.

Our study makes two important contributions to the research on the external environment, particularly geographical clustering, and new firm survival. First, by shifting the focus from the (frequently studied) colocation of established firms to that of local entrepreneurs, we provide fresh theoretical insights into the mechanisms by which a founder may acquire new entrepreneurial process knowledge from other local entrepreneurs and why such knowledge acquisition and learning positively affect the post-entry survival of his/her new firm. In doing so, we correspond to a recent call in the literature for investigations of the circumstances in which the founders of new firms might gain access to and benefit from localized knowledge (Spigel & Harrison, 2018). Second, our paper adds to the small but growing collection of studies that explores contingency factors that condition the effect of clustering on new firm survival. While previous studies have investigated such factors at the level of region (Plummer et al, 2020), industry (Renski, 2015), and firm (Pe'er & Keil, 2013), we focus on the level of individual founders and theoretically and empirically investigate the effect of a *fit* between a founder and his/her local learning environment on the survival of his/her new firm. In doing so, we also take one of the first steps toward better understanding the sorely understudied cross-link between founder characteristics and the local environment in entrepreneurship research (Davidsson, 2020). This is an important step because aggregate-level research (region, industry) often misses varying effects within the same context, while micro-level studies (firm, individual) often neglect the environment altogether (Welter, 2011).

## 2. THEORY DEVELOPMENT

### 2.1. Locational (Geographical Clustering) Effects and New Firms

The effects of location, particularly geographical clusters[1], on new firm survival have been studied in a variety of fields, including regional studies (e.g., Fritsch et al, 2006), management and strategy studies (e.g., Arikan & Schilling, 2011) and entrepreneurship studies (e.g., Pe'er & Keil, 2013). Studies have consistently shown that while clusters boost new firm emergence, they can be simultaneously detrimental for their post-emergence survival (McCann & Folta, 2008) due to competition and congestion effects (Sorenson & Audia, 2000) and nonentrepreneurial employment opportunities for founders within clusters (Folta et al, 2006). Some studies have even found positive effects of clusters on post-entry survival of new firms, particularly when clusters are defined as the colocation of *related* firms (Wennberg & Lindqvist, 2010). Such a positive effect is mainly driven by *agglomeration benefits* in terms of better access to (i) pools of skilled labor for recruitment, (ii) specialized suppliers, (iii) customers (Delgado et al., 2010; Pe'er & Keil, 2013), and (iv) knowledge externalities and associated learning, which could preliminarily spill over from established organizations into nearby new firms (Feser, 2002; McCann & Folta, 2008; Tan & Tan, 2017). The source of such agglomeration benefits for new firms is typically identified as established and large organizations in the region, which are so-called anchor firms (Feldman, 2003).

Another less studied source of agglomeration benefits is the colocation of small and new firms founded by other entrepreneurs in a given location. The entrepreneurial ecosystem literature has recently highlighted that this source of agglomeration benefits from a conceptual perspective (Autio et al, 2018; Spigel, 2017). The presence of many existing local entrepreneurs in a region contributes to the building of support structures for new founders that include networks of investors, advisors, and mentors (Spigel, 2017). More importantly, the agglomeration of local entrepreneurs can be an important source of knowledge externalities and *entrepreneurial learning* for a founder who establishes his/her new firm in a given locality (Maskell, 2001; Malmberg & Maskell, 2006).

### 2.2. Entrepreneurial Learning

Following Holcomb et al. (2009), entrepreneurial learning is the process by which entrepreneurs "acquire new knowledge, including skills and specific competencies [i.e., the 'what' of learning], from experience or by observing others [i.e., the 'where from' of learning], and assimilate and

[1] A geographical cluster is the spatial concentration of economic agents and activities in a region.

organize them with prior knowledge in memory [i.e., the 'how' of learning] to make them retrievable for use in both routine and nonroutine action [i.e., the 'outcome' of learning]" (p.171, brackets added by authors). With regard to the *where from (*or source) of learning, observing others, specifically role model entrepreneurs, is traditionally associated with learning or being inspired (Scherer et al, 1989). The more recent literature associates such learning sources more broadly with learning from any entrepreneur (Lévesque et al, 2009) and from incumbent large firms (Posen & Chen, 2013). The research indeed shows that a significant portion of knowledge gained from learning occurs vicariously (Kim & Miner, 2007) as entrepreneurs learn by modeling the behavior of others (Holcomb et al, 2009). This is in line with the psychology literature, which indicates that people learn many complex behaviors, such as negotiation, helping, and gender-appropriate behavior, through the observation of others (Nadler et al., 2003). In learning-from-others, entrepreneurs can benefit not only from observing successes but also by observing failures and near failures (Kim & Miner, 2007). Learning-from-others can also occur through a variety of mechanisms beyond mere observation, as we will elaborate below.

Entrepreneurial learning-from-others occurs not only more frequently but also more effectively if the learning is *local* rather than nonlocal (Anselin, Varga, & Acs, 1997; Kim & Miner, 2007). According to Kim and Miner (2007), to minimize the uncertainties associated with learning, managers in the US banking industry allocate greater monitoring efforts to similar firms, i.e., their competitors. When competitors are mainly local, for example, in geographically concentrated industries such as the banking industry and knowledge intensive business service (KIBS) industries (Delgado et al, 2016), learning becomes localized more frequently. Moreover, localized learning-from-others is also more effective than nonlocalized learning because in the former case, the scanning cost and information acquisition barriers are lower than those in the latter case (Howells, 2002). In other words, knowledge transfer and associated learning is subject to a distance-decay function according to a stylized fact in economic geography (Karlsson & Olsson, 2006).

### 2.3. Mechanisms for (Entrepreneurial) Learning-from-Others

In this section, we argue that the source of learning based on Holcomb et al.'s definition of entrepreneurial learning can be extended to incorporate a variety of local learning mechanisms. In doing so, we will also clarify *how* learning occurs. Because learning-from-others is largely effective when it is local, as explained above, we build our argument based on the *localized learning* concept drawing from the economic geography literature. The concept of localized learning is at the center of the knowledge-based theory of spatial clustering (Maskell, 2001). The

concept "outlines how local conditions and spatial proximity between actors [e.g., entrepreneurs] enable the formation of distinctive cognitive repertoires and influence the generation…of skills, processes, and products within a field of knowledge [e.g., entrepreneurial process knowledge]" (Malmberg & Maskell, 2006, p.1).

Based on the localized learning literature (Maskell, 2001; Malmberg & Maskell, 2002, 2006) and recent developments in the entrepreneurial ecosystem literature (Spigel, 2017, Autio et al, 2018), a new firm founder may learn from other local entrepreneurs through two main localized learning mechanisms.

*Learning-by-observing.* A new firm founder can learn from other local entrepreneurs by simply monitoring them without interacting with or knowing them, which is often referred to as competitive emulation (Kim & Miner, 2007). In this mechanism, other local entrepreneurs are the source of learning for a new firm founder involuntarily (Autio et al, 2018). As Maskell (2001, p. 929) explained, "it is by watching…and comparing dissimilar solutions that firms and individuals…[in] cluster become increasingly engaged in the process of learning and continuous improvement, on which their survival depends". Such learning-by-observing has been theorized specifically in the context of entrepreneurship, albeit more during the pre-emergence stage of a new firm (Lévesque et al, 2009). For example, as Minniti (2005, p.2) noted, "the larger the number of entrepreneurs she [i.e., a new firm founder] observes,…she learns the ropes of how to find competent employees, inputs at affordable prices, financial support and potential buyers". In its simplest form, such learning-by-observing can involve the copying of a certain behavior, leading to routine actions (Holcomb et al, 2009). In a more sophisticated form, a new firm founder can adapt the observed behavior to his/her own specific needs and context by "observing something and incorporating it in another environment" (Desrochers & Leppälä, 2011, p.880), leading to nonroutine actions (Holcomb et al, 2009). Learning by observing is useful not only for identifying opportunities and obtaining the confidence needed to act upon them (Sorenson & Audia, 2000), but also for running and sustaining a newly established firm during the post-emergence stage (cf. Cope, 2005; Politis, 2005), for example, by enabling a new firm founder to scale-up the number of initial customers or exploit a number of established routines.

*Learning-by-sharing.* This learning mechanism can be either nonreciprocal or reciprocal. Nonreciprocal learning-by-sharing occurs when local entrepreneurs openly, voluntarily and unilaterally share their experiences with others including the new firm founder (Autio et al, 2018). An example of nonreciprocal learning-by-sharing is when local entrepreneurs present and share their business model ideas in the context of a local networking event such as pitch nights in front of audiences including the new firm founder (Busch & Barkema, 2020). Reciprocal

learning-by-sharing occurs when the new firm founder actively engages in bilateral social learning with local entrepreneurs (cf. Bandura, 1986). Examples of reciprocal learning-by-sharing include organized or accidental meetings in coworking spaces or accelerators (Waters-Lynch & Duff, 2019), which typically involve face-to-face interactions (Malmberg & Maskell, 2006). Learning-by-sharing helps the new firm founder gain new knowledge, particularly concerning lean entrepreneurship practices such as effective business model experimentation (Shepherd & Gruber, 2020). Moreover, the occurrence of learning-by-sharing can be amplified if elements of digital technologies are prevalent in the industry (Nambisan, 2017), such as KIBS sector. For example, the majority of entrepreneurs in the Waterloo ICT cluster asserted that they had shared their entrepreneurial journey experiences with each other via digital platforms (Spigel, 2017). Therefore, a new firm founder in the KIBS sector does not merely compete against other local entrepreneurs. In contrast, "[by] exploiting digital platforms for business model experimentation, [entrepreneurs] will have an incentive to share their experiences, as reciprocal sharing of such knowledge will help all occupants of the entrepreneurial ecosystem" (Autio et al, 2018, p.80).

### 2.4. Entrepreneurial Process Knowledge: *What* can be Learned from Others

According to Holcomb et al., the 'what' of entrepreneurial learning refers to "acquiring new knowledge, including skills and specific competencies" (p.171). In this paper, building on the recent advancement in the entrepreneurial ecosystem literature (see Spigel & Harrison, 2018; Autio et al, 2018), we bring forward the concept of *entrepreneurial process knowledge*, as what can be learned from other entrepreneurs. It consists of mainly critical nontechnological knowledge and skills central to new firm survival such as business planning, pitching for investment, and how to act and present oneself to others as part of the legitimation-building process (Spigel & Harrison, 2018; de Clercq & Voronov, 2009). This type of knowledge is important for new firm survival during the post-emergence stage because it helps the founders of new firms anticipate and overcome the challenges inherent in venture development processes, such as developing new products, finding initial customers, and growing firms under severe resource constraints (Spigel & Harrison, 2018). Entrepreneurial process knowledge is similar to the recently proposed 'process skill' in the theory of entrepreneurial agency, which is one of the conditions necessary for entrepreneurial success (McMullen, Ingram, & Adams, 2020). This type of knowledge is also closely associated with "how to be entrepreneurial" (Minniti & Bygrave, 2001, p.6) as well as "learning about small business management" (Cope 2005, p.380).

Entrepreneurial process knowledge can be accumulated from one's own prior entrepreneurial experiences. This type of knowledge can also be acquired from other local entrepreneurs who have built knowledge when starting and running their own firms (Autio et al, 2018). The main focus of this paper is on the latter source of acquiring entrepreneurial process knowledge. Our underlying assumption here is that entrepreneurial process knowledge is largely local knowledge, and the learning processes governing its acquisition can be explained by localized learning mechanisms. The logic for such assumption is based on the type of knowledge in terms of codified versus tacit knowledge. If technological (and more codified) knowledge spillover and learning are geographically bounded and localized (Audretsch & Keilbach, 2007), it can be expected that more nontechnological (and more tacit) entrepreneurial process knowledge is also localized (Howells, 2002).

## 3. HYPOTHESIS DEVELOPMENT

### 3.1. Localized Learning and New Firm Survival

New firms are subject to resource constraints and the liability of newness; hence, the knowledge acquired and the associated learning from the environment are proposed to be vital for their survival (Stinchcombe, 1965; Yang & Aldrich, 2017). The founder of a new firm is "continually learning and developing in relation to his/her business and the wider environment" (Cope, 2005, p.374). Similarly, Politis (2005) highlights how entrepreneurs continuously develop their entrepreneurial knowledge throughout their professional lives. Such continuous learning by a new firm founder increases the survival chances of his/her new firm according to the survival-enhancing learning framework (Baum & Ingram 1998), particularly if such learning stems from other local entrepreneurs (Kim & Miner, 2007).

Several interrelated reasons can explain the positive effect of localized learning-from-others on the survival of new firms. We refer to them as *localized learning effects*. First, the localized learning stemming from the existence of many local entrepreneurs can *reduce ambiguity* for the new firm founder (Minniti, 2005), particularly when he or she goes through a typical period of post-entry experimentation in determining resource mobilization and how to pitch and finance his/her new venture (Duranton & Puga, 2001). Second, the localized learning stemming from the existence of many local entrepreneurs can *boost the confidence* of the new firm founder by giving him/her the energy to maintain a positive attitude when facing the adversities and setbacks often associated with the development of new firm activities (Sorenson & Audia, 2000). Third, through localized learning-from-others, a new firm founder can access local entrepreneurial process knowledge stocks and hence will be able to *bridge the gap* between his/her initial

endowments and the capabilities necessary to effectively compete, which in turn can lead to a higher survival rate of his/her new firm (Posen & Chen, 2013). Empirical studies have reported the positive localized learning effect (Kim & Miner, 2007; Strotmann, 2007) and, more broadly, the clustering effect (Wennberg & Lindqvist, 2010; Pe'er & Keil, 2013; Shu & Simmons, 2018) on the survival of new firms[2].

To build the link between the presence of local entrepreneur clusters and the survival of new firms, our main argument in this paper has evolved around localized learning effects, as discussed above. In addition to such effects, the presence of many entrepreneurs in a region can also increase the survival of a new firm by contributing to the building of a *support structure* for the new firm founder, such as networks of investors, advisors, and mentors (Spigel, 2017). In summary, a cluster of local entrepreneurs constitutes a localized learning environment from which a new firm founder can acquire knowledge, particularly entrepreneurial process knowledge, through two major learning mechanisms. This, in turn, positively affects the survival of his/her new firm through mainly localized learning effects but also through the creation of a support structure. Therefore, our baseline hypothesis is as follows.

*H1: The number of entrepreneurs in a region (i.e., local entrepreneurs) increases the probability of a new firm's survival in that region.*

### 3.2. Enhanced Localized Learning and New Firm Survival: Experiential Background Relatedness

Not all new firm founders within the same region are equally exposed to agglomeration benefits such as localized learning (McCann & Folta, 2011). This, in turn, implies the survival chance differential of new firms even if they are located in the same region (Pe'er & Keil, 2013; Renski, 2015). We argue that a new firm founder must *fit* within the cluster of other local entrepreneurs in terms of having a shared *experiential background* with them to enjoy an enhanced learning experience, for example, in regard to acquiring new entrepreneurial process knowledge. Individuals' experiential backgrounds are shaped and developed in the different physical and social environments in which they have socialized, were educated and have worked (Nooteboom, 2000). Moreover, if individuals have shared experiential backgrounds, then they are not only more likely to attend to learning opportunities that they may present to each other (Golub & Jackson, 2012), but also learn from each other better because they can "…communicate, understand, absorb and process new information successfully" (Boschma

[2] There are also studies that found negative effect of clustering on firm survival driven by competition effects (e.g., Sorenson & Audia 2000). We will deal with such countereffect in our second and third hypotheses.

2005, p. 64). We refer to such shared or overlapped experiential backgrounds among entrepreneurs as *experiential background relatedness* (cf. Sapienza et al, 2004; Makri et al, 2010).

The experiential background relatedness between the source and receipt of information can enhance learning because it improves *understandability* and increases the *learning opportunity* between them (Novak & Gowin, 1984; Nooteboom, 2000). Each of these two reasons is rooted in separate but related theoretical perspectives (cf. Makri et al, 2010). First, learning-from-others often involves the drawing of inferences from noisy information (Denrell, 2003). Consequently, complications with assimilating such information often make learning less efficient, irrespective of the exact mechanism of learning (Holcomb et al, 2009). Nevertheless, according to Novak and Gowin's (1984) 'learning how to learn' framework, some sort of common understanding between the source and receipt of information reduces such assimilation complications and instead facilitates the acquisition, interpretation, and categorization of incoming information (Estes, 1975; Golub & Jackson, 2012). Accordingly, a new firm founder, who, for example, studied software engineering and has been working in the software area of the KIBS sector, can learn better from other local entrepreneurs who have a similar background to his/her own, for instance, when s/he listens to their idea pitch concerning attracting customers for their new app. Such enhanced learning is arguably based on a high level of understandability between these individuals, which is, in turn, due to the similarity of their prior experiential backgrounds and their mental frames, which reflects itself in, for example, similarities in their information funnels, ways of presenting new ideas, and types of targeted customers (Zheng, 2012; Nooteboom, 2006; Westhead et al, 2005). This means that the closer the experiential backgrounds are, the more (enhanced) the learning outcomes will be, which we refer to as a *high experiential background relatedness* between a new firm founder and other local entrepreneurs. Such a high experiential background relatedness is specifically argued to be an important enhancer of localized learning; for example, as Boschma (2005) noted, "people sharing the same … expertise may learn from each other better" (p. 63).

Second, building on Cohen and Levinthal's (1990) absorptive capacity thesis, Nooteboom[3] (2000) reasserts that the experiential background and prior knowledge between two individuals

[3] Cohen and Levinthal's and Nooteboom's theses are predominately evolved in the learning literature around technological knowledge and firm innovation (e.g., Subramanian et al, 2018). However, their original writing has a broader definition of knowledge: "knowledge does not simply include substantive, technical knowledge; it also includes…knowledge of who knows what, who can help with what problem, or who can exploit new information" (p. 133). Moreover, their arguments concern both firms' and individuals' cognition and prior experience. This makes their frameworks suitable for the purpose of this study.

should be close to each other; however, he also makes the point that such background should not be too close because if they are, this closeness may trigger the problem of a lack of *learning opportunity and novelty* (cf. Boschma, 2005, Frenken et al, 2007). Therefore, for enhanced learning to occur, "a tradeoff needs to be made between cognitive [or experiential] distance, for the sake of novelty [i.e., newness and usefulness of incoming information], and cognitive proximity, for the sake of efficient absorption [of incoming information]" (Nooteboom, 2000, p. 153). Accordingly, a new firm founder who, for example, studied software engineering and has been working in the software area of the KIBS sector, can learn better from another local entrepreneur who studied human computer interaction while working in the hardware area of the KIBS sector by combining their hardware and software knowledge to come up with an artificial intelligence app to enhance their initial sales and hence their survival probability. The reason for such enhanced learning is the complementarity of their experiential backgrounds—as opposed to the compatibility of backgrounds in the first perspective above—which allows for new combinations of knowledge (Shenkar & Li, 1999). This means that for enhanced learning outcomes to occur, the experiential backgrounds of two entities should be close to each other but not too close to each other, to which we refer as an *intermediate experiential background relatedness* between a new firm founder and other local entrepreneurs (cf. Sapienza et al, 2004). Empirical studies have reported the positive effect of such intermediate relatedness, particularly concerning the acquisition of marketing (Sapienza et al, 2004) and scientific knowledge (Lane & Lubatkin, 1998).

The high and intermediate levels of experiential background relatedness can enhance any of the two learning mechanisms by improving the understandability and the learning opportunity, respectively. First, both the high and intermediate levels of experiential background relatedness can enhance the learning-by-observing mechanism because they increase the capacity for an observer (knowledge recipient) to enact the behavior of a model (knowledge source) (Nadler et al, 2003). Second, both can enhance the learning-by-sharing mechanism because they enable the capacity for the knowledge recipient to absorb the shared information by the knowledge source more effectively, either nonreciprocally or reciprocally (Minniti & Bygrave, 2001).

A new firm founder in an industry characterized by the dominance of digital platforms, such as the KIBS industry, does not merely compete against other local entrepreneurs; they also have an incentive to share their experiences to learn from each other to develop new business models (Spiegel, 2017; Autio et al, 2018). However, the occurrence of learning is dubious if there is an absence of high or intermediate levels of experiential background relatedness. This in turn implies that the positive effect of clustering, which comes from localized learning, is expected

to be minimal. In this situation, the negative effect of clustering, which is associated with competition and congestion costs, is expected to prevail (Pe'er & Keil, 2013; Renski, 2015). This implies that a higher number of local entrepreneurs who have *no experiential background relatedness* to a new firm founder is expected to decrease the likelihood of survival of his/her new firm in that region. Previous empirical studies have suggested such negative effects (Mata & Portugal, 1994; Staber, 2001; Strotmann, 2007).

In summary, we argue that there must be a fit, in terms of some levels of experiential background relatedness (or overlaps) between a new firm founder and other local entrepreneurs, to enhance the founder's learning and hence his/her new firm survival probability. Conversely, if there is no such relatedness, the existence of many local entrepreneurs is expected to be detrimental to the survival of the new firm. Therefore, our second hypothesis is as follows:

*H2: The number of local entrepreneurs who have an A) high or B) intermediate level of experiential background relatedness with the founder of a new firm increases the probability of his/her new firm survival, while C) the number of local entrepreneurs who have no experiential background relatedness with the founder decreases the probability of his/her new firm survival.*

We further argue that various levels of experiential background relatedness may have differentiated effects on learning, depending on whether the new firm founder has entrepreneurial experiences, i.e., prior entrepreneurial process knowledge (Politis, 2008). In advancing our argument herein, we will again use the understandability and learning opportunity aspects as the main reasons for enhanced learning.

On the one hand, if a new firm founder is experienced, then s/he already has some entrepreneurial process knowledge stock available. This in turn implies that not all incoming information and knowledge from other local entrepreneurs can be new and novel to him/her, particularly entrepreneurial process knowledge (Zheng, Ahsan, & DeNoble, 2020). Therefore, to ensure the newness, novelty, and usefulness of incoming information to him/her and to thus obtain enhanced learning, there is a need for him/her to have a certain level of experiential background distance from other local entrepreneurs. This is because "information is useless if it is not new" (Nooteboom, 2000, p. 153). Moreover, an experienced founder will likely attend to the learning opportunities presented by others with slightly more dissimilar experiential backgrounds (Westhead, Ucbasaran, & Wright, 2005). This suggests that the intermediate level of experiential background relatedness can be ideal for an experienced entrepreneur's enhanced learning because this level of relatedness is inherently characterized by the existence of experiential distance, as explained above. Conversely, a high level of relatedness is expected to

be less effective in improving learning for an experienced entrepreneur because it does not provide a necessary learning opportunity for him/her. Even though a high level of relatedness improves the understandability aspect of learning, it nevertheless has little effect for an experience entrepreneur because his/her understandability is relatively high in comparison with that of novice entrepreneurs, as s/he has more in common with other existing local entrepreneurs in terms of the stock of entrepreneurial process knowledge (De Jong & Marsili, 2015; Zheng et al, 2020). Therefore, by being experienced, a new firm founder conditions the effect of experiential background relatedness on learning in a way that the intermediate level of relatedness is better for his/her learning (i.e., it has a more positive effect on learning) than is a high level of relatedness.

On the other hand, if a new firm founder is a novice, then by definition s/he does not have as much entrepreneurial process knowledge stock available, which in turn implies that most incoming information or knowledge from other local entrepreneurs will be novel to him/her, particularly entrepreneurial process knowledge (Zheng et al, 2020). Thus, it follows that s/he does not need as great of an experiential background distance to others to find opportunities to learn. This suggests that the intermediate level of relatedness, which is characterized by a certain experiential background distance, is less important for a novice entrepreneur's learning than the high level. In fact, a high level of relatedness should effectively boost the understandability aspect for him/her without imposing an unnecessary trade-off between understandability and learning opportunities. Therefore, by being a novice, a new firm founder conditions the effect of experiential background relatedness on learning in a way such that a high level of relatedness is better for his/her learning (i.e., it has a more positive effect on learning) than an intermediate level of relatedness.

Moreover, a novice entrepreneur typically relies more on external localized learning stemming from other entrepreneurs due to lack of his/her own entrepreneurial process knowledge compared to an experienced entrepreneur (Westhead et al, 2005). Consequently, the learning of a novice entrepreneur will be more negatively affected than that of an experienced founder if the external environment has little to offer for his/her learning, for example, due to a lack of experiential background relatedness between the founder and other local entrepreneurs. Therefore, we expect that the survival of new firms founded by novice entrepreneurs will be more negatively affected than firms founded by experienced entrepreneurs in a local environment characterized by no experiential background relatedness between a new firm founder and existing local entrepreneurs.

In summary, the positive effect of intermediate and high levels of experiential background relatedness is expected to have differentiated effects on the new firm founder's learning depending on whether s/he is experienced or a novice. Moreover, the negative effect of no relatedness is expected to harm the survival of new firms founded by novice entrepreneurs more than firms founded by experienced entrepreneurs. Our last hypothesis is follows:

*H3: A) The positive effect of an intermediate level of experiential background relatedness on new firm survival is stronger than the effect of a high level if the new firm founder is an experienced entrepreneur. B) The positive effect of a high level of experiential background relatedness is stronger than the effect of an intermediate level if the founder is a novice entrepreneur. C) The negative effect of no experiential background relatedness is stronger if the founder is a novice entrepreneur.*

# 4. METHODOLOGY

## 4.1. Dataset

The dataset in this study comes from the matched employer-employee database that covers the population of both firms and individuals in Sweden over a twelve-year period from 2001 to 2012. The firm-level data are drawn from the Firm and Establishment Dynamics database (FAD and FEK), and the individual-level data are drawn from the Longitudinal Individual Level database (LISA). Both of these databases are provided by Statistics Sweden (SCB), and we accessed them through the Microdata Online Access (MONA) system. Using the full population of firms based on high-quality and registered data allows us to reduce problems related to inferences and internal validity because our estimates are not based on a sample of firms. We chose the year 2001 as the starting point of the study period as this was the earliest year for which we could obtain a full set of explanatory and control variables at the level of individual, firm, and region.

We followed the following steps to create our dataset for the current analysis. First, we identified (i) all the new firms that appeared in the firm-level databases between 2001 and 2012 that (ii) had only one employee at the time of their appearance in the database and (iii) belonged to the KIBS sector according to the industry code. The KIBS sector corresponds to the 72-74 industry codes in the European NACE Industrial Classification (we will provide more explanation in section 3.6. Empirical Context).

Second, we matched the new firm to an employee who, in the individual-level dataset, was classified as an 'entrepreneur' and was linked to that new firm[4]. The underlying logic was that if a new firm had only one employee and that one employee listed his/her occupation as 'entrepreneur', then that individual would most likely be the founder of that new firm. We only kept new firms with a solo founder because we wanted to (i) identify the effect of learning from others on the founder's learning and hence the survival of his/her new firm as precisely as possible and (ii) to control for the individual characteristics of the founder explicitly (e.g., gender, age, education). Furthermore, the smaller the firm is, the more important the founder is at influencing its performance because the founder is the firm's main capacity (Brown & Kirchhoff, 1997). This further reinforced our choice of solo-founded new firms to study the learning-from-others effects on the survival of the new firms s/he has founded. Such solo-founder new firms make up for 90% of all the new KIBS firms in our dataset, in which we can match employee-firm information[5]. Among the solo-founders, 56% are novice whereas the rest are experienced founders. A novice founder is the one who had not started any other new firm (at least up to a 10-year period from the inception of his/her new firm). Concerning the 'other local entrepreneurs' and their firms in the region, we use both solo-founded and co-founded firms to allow for the 'source' of learning-from-others to be entrepreneurs from both types of firms.

Third, we matched the new firms (together with their founders) to the *Local Labor Market (LLM)* region, in which they are located. The LLM regions or functional regions (Funktionell analysregioner in Swedish) are defined by the Swedish Agency for Economic and Regional Growth. Such regions are based on the commuting patterns of workers together with the historical development and future forecasts of the population, labor market, and economic activities. The definition is revised approximately every ten years. In this study, we use the 2005 definition with 72 LLM regions. In choosing the LLM regions as our geographical unit, we followed Karlsson and Olsson's (2006) recommendation. They showed that knowledge flow, knowledge acquisition, and associated learning are 'bounded' within the boundaries of LLM regions in Sweden–as opposed to administrative regions, e.g., municipalities or counties (cf. Anselin et al, 1997). A similar choice in the identification of the geographical boundary of a cluster has been made in previous empirical studies that have analyzed the effects of localized

[4] The individual-level database classifies the main occupation type of each individual to be either (i) a sailor, (ii) a farmer, (iii) an employee, (in public or private sectors) or (iv) an entrepreneur (the founder of a business from which his/her main income is derived).

[5] We exclude new KIBS firms with no information on founders nor financial capital, and new KIBS firms that are established from mergers. Including these firms will reduce the proportion to approximately 30%.

learning and knowledge externalities on the survival of new firms in Canada (Pe'er & Keil, 2013), the US (Acs et al, 2007; Shu & Simmons, 2018), and Sweden (Wennberg & Lindqvist, 2010; Tavassoli & Jienwatcharamongkhol, 2016). Identifying the location of each new firm based in the LLM region enables us to operationalize the experiential relatedness of the firm founder with other local entrepreneurs within the same LLM region. It also makes it possible to control for conventional sources of learning and knowledge externalities in geographical clusters such as regional R&D investments and regional skilled labor pools.

Fourth, we exclude those new firms that disappeared in the database because of mergers and acquisitions (M&As) because an M&A is a sign of success rather than failure (Wennberg & Lindqvist, 2010). Moreover, to increase the reliability of the database, we kept only those firms that consecutively appeared throughout the period until they permanently disappeared in the dataset. Because new firms enter the dataset during the period of study, we are not limited to the cohort of the new firms in the beginning of the period. The above multistage procedure left us with a total of 109,807 observations of solo-founder KIBS firms that were founded during the 2001-2012 period. This corresponds to 41,221 unique new firms during the period.

### 4.2. Dependent Variable

The dependent variable is the post-entry survival time of a new firm, calculated as the number of years from registration to the discontinuance of the new firm (De Jong & Marsili, 2015). As explained above, we ensured that the discontinuance of the firm was not due to mergers and acquisitions, i.e., a success exit (Wennberg & Lindqvist, 2010).

### 4.3. Explanatory Variables

*Local Total Entrepreneurs*. This variable is the total number of all entrepreneurs in the KIBS sector who are located in the same LLM region *r* as a new firm founder *i* in a given year *t* (log transformed). These entrepreneurs have founded their new firms either in the same year as the new firm founder *i* or up to five years prior to the inception of the new firm founder *i*'s new firm. This variable captures the localized learning-from-others for a new firm founder *i* in a generic sense. A similar measure of learning from others (externalities) has been used in previous studies (Kim & Miner, 2007; Guiso & Schivardi, 2011; Rosenthal & Strange, 2004; Andersson & Larsson, 2016). This explanatory variable will be used to test our first hypothesis[6].

[6] We also used several other time windows to define the "other local entrepreneurs", for example, 'ten' years prior. The results remained the same and are available upon request. Moreover, instead of the total number of entrepreneurs, using the share of total entrepreneurs to total population or total employees in the region reveals qualitatively the same results in the subsequent survival analysis.

*Local HER Entrepreneurs*. This variable is the number of local entrepreneurs in LLM region *r* in the KIBS sector who have high level of experiential background relatedness (HER) with a new firm founder *i* in year *t* (log transformed). Following the previous studies, the *experiential background* of individuals is captured in three ways: their educational backgrounds (De Clercq & Sapienza, 2005; Wixe & Andersson, 2017), occupation-specific experiences (De Clercq & Sapienza; Wixe & Andersson; Qian, 2017), and the overall characteristics of the industry in which they operate (Schildt et al, 2005; Frenken et al, 2007). However, each of these three aspects has its own shortcomings in capturing individuals' experiential background. First, education is subject to the depreciation effect (Timmermans & Boschma, 2014); hence, education may not fully capture the experiential background of more senior entrepreneurs who have acquired work-specific experiences through on-the-job training[7] (Aldricht & Yang, 2014). Second, occupational experience does capture knowledge gained through on-the-job training; however, it does not fully capture the long-lasting effect of educational background in shaping individuals' mental frames and cognition (Schubert & Tavassoli, 2020). Third, the industry in which an entrepreneur starts his/her new firm captures the overall and inherent industry-specific knowledge (Frenken et al); however, it may not fully capture the heterogeneity of an individual's experiential background (Wixe & Andersson). Therefore, to remedy these shortcomings, we adopt a holistic approach and capture individuals' experiential background through their educational *and* occupational *and* industry backgrounds and affiliations simultaneously[8]. A similar choice has been made in previous studies (e.g., De Clercq & Sapienza, 2005).

Following Sapienza et al. (2004), the term *relatedness* refers to having "overlaps" between experiential background of a source and a receipt of knowledge. Therefore, we consider a new firm founder to have experiential background relatedness to another local entrepreneur if they have overlaps in all three elements of their backgrounds simultaneously. In our robustness check, we will also relax such simultaneous restriction, i.e., we will construct the experiential background relatedness variables by considering education, occupation, and industry affiliations separately. Following Makri et al. (2010) and Shenkar and Li (1999), we consider the experiential background relatedness to be *high* if individuals come from the same narrowly defined knowledge-related experiential background. Following Wixe and Andersson (2017), two individuals have the same narrowly defined experiential background if they share not only

[7] To partly remedy this depreciation effect, we consider only the education of entrepreneurs up to 10 years of graduation.

[8] In our robustness check, we will also relax such simultaneous restriction, i.e., we will capture the experiential background variables by considering education, occupation, and industry affiliation *separately*.

the same educational background at the upper level of the educational program hierarchy (e.g., engineering) but also at the lower level of the hierarchy (e.g., software engineering). The same principle applies for occupational and industrial hierarchy (Wixe & Andersson, 2017). We used official classifications for identifying such hierarchies. First, to identify the educational hierarchy, we follow the International Standard Classification of Education (ISCED). Accordingly, each individual (e.g., a new firm founder) has one major educational field—out of nine total major fields—at the first-digit level, which is further divided into the three-digit level detailing the sub-major educational field[9]. Second, to identify the occupational hierarchy, we follow the International Standard Classification of Occupation ISCO-08 (International Labor Office, 2012). Accordingly, each individual has one major occupational field at the first-digit level—out of ten total major fields—which is further divided to the four-digit level to cover sub-major, minor, and unit group. Third, to identify the industrial hierarchy, we use the NACE system to specify the firms' industry code field at 1 digit (upper level) and 5 digits (lower level). Note that this variable is the subset of the total number of local entrepreneurs (*Local HER Entrepreneurs* $\subset$ *Local Total Entrepreneurs*). This explanatory variable will be used to test our second and third hypotheses.

*Local IER Entrepreneurs*. This variable is the number of local entrepreneurs in LLM region *r* who have intermediate experiential background relatedness (IER) with new firm founder *i* in year *t* (log transformed). Following Makri et al. (2010) and Sapienza et al. (2004), we consider the experiential background relatedness between a new firm founder and a local entrepreneur to be *intermediate* if their backgrounds come from the same broadly defined knowledge-related experiential background (e.g., engineering); however, they differ from each other in their narrowly defined background (software engineering versus hardware engineering). Note that this variable is also the subset of the total number of local entrepreneurs (*Local IER Entrepreneurs* $\subset$ *Local Total Entrepreneurs*). This explanatory variable will also be used to test our second and third hypotheses.

*Local NER Entrepreneurs*. This variable is the number of local entrepreneurs in LLM region *r* who have no experiential background relatedness (NER) with new firm founder *i* in year *t* (log transformed). Following Makri et al. (2010) and Frenken et al. (2007), we consider the experiential background between a new firm founder and a local entrepreneur to have no relatedness if their experiential background come from the different backgrounds not only narrowly but also broadly (e.g., software engineering and philosophy). Note that this variable is

[9] For example, the education code 481 indicates that the individual has a degree in the major field of Science and Mathematics ('4'), within a subcategory of Computing ('8'), with specialization in Computer Science ('1').

also the subset of the total number of local entrepreneurs (*Local NER Entrepreneurs* ⊂ *Local Total Entrepreneurs*). This explanatory variable will be used to test our second hypothesis.

Figure 1 visually illustrates how our four explanatory variables are calculated. For example, for the new firm founder $i = 1$ who is located in LLM $r$, the number of Total, HER, IER, and NER local entrepreneurs are 8, 2, 1, and 5, respectively.

***[Figure 1 about here]***

### 4.4. Control Variables

We control for an extensive set of variables at the level of the individual founder; firm (which is founded by the founder); and local labor market region (where the new firm is founded).

#### *4.4.1. Individual-level control*

*Founder Age.* This variable is the age of the new firm founder in a given year. It is important to control for this variable since the demographic heterogeneity of founders is shown to affect the post-entry performance of their firms such as the survival of their businesses (Santarelli & Vivarelli, 2007; De Jong & Marsili, 2015).

*Founder Gender*. This variable takes a value of 0 if the founder is female and 1 if it is male. Gender is a typical demographic measure of founder characteristics, and this variable is included because of the same reason as including the *Age* variable (De Jong & Marsili, 2015).

*Founder STEM*. It takes a value of 1 if the founder has education in science, technology, engineering, and mathematics (STEM) fields and 0 otherwise. STEM captures the founder's human capital in terms of his/her education field, which is particularly relevant for the knowledge intensive business service industry because of the technological knowledge intensity of the industry (Aslesen & Jakobsen, 2007). Previous studies show that STEM education can positively affect a variety of new firm outcomes including the survival rate of firms (Woolley, 2019).

#### *4.4.2. Firm-level control*

*Firm Size*. This variable is the number of employees, including the founder, in a given year $t$ after the new firm is founded. Firm size is expected to increase the probability of survival (De Jong & Marsili, 2015).

*Educated Employees*. This variable is the share of highly educated employees (with at least three years of university education) in the new firm in year $t$. Previous studies show that having employees with a higher education increases the knowledge stock of firms and improves post-entry survival (Wennberg & Lindqvist, 2010) because "formal education trains individuals to rationally assess information" (Acs & Armington, 2006, p. 126).

*Physical Capital*. This variable is the new firm's physical capital including the value of buildings and machines in year *t*. Physical capital and assets are shown to positively affect new firm survival because during the early life of a new firm, such tangible resources "may be particularly important to shield the firm from competitive pressures that otherwise may force the firm to exit" (Pe'er & Keil, 2013, p.362).

*Productivity*. This variable is the change in the new firm's value added per employee in year *t* (absolute value). We included this variable to control for experiential learning (Huber, 1991), which occurs for a new firm founder (and other employees in the new firm) by learning-by-doing during the post-emergence of the new firm. While we cannot measure experiential learning directly, nevertheless, our approach is "to measure changes in characteristics of performance, such as its accuracy or speed, as indicative that knowledge was acquired and organizational learning occurred" (Argote & Miron-Spektor, 2011, p.1124). Therefore, the 'change' in absolute value of the new firm's performance (e.g., productivity) can be an indicator of experiential learning including learning-by-failure.

*Spin-off*. This variable takes a value of 1 if the new firm is the result of a spin-off from a parent firm and 0 otherwise. We include this variable because the type and mechanism of learning for a spin-off new firm is systematically different than otherwise. Spin-off firms are expected to have higher survival due to knowledge inheritance from parent firms (Agarwal, Echambadi, Franco, & Sarkar, 2004).

#### *4.4.3. Local Labor Market region-level control*

*Local R&D investments*. At the level of the LLM region in which a new firm founder founded his/her new firm, we control for the typical sources of (technological) knowledge spillover, specifically, corporate and university R&D investments. This is because the source of such knowledge spillovers can be either large incumbent firms (Audretsch & Keilbach, 2007) or research institutions such as universities (Audretsch & Lehmann, 2005). In this way, we attempt to isolate the effect of localized learning-from-others (stemming from local entrepreneurs) from localized technological knowledge spillover stemming from established firms and research institutes.

*Skilled labor*. This variable is the share of the skilled labor force (at least three years of university education) in region r in year t (excluding local entrepreneurs) following Wennberg and Lindqvist (2010). This variable captures the region-level (or cluster-level) knowledge stock stemming from the regional pool of skilled labor, which is shown to have a positive effect on the survival rate of new firms (Acs et al, 2007). This is because an LLM region with a higher portion of skilled labor provides a new firm "with a larger pool of potential employees by recruiting

from either existing or exiting firms" (Pe'er & Keil, 2013, p.361). It is important to control for this variable to further isolate the effect of learn-from-other local entrepreneurs from general knowledge stock and Marshallian agglomeration forces (McCann & Folta, 2008).

*KIBS Cluster*. This variable is captured by the location quotient (LQ) index as the share of employees in a KIBS industry in a given LLM region relative to the share of KIBS employees in Sweden, which was developed by Glaeser et al. (1992) and used by subsequent studies to capture clusters of firms in a similar industry (e.g., Wennberg & Lindqvist, 2010; Bau et al., 2018). Firms founded in a cluster of related firms are shown to have a higher survival rate than firms founded outside of such a cluster (Wennberg & Lindqvist, 2010), particularly if the cluster is composed of firms that have a similar but not exactly the same specialization as the new firm (Tavassoli & Jienwatcharamongkhol, 2016).

*Competition*. This variable is the number of firms per worker in a given industry in a given LLM region relative to the number of firms per worker in that industry in Sweden—which was developed by Glaeser et al. (1992) and has been used by subsequent studies (e.g., Plummer & Acs, 2014). A value greater than one means that the industry in which a new firm belongs has more firms relative to its size in the LLM region than it does in Sweden. A higher competition in an LLM region may imply that a given industry in a given LLM region is more competitive than the rest of Sweden (cf. Porter, 1998); however, it may also imply a harsher local environment in which a new firm seeks to survive (Pe'er & Keil, 2013).

*Population Density.* This variable is the number of inhabitants per square kilometer in LLM region *r* in year *t*. Population density is shown to positively affect new firm survival (Wennberg & Lindqvist, 2010) because learning opportunities from others are more likely in denser places. It is particularly important to control for this variable in our study, because our explanatory variables are constructed based on the number of local entrepreneurs without explicitly taking into account the scale (size) of the LLM region.

*Stockholm, Gothenburg, Malmo*. We used three dichotomous variables, each corresponding to whether a new firm is founded in one of the three metropolitan LLM regions in Sweden, i.e., Stockholm, Gothenburg, Malmo, following previous Swedish studies (e.g., Johansson & Lööf, 2008). Metropolitan areas provide large markets that create "natural laboratories for testing and introducing new ideas cost-effectively" (Venkataraman, 2004, p. 165). Such early and efficient access to the marketplace provides new firms with faster feedback on the functionality of their products, which in turn implies a positive effect on their survival (Huggins et al, 2017). Moreover, our main explanatory variables are to some extent skewed toward these metropolitan

areas, suggesting structural differences between metropolitan areas and the rest of Sweden. This further necessitates controlling for these three metropolitan areas.

*Time and industry fixed effects*. We control for the year and the industry in which new firms are founded, in line with the previous studies (e.g., Strotmann, 2007; Pe'er & Keil, 2013).

The summary statistics and correlation matrix of all variables are displayed in Table 1, and the exact variable description is reported in Table A1 in the Appendix. Tests for multicollinearity among independent variables using the variance inflation factor does not reveal problems (VIF < 2 for all variables across all models).

***[Table 1 about here]***

### 4.5. Empirical Strategy

Similar to the previous studies (e.g., Kim & Miner, 2007, Argote & Miron-Spektor, 2011; Pe'er & Keil, 2013), we intend to investigate the effect of the colocation of existing entrepreneurs in a given region on new firm founder's learning outcome, i.e., his/her new firm survival, without directly examining intermediate learning processes. To do so, we use the Cox proportional hazards (CPH) model, which allows us to estimate new firm survival without the need for specific assumptions about the duration dependence of such survival. This method of estimation has been widely used in the entrepreneurship literature concerning new firm survival (e.g., De Jong & Marsili, 2015, Ebert et al, 2019). The hazard function for new firm *j* (founded by new firm founder *i*) in LLM region *r* is as follows:

$$h_{j,r}(t) = h_0(t)\, exp(X\beta_X + Z\beta_Z) \quad (1)$$

where $h_0(t)$ is the unspecified baseline hazard that captures the direct impact of the new firm's age on the survival of the new firm, $t$ is time, $X$ is the vector of four explanatory variables in this study, $\beta_X$ is the vector of regression coefficients for the explanatory variables, $Z$ is the vector of control variables, $\beta_Z$ is the vector of regression coefficients for the control variables, and $exp(X\beta_X)$ denotes the hazard ratio. Because learning is unlikely to affect the survival rate instantaneously, all independent variables were taken from the year before a new firm was at risk of failure (t - 1). This is in line with previous studies on localized learning-from-others and the survival of firms (e.g., Kim & Miner, 2007; Pe'er & Keil, 2013).

To test the moderation effect in our third hypothesis, we used the subgroup analysis by breaking the sample into two subsamples of novice and experienced founders rather than using the interaction effect. This is because we are interested in the strength of a relationship rather

than its form, and, as explained by Hitt, Boyd and Li (2004, p.7), "strength moderation occurs when the intensity of the relationship between x and y is different at varying levels of z and is analyzed via subgroup analysis". Moreover, the interpretation of interaction effects in nonlinear models, including hazard models, is complicated (Ai & Norton, 2003; Buis, 2010), which provides another reason for choosing subsample analysis in our study.

### 4.6. Empirical Context

We chose the knowledge intensive business service (KIBS) sector as the empirical context of this study. KIBS are defined as private sector firms providing knowledge-based services to other, private and public sector organizations (Muller & Doloreux 2009). The knowledge-based services they provide comprises "strategic, technical and professional advice, primarily employing the skills of information gathering, processing, and in particular, interpretation" (Aslesen & Jakobsen, 2007 p.191). This sector alone corresponds to 46% of all service firms and 40% of all firms in Sweden[10].

Apart from being a large part of the economy, KIBS firms and their entrepreneurs are theoretically more in line with the main argument of this paper, which is about knowledge externalities and associated learning-from-others. First, because of the knowledge intensity of the sector, KIBS entrepreneurs typically need more knowledge capital, and it is shown that they are also more capable of accumulating it in comparison to an average entrepreneur (von Nordenflycht, 2010). This necessitates the importance of acquiring new knowledge (e.g. from others) for a founder in the KIBS sector. Second, the founders of KIBS firms are typically involved in all the business processes, from technical aspects of a service to marketing, making them a critical component of their new firms' performance (Rosenthal & Strange, 2004). Therefore, the occurrence of learning-from-others for KIBS entrepreneurs can have profound effects on the survival of their new firms compared with entrepreneurs in the manufacturing sector, for example, who typically have less responsibilities due to a finer division of labor in which founders and employees carry out certain specialized tasks (Andersson et al, 2012). Third, KIBS is among the industries that are heavily concentrated in certain locations in terms of the colocations of new firms, established firms, and customers (Delgado et al., 2016). This implies that the nature of learning from others becomes localized more frequently (Kim & Miner, 2007),

[10] According to the Swedish industry classification, KIBS is defined as industry codes 72-74, which includes computer and related activities, research and development, architectural activities, and advertising.

which in turn makes KIBS new firms and their entrepreneurs a suitable empirical context for this paper.

# 5. RESULTS

## 5.1. Main Results

Table 2 reports the results of the estimation of Cox proportional hazard model. There are four models reported in this table, each of them introducing one of our four explanatory variables, while all models include an extensive set of control variables capturing individual, firm, and regional characteristics. We avoid inserting all the four variables in one model simultaneously because they are highly correlated with each other. The reason for such high correlation is that the three experiential background relatedness variables (introduced in models 2.2, 2.3, 2.4) are the subsets of Total Local Entrepreneurs (introduced in model 2.1), hence they are naturally correlated with their superset and also with each other. For intuitive interpretations, the table reports the hazard ratio (*hr*), which is the exponentiated raw coefficients. A hazard ratio below 1 means a positive effect on the survival rate of new firms and a hazard ratio above 1 represents a negative effect on the survival rate.

Hypothesis 1, which is our baseline hypothesis, suggests that the total number of entrepreneurs in the region (regardless of whether they have experiential relatedness to the new firm founder or not), has positive effect on new firm survival. The estimation in Table 2 indicates that the total number of entrepreneurs in a given LLM region (i.e. *Total Local Entrepreneurs)* is positively and significantly associated with the survival probability of a new firm located in that region (model 2.1: hr = 0.982, $p < .05$). In terms of the effect magnitude, increasing the total number of local entrepreneurs in a given LLM region *r* by twice (100 Percentage Point) is associated with (1- 0.982)*100 = 1.8 Percentage Point (PP) increase in the survival rate of a given new firm in that LLM region *r,* ceteris paribus. This result confirms the first hypothesis.

Hypothesis 2 suggests that either high or intermediate experiential background relatedness of a new firm founder to his/her surrounding entrepreneurs increases the probability of his/her firm's survival, compared to their experiential backgrounds being unrelated. The estimation in Table 2 indicates that the numbers of local entrepreneurs who have high (model 2.2: hr = 0.940, $p<0.001$) and intermediate (model 2.3: hr = 0.942, $p<0.001$) experiential background relatedness with the founder of a new firm are positively and significantly associated with the survival probability of his/her new firm. Moreover, the number of local entrepreneurs who have no experiential background relatedness with the new firm founder (model 2.4: hr = 1.005, $p > 0.1$) has a negative, however insignificant, effect on the survival of his/her new firms. In terms of the effect magnitude, increasing the number of local entrepreneurs, who have high and intermediate

experiential background relatedness to the founder in a given LLM region *r*, by twice (100 Percentage Point) is associated with (1- 0.940)*100 = 6 PP and (1- 0.942)*100 = 5.8 PP increase in the survival rate of his/her new firm in that LLM region *r,* ceteris paribus, respectively. These results partially confirm the second hypothesis, i.e. H2A and H2B are confirmed and H2C is rejected.

***[Table 2 about here]***

Hypothesis 3 suggests that, on the one hand, if a new firm founder is novice, the positive effect of a high level of experiential background relatedness on his/her new firm's survival will be stronger than the effect of an intermediate level of relatedness. On the other hand, if the new founder is experienced, the intermediate level of experiential relatedness will have a stronger positive effect than the high level. Moreover, the hypothesis predicts that the negative effect of no experiential relatedness will be stronger for a novice entrepreneur. Using subgroup analysis, as noted in the Empirical Strategy section, Table 3 divides the total sample of founders into novice and experienced subsamples. First, for novice founders, the positive effect of a high level of experiential background relatedness on their new firms' survival (model 3.2: hr = 0.968, $p<0.001$) is stronger than that of the intermediate level (model 3.3: hr = 0.994, $p<0.05$). Here, this effect is stronger both in terms of statistical significance and the magnitude of the effect. In terms of the magnitude of such strength, increasing the number of local entrepreneurs who have high experiential background relatedness to a novice founder by twice is associated with an (1- 0.968)*100 = 3.2 PP increase in the survival rate of his/her new firm, while the same increase in the number of local entrepreneurs who have intermediate relatedness to him/her is associated with an (1- 0.994)*100 = 0.6 PP increase in his/her new firm survival rate. Second, for experienced founders, the positive effect of intermediate experiential background relatedness on their new firms' survival (model 3.7: hr = 0.962, $p<0.001$) is stronger in comparison with the high level (model 3.6: hr = 0.987, $p<0.1$). Again, here, such an effect is stronger both in terms of statistical significance and the magnitude of the effect. Third, for novice founders, the negative effect of no experiential background relatedness on their new firms' survival (model 3.4: hr = 1.007, $p>0.1$) is stronger than that of experienced entrepreneurs (model 3.8: hr = 0.989, $p>0.1$); however, this effect is not statistically significant. Overall, these results partially confirm the third hypothesis, i.e. H3A and H3B are confirmed and H3C is rejected.

***[Table 3 about here]***

### 5.2. Robustness Check

We performed four robustness checks in order to investigate whether our main findings hold. First, instead of restricting the construction of experiential background relatedness variables to simultaneously account for the three elements of education, occupation, and industry, we reconstructed the explanatory variables based on each of these three elements individually. The result of such robustness check is reported in Appendix Table A2. The main result which was obtained in Table 2 and 3 remained the same here.

Second, we cannot directly examine what a new founder observes and shares, or with whom does he/she interact within the LLM region. In order to increase the likelihood of the entrepreneurs' encounter, and hence the possibility of learning, we consider the *local embeddedness* of entrepreneurs within the same region (Bau et al, 2018). In doing so, we restricted our sample to those new firm founders and local entrepreneurs who lived within the same LLM region over the past ten years; prior to the inception of the new founder's firm. The result remained the same, which is reported in the Appendix Table A3.

Third, the underlying logic to construct our experiential background relatedness measures is the hierarchical system in educational, occupational, and industrial classifications. In the main result (reported in Table 2 and 3), we employed the highest and lowest possible levels for these three classifications–i.e. one-digit as the highest level for all the three of them, while for the lowest level, we applied 3-digit for education, 4-digit for occupation, and 5-digit for industry level. In order to rule out the arbitrary choice of the employed hierarchical level, we apply 2-digit for the highest level of hierarchy in our robustness check. The result of this robustness check is reported in Table A4 of Appendix. Once more, the main result which was obtained in Table 2 and 3 remained the same.

Fourth, Swedish business laws and regulations are fairly uniform geographically, as they are mainly formulated by federal government. Nevertheless, different regions in Sweden do not equally provide munificent conditions for entrepreneurship (Andersson & Henrekson, 2015). Therefore, we added regional fixed effects to our models as an additional robustness check to control for such regional heterogeneity, such as institutional differences between regions (Tables A5.1 and A5.2 in the Appendix). We used 21 counties in Sweden to operationalize the regional fixed effects because most local government initiatives and institutional factors to foster entrepreneurship come from this level of aggregation. The main results in our robustness check remained the same after controlling for such regional fixed effects.

Finally, even though it is difficult to measure learning per se, but we endeavor to provide evidence of interaction of entrepreneurs in one way or another provides a better empirical setting

for our paper. we re-ran our analysis and instead of total number of local entrepreneurs in LLM regions (which we originally used), now we use the number of start-up tenants in incubators, aggregated at the level of LLM regions (Ulvenblad et al, 2011). This measure captures somewhat the interaction of entrepreneurs in the LLM regions, because these 44 incubators provide business supports for their tenants that is heavily based on networking events and meetings for start-ups, hence they are one of the major platform for interaction of entrepreneurs in Sweden (Lindholm-Dahlstrand & Politis, 2013; Klofsten et al, 2020). We reported the new results in Appendix Table A6, which shows the robustness of our original results.

## 6. DISCUSSION AND CONCLUSION

The paper examines the effect of the colocation of entrepreneurs on new firm survival. Using a rich longitudinal dataset covering the population of all newly founded KIBS firms in Sweden matched with their founders over the 2001-2012 period, our findings demonstrate that a cluster of colocated entrepreneurs in a region enhances the survival of new firms. Moreover, for any given new firm founder, we broke down the overall cluster of colocated entrepreneurs into three subclusters, depending on the extent of the experiential background relatedness between the new firm founder and the other local entrepreneurs. In doing so, we found that the subclusters of local entrepreneurs who have high or intermediate levels of experiential background relatedness to the new firm founder—as opposed to the subcluster of local entrepreneurs with unrelated background—are the main enhancers of his/her new firm survival. Moreover, whether a founder has prior entrepreneurial experiences is an important contingency factor that determines the most conducive level of experiential background relatedness (i.e., high or intermediate) for his/her learning and hence the survival of his/her new firm. These results hold after controlling for an extensive set of factors at the individual founder, firm, and regional levels.

Our study has theoretical implications for research on the external environment, particularly geographical clustering, and new firm survival. Previous studies have reported that new firm survival can be negatively affected by the colocation of established firms due to competition and congestion effects (Sorenson & Audia, 2000; Staber, 2001; Strotmann, 2007) and also non-entrepreneurial employment opportunities in clusters (Folta et al, 2006). By shifting the focus from the (much studied) colocation of established firms to local entrepreneurs, we propose that new firm survival can be positively affected by the colocation of individual entrepreneurs due to *localized learning* effects. Whereas previous studies have shown that the colocation of entrepreneurs increases the odds and timing of new firm formation in a given location—due to

motivational influences (Minniti, 2005; Lévesque et al, 2009)—we add to the literature by proposing that such colocation of other entrepreneurs also influences new firm survival due to post-entry localized learning effects. We further argue that such localized learning is particularly concerned with the acquisition of entrepreneurial process knowledge stemming from other local entrepreneurs (Autio et al, 2018) who continuously develop their entrepreneurial knowledge as they develop their firms (Politis, 2005). Entrepreneurial process knowledge is distinct from the technological knowledge that stems from established and large firms (Gilbert et al, 2008), which is extensively shown to influence opportunity recognition and hence new firm formation rather than survival, according to the knowledge spillover theory of entrepreneurship (Audretsch & Keilbach, 2007). Entrepreneurial process knowledge is important for founders' post-entry learning and hence the survival of their new firms because it helps founders overcome the challenges inherent in venture development processes such as finding customers, pitching for investment, and growing their firms under severe resource constraints (Spigel & Harrison, 2018).

Our second contribution is in line with recent insights from the agglomeration literature, which suggest that *not* all new firms within a cluster can benefit *equally* from agglomeration, e.g., learning externalities (Pe'er & Keil, 2013). Following the important question of whether all new firms "are equally likely to experience the benefits and drawbacks of locating in such geographic clusters" (Pe'er & Keil, 2013, p. 354), subsequent studies have highlighted certain contingency factors that can condition the effect of agglomeration on residing new firms. Such factors have been identified as new firms' internal resources and capabilities (McCann & Folta, 2011), the industry in which new firms are founded (Renski, 2015), and regional-level factors (Litzel, 2017; Plummer et al, 2020). We advance this ongoing debate by elaborating on an additional contingency factor, i.e., the very fundamental of any new firm; its founder. We investigate the *fit* of a new firm's founder with regard to his/her learning environment in terms of his/her experiential background relatedness to other local entrepreneurs. Despite the rich literature on the founder's human capital and firm survival (Brüderl et al, 1992; Geroski et al, 2010), little attention has been given to the founder's fit within a cluster and how such a fit can play a role in enhancing his/her learning and hence the survival of his/her newly established firm. In this way, we theoretically elaborate on the extent to which experiential relatedness between a founder and his/her learning environment, specifically the cluster of other local entrepreneurs, is conducive to enhancing his/her learning. In doing so, we address a recent call in the literature for the investigation of circumstances in which the founders of new firms may access and benefit from localized knowledge (Spigel & Harrison, 2018).

Building on individual learning theories (Novak & Gowin, 1984; Nooteboom, 2000), we further argue that whether the firm founder has prior entrepreneurial experiences is an additional important contingency factor that conditions his/her learning from the learning environment, which is composed of local entrepreneurs, inter alia. In doing so, we argue and empirically show that a high level of experiential background relatedness is the strongest enhancer of localized learning for a novice entrepreneur, while an intermediate level is the strongest enhancer for an experienced entrepreneur. This elaboration has important consequences for entrepreneurship research because it shows that insights from the organizational learning literature should be adopted with caution within the entrepreneurship context (cf. Harrison & Leitch, 2005). For example, the existing theorizing and empirical evidence in interorganizational learning mainly advocates for intermediate experiential background relatedness—not high relatedness—particularly in acquiring new technological (Nooteboom et al, 2007), marketing (Sapienza et al, 2004), and scientific knowledge (Lane & Lubatkin, 1998), but not entrepreneurial process knowledge, which we have put forward in this paper.

Our approach that shifts the focus from the colocation of established firms to local entrepreneurs provides a new theoretical foundation for explaining the positive and negative effects of clustering under a unified rationale, i.e., the existence or lack of learning opportunities stemming from local entrepreneurs. This approach is better able to reconcile the conflicting evidence concerning the clustering effect in comparison with the existing firm-focused approach, which has dispersedly explained the positive and negative effects of clustering on new firm emergence and survival by interfirm learning on the one hand (Wennberg & Lindqvist, 2010) and interfirm competition and alternative nonentrepreneurial employment opportunities in clusters on the other hand (Sorenson & Audia, 2000; Strotmann, 2007; Folta et al, 2006).

Finally, our study advances the discussion on contextualizing entrepreneurship research (Welter, 2011). By theorizing and empirical investigation of the 'fit' between a founder and his/her environment, we correspond with developing "multi-layered embeddedness concepts that cut across levels of analysis [that] can assist in theorizing top-down effects [e.g., effect of clusters on new firm survival]" (Welter, 2011, p. 177). In doing so, we also take one of the first steps toward better understanding the sorely understudied *cross-link* between founder characteristics and the local environment in entrepreneurship research (Davidsson, 2020). This is an important step because aggregate-level research (region, industry) often misses varying effects within the same context, while micro-level studies (firm, individual) often neglect the environment altogether.

Our study also has practical implications. First, our findings signal to new firm founders the importance of taking into account the conditions in the founding location when deciding where to start a venture. The main message in this paper reinforces the recent findings in entrepreneurship studies; i.e., for entrepreneurs to help their business survive, it not only matters who they are (Gartner, 1988) but also *where* they are (Fritsch et al, 2006). On the one hand, if the new firm founder decides to establish his/her new firm in a location with many local entrepreneurs who have experiential relatedness to him/her, then his/her new firm survival rate can increase. This is because by being in such an environment, s/he can enjoy enhanced learning through a variety of localized learning mechanisms. Such localized learning can occur, for example, by attending specialized Meetup groups or pitch nights to interact with the other entrepreneurs with related experiential backgrounds. On the other hand, if the founder decides to establish his/her new firm in a location with many local entrepreneurs who have no experiential relatedness to him/her, then a negative effect of agglomeration due to competition may prevail and may harm the survival of his/her new firm.

Our second practical implication is concerned with entrepreneurship policy. To foster the survival of new firms in a given region, relying on the unexploited knowledge of large research institutions is not the only opportunity for which policy makers might aim. Investment in human capital, which can be embedded particularly in local entrepreneurs, can be a novel source of learning for new founders. Two examples of such investments, particularly for entrepreneurs, are (i) educational and vocational programs in entrepreneurship and (ii) programs and funding that support the entrepreneurial ecosystems in cities and local labor market areas.

There are at least three limitations in this study that open up additional routes for future research. First, in this paper, we advocate the idea that experiential background relatedness between two entrepreneurs enhances learning between them. For two entrepreneurs to further enhance their learning from each other, there might be other factors that should be taken into account as being rooted in their cognition. Examples of such factors are norms, attitudes, and learning styles (e.g., visual, auditory, and kinesthetic), which might differ significantly between individuals (Nooteboom, 2000; Cope, 2005). This possibility creates an interesting future avenue for the richer theorizing and operationalizing of interindividual relatedness and learning among entrepreneurs and the effect of such learning on their firm performance. Second, our aim has been to investigate the effect of the colocation of existing entrepreneurs on a new firm founder's learning outcome, i.e., his/her new firm survival, without directly examining intermediate learning processes, similar to previous studies (e.g., Kim & Miner, 2007). Future studies may explicitly operationalize and test the strength of various learning processes and mechanisms,

such as learning-by-observing and learning-by-sharing, on new firm survival. Third, our study focused on single-founder new firms in the KIBS sector for the reasons elaborated in the Empirical Context section. Nevertheless, this may limit the generalizability of the findings (cf. Renski, 2015). Future studies may investigate co-founded firms, as well as new firms in other sectors.

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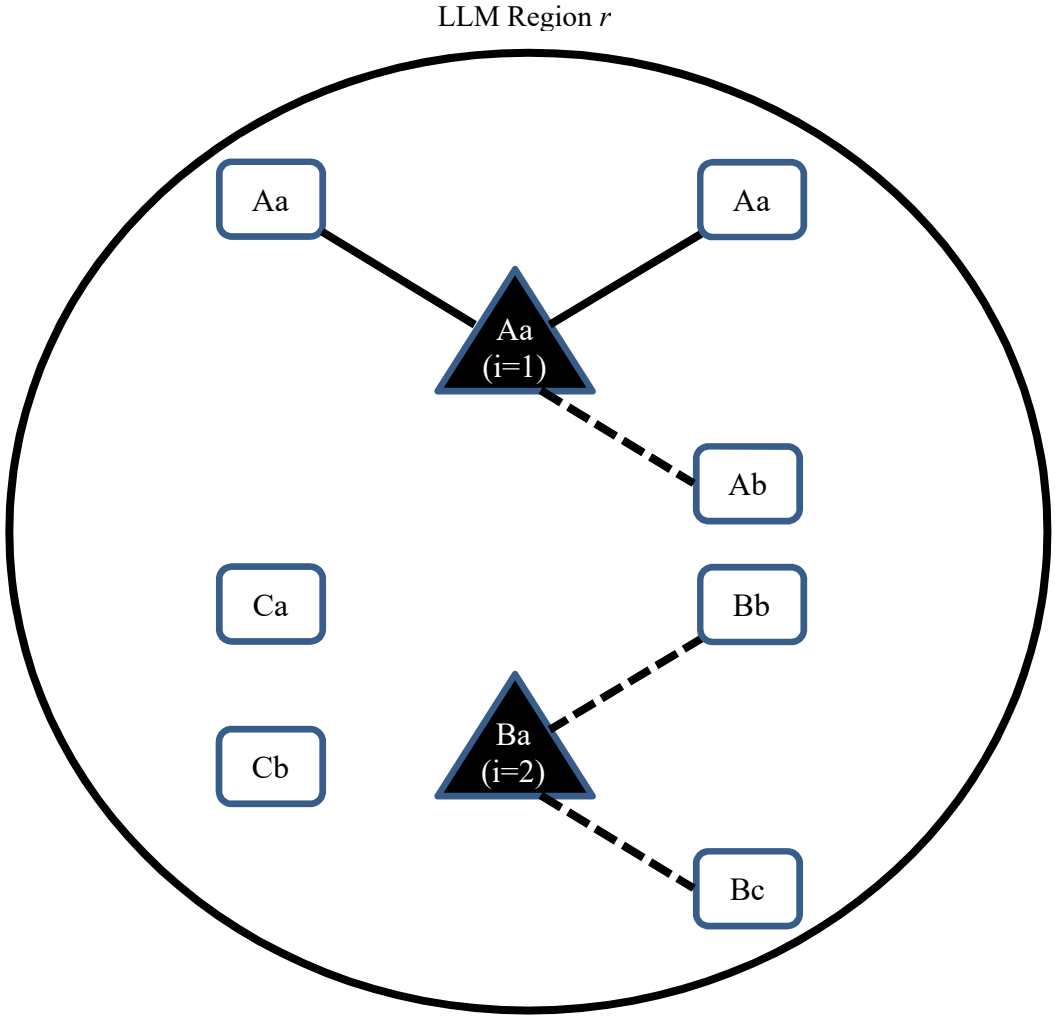
**Table 1- Descriptive statistics and correlation matrix of variables**

| VARIABLES | Mean | S.D | Min | Max | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (7) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *(1) Local Total Entrepreneurs* | 9.16 | 1.64 | 2.71 | 11.35 | 1 | | | | | | | | | | | | | | | | | |
| *(2) Local HER Entrepreneurs* | 7.76 | 1.76 | 0 | 10.07 | 0.94 | 1 | | | | | | | | | | | | | | | | |
| *(3) Local IER Entrepreneurs* | 7.66 | 1.80 | 0 | 10.08 | 0.93 | 0.87 | 1 | | | | | | | | | | | | | | | |
| *(4) Local NER Entrepreneurs* | 9.06 | 1.47 | 2.69 | 11.34 | 0.95 | 0.84 | 0.81 | 1 | | | | | | | | | | | | | | |
| *(5) Founder Age* | 47 | 11.80 | 18 | 84 | -0.04 | -0.02 | -0.02 | -0.04 | 1 | | | | | | | | | | | | | |
| *(6) Founder Gender* | 0.70 | 0.45 | 0 | 1 | -0.03 | 0.01 | 0.01 | -0.03 | 0.05 | 1 | | | | | | | | | | | | |
| *(7) Founder STEM* | 0.35 | 0.48 | 0 | 1 | -0.06 | -0.02 | -0.02 | -0.06 | 0.01 | 0.34 | 1 | | | | | | | | | | | |
| *(8) Firm Size* | 0.29 | 0.63 | 0 | 7.56 | -0.02 | -0.01 | -0.02 | -0.02 | -0.07 | 0.05 | 0.00 | 1 | | | | | | | | | | |
| *(9) Educated Employees* | 0.04 | 0.13 | 0 | 0.94 | 0.04 | 0.06 | 0.06 | 0.03 | -0.03 | 0.03 | 0.03 | 0.48 | 1 | | | | | | | | | |
| *(10) Physical Capital* | 10.53 | 1.74 | 1 | 19.50 | -0.06 | -0.05 | -0.04 | -0.06 | -0.01 | 0.13 | 0.06 | 0.28 | 0.12 | 1 | | | | | | | | |
| *(11) Productivity* | 3.31 | 5.96 | 0 | 18.40 | -0.02 | -0.01 | -0.01 | -0.02 | -0.06 | 0.06 | 0.01 | 0.83 | 0.51 | 0.24 | 1 | | | | | | | |
| *(12) Spin-off* | 0.01 | 0.09 | 0 | 1 | -0.01 | -0.01 | -0.01 | -0.01 | -0.02 | 0.01 | 0.00 | 0.19 | 0.09 | 0.06 | 0.16 | 1 | | | | | | |
| *(13) R&D Investments* | 21.94 | 3.32 | 0 | 25.03 | 0.75 | 0.72 | 0.70 | 0.75 | -0.03 | -0.02 | -0.04 | -0.01 | 0.03 | -0.04 | -0.02 | -0.01 | 1 | | | | | |
| *(14) Skilled labor* | 0.06 | 0.29 | 0.00 | 20.53 | 0.97 | 0.93 | 0.90 | 0.96 | -0.07 | -0.03 | -0.06 | -0.02 | 0.04 | -0.06 | -0.01 | 0.00 | 0.75 | 1 | | | | |
| *(15) KIBS Cluster* | 0.04 | 0.23 | 0 | 23.18 | -0.07 | -0.07 | -0.07 | -0.07 | 0.00 | 0.00 | 0.00 | 0.00 | -0.01 | 0.00 | 0.00 | 0.01 | -0.11 | -0.08 | 1 | | | |
| *(16) Competition* | 1.18 | 0.52 | 0.13 | 12.77 | -0.73 | -0.70 | -0.68 | -0.72 | 0.05 | 0.03 | 0.06 | 0.00 | -0.03 | 0.04 | 0.00 | 0.00 | -0.58 | -0.76 | 0.07 | 1 | | |
| *(17) Population Density* | 4.38 | 0.99 | 0.01 | 5.06 | 0.60 | 0.54 | 0.53 | 0.60 | -0.06 | -0.03 | -0.05 | -0.01 | 0.04 | -0.06 | 0.00 | -0.01 | 0.70 | 0.64 | 0.08 | -0.63 | 1 | |
| *(18) Stockholm* | 0.23 | 0.42 | 0 | 1 | 0.44 | 0.42 | 0.41 | 0.44 | -0.11 | -0.01 | -0.07 | 0.04 | 0.07 | -0.02 | -0.03 | 0.02 | 0.34 | 0.58 | 0.07 | -0.43 | 0.32 | |
| *(19) Gothenburg* | 0.03 | 0.18 | 0 | 1 | 0.03 | 0.02 | 0.02 | 0.03 | -0.03 | -0.01 | -0.02 | 0.02 | 0.02 | -0.01 | 0.01 | 0.01 | 0.01 | -0.12 | -0.03 | 0.06 | 0.11 | -0 |
| *(20) Malmo* | 0.07 | 0.26 | 0 | 1 | 0.05 | 0.05 | 0.05 | 0.05 | -0.03 | 0.01 | 0.00 | 0.02 | 0.03 | -0.02 | -0.01 | 0.01 | 0.05 | -0.16 | 0.03 | 0.03 | 0.16 | -0 |

**Figure 1- Visual illustration of the *experiential background relatedness* variables**




For new firm founder i=1: $\begin{cases} Local\ Total\ Entrepreneurs = 8 \\ Local\ HER\ Entrepreneurs = 2 \\ Local\ IER\ Entrepreneurs = 1 \\ Local\ NER\ Entrepreneurs = 5 \end{cases}$

For new firm founder i=2: $\begin{cases} Local\ Total\ Entrepreneurs = 8 \\ Local\ HER\ Entrepreneurs = 0 \\ Local\ IER\ Entrepreneurs = 2 \\ Local\ NER\ Entrepreneurs = 6 \end{cases}$

***Legend***

Aa (i=n) : New firm founder *i* (n=1, 2) in LLM region *r* who has experiential background at upper (A) and lower (a) hierarchical levels

Aa : A local entrepreneur in LLM region *r* who has experiential background at upper (A) and lower (a) hierarchical levels

: Indicates that experiential background of new firm founder *i* to a given local entrepreneur is highly related, i.e. they both have the same experiential backgrounds (educational, occupational, industry) at both upper and lower hierarchical levels

: Indicates that experiential background of new firm founder to a given local entrepreneur is intermediately related, i.e. they both have the same experiential backgrounds (educational, occupational, industry) at both upper but different at lower hierarchical levels

**Table 2- The effect of local entrepreneurs and experiential background relatedness on new firms survival: All founders**

| VARIABLES | (2.1) | (2.2) | (2.3) | (2.4) |
|---|---|---|---|---|
| Explanatory variables | | | | |
| *Local Total Entrepreneurs* | 0.982* | | | |
| | (0.008) | | | |
| *Local HER Entrepreneurs* | | 0.940*** | | |
| | | (0.004) | | |
| *Local IER Entrepreneurs* | | | 0.942*** | |
| | | | (0.004) | |
| *Local NER Entrepreneurs* | | | | 1.005 |
| | | | | (0.009) |
| Individual-level controls | | | | |
| *Founder Age* | 1.004*** | 1.004*** | 1.004*** | 1.003*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| *Founder Gender* | 1.032** | 1.044*** | 1.043*** | 1.032** |
| | (0.012) | (0.012) | (0.012) | (0.012) |
| *Founder STEM* | 0.984+ | 1.006 | 1.008 | 0.984+ |
| | (0.011) | (0.011) | (0.011) | (0.011) |
| Firm-level controls | | | | |
| *Firm Size* | 0.970*** | 0.970*** | 0.970*** | 0.971** |
| | (0.009) | (0.009) | (0.009) | (0.009) |
| *Educated Employees* | 0.884** | 0.903* | 0.902* | 0.882** |
| | (0.037) | (0.038) | (0.038) | (0.037) |
| *Physical Capital* | 1.011*** | 1.011*** | 1.011*** | 1.011*** |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| *Productivity* | 0.986*** | 0.986*** | 0.986*** | 0.986*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Spin-off* | 0.889 | 0.880+ | 0.880+ | 0.889 |
| | (0.064) | (0.063) | (0.063) | (0.064) |
| Local Labor Market-level controls | | | | |
| *R&D Investments* | 1.076*** | 1.084*** | 1.084*** | 1.072*** |
| | (0.003) | (0.003) | (0.003) | (0.003) |
| *Skilled Labor* | 0.999* | 0.999*** | 0.999*** | 0.999 |
| | (0.001) | (0.000) | (0.000) | (0.001) |
| *KIBS Cluster* | 0.706*** | 0.707*** | 0.706*** | 0.707*** |
| | (0.023) | (0.023) | (0.023) | (0.023) |
| *Competition* | 1.144*** | 1.121*** | 1.123*** | 1.154*** |
| | (0.018) | (0.017) | (0.017) | (0.018) |
| *Population Density* | 0.999*** | 0.999*** | 1.000*** | 1.000*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Stockholm* | 0.921*** | 0.929*** | 0.930*** | 0.923*** |
| | (0.014) | (0.014) | (0.014) | (0.014) |
| *Gothenburg* | 0.978 | 1.026 | 1.024 | 0.958 |
| | (0.028) | (0.029) | (0.029) | (0.027) |
| *Malmo* | 0.901*** | 0.941** | 0.940** | 0.886*** |
| | (0.019) | (0.020) | (0.020) | (0.019) |
| Observations | 109,807 | 109,807 | 109,807 | 109,807 |
| Nr of unique new firms | 41,221 | 41,221 | 41,221 | 41,221 |
| Nr of failures | 28,985 | 28,985 | 28,985 | 28,985 |

***Notes***: The table reports the estimated hazard ratio of Cox proportional hazard model, which is the exponential of raw coefficients. A hazard ratio<1 means a positive effect on the survival rate of new firms and a hazard ratio>1 means a negative effect on the survival rate. Robust standard errors are reported in the parentheses. Significance level: *** p<0.001, ** p<0.01, * p<0.05, + p<0.1. The sample refers to the population of newly-established single-founder firms in the KIBS (Knowledge Intensive Business Services) sector, which refers to NACE 72-74. In all models, sets of industry and time dummies are included.

**Table 3- The effect of local entrepreneurs and experiential background relatedness on new firms survival: Novice versus Experienced founders**

| VARIABLES | (3.1) | (3.2) | (3.3) | (3.4) | (3.5) | (3.6) | (3.7) | (3.8) |
|---|---|---|---|---|---|---|---|---|
| | Novice Founders | | | | Experienced Founders | | | |
| Explanatory variables | | | | | | | | |
| *Local Total Entrepreneurs* | 0.996+ | | | | 0.966** | | | |
| | (0.010) | | | | (0.013) | | | |
| *Local HER Entrepreneurs* | | 0.968*** | | | | 0.987+ | | |
| | | (0.007) | | | | (0.007) | | |
| *Local IER Entrepreneurs* | | | 0.994* | | | | 0.962*** | |
| | | | (0.003) | | | | (0.007) | |
| *Local NER Entrepreneurs* | | | | 1.007 | | | | 0.989 |
| | | | | (0.011) | | | | (0.013) |
| Individual-level controls | | | | | | | | |
| *Founder Age* | 0.999 | 0.999 | 0.999 | 0.999 | 1.008*** | 1.009*** | 1.009*** | 1.008*** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| *Founder Gender* | 1.035* | 1.041* | 1.033* | 1.035* | 1.025 | 1.026 | 1.017 | 1.025 |
| | (0.017) | (0.017) | (0.017) | (0.017) | (0.018) | (0.022) | (0.018) | (0.018) |
| *Founder STEM* | 0.983 | 0.996 | 0.996 | 0.984 | 0.992 | 0.961* | 0.981 | 0.992 |
| | (0.015) | (0.015) | (0.016) | (0.015) | (0.016) | (0.018) | (0.015) | (0.016) |
| Firm-level controls | | | | | | | | |
| *Firm Size* | 0.965** | 0.967** | 0.963** | 0.965** | 0.976+ | 0.944** | 0.978+ | 0.977+ |
| | (0.012) | (0.012) | (0.012) | (0.012) | (0.013) | (0.018) | (0.013) | (0.013) |
| *Educated Employees* | 0.926 | 0.925 | 0.935 | 0.925 | 0.849** | 0.983 | 0.844** | 0.846** |
| | (0.056) | (0.056) | (0.056) | (0.056) | (0.050) | (0.075) | (0.050) | (0.050) |
| *Physical Capital* | 1.013** | 1.013** | 1.013** | 1.013** | 1.007+ | 1.011* | 1.008+ | 1.008+ |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.005) | (0.004) | (0.004) |
| *Productivity* | 0.990*** | 0.990*** | 0.990*** | 0.990*** | 0.984*** | 0.984*** | 0.984*** | 0.984*** |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.001) | (0.002) | (0.001) | (0.001) |
| *Spin-off* | 1.046 | 1.042 | 1.045 | 1.046 | 0.760* | 0.771+ | 0.762* | 0.760* |
| | (0.101) | (0.100) | (0.101) | (0.101) | (0.081) | (0.120) | (0.081) | (0.081) |
| LLM region-level controls | | | | | | | | |
| *R&D Investments* | 1.066*** | 1.070*** | 1.066*** | 1.064*** | 1.089*** | 1.075*** | 1.091*** | 1.085*** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.005) | (0.006) | (0.005) | (0.005) |
| *Skilled Labor* | 0.999 | 0.999** | 0.999+ | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| | (0.001) | (0.001) | (0.001) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| *KIBS Cluster* | 0.700*** | 0.700*** | 0.700*** | 0.701*** | 0.720*** | 0.737*** | 0.718*** | 0.720*** |
| | (0.028) | (0.028) | (0.028) | (0.028) | (0.039) | (0.055) | (0.039) | (0.039) |
| *Competition* | 1.159*** | 1.144*** | 1.157*** | 1.164*** | 1.126*** | 1.096*** | 1.106*** | 1.135*** |
| | (0.024) | (0.024) | (0.024) | (0.024) | (0.025) | (0.028) | (0.025) | (0.026) |
| *Population Density* | 0.999*** | 0.999*** | 1.000*** | 1.000*** | 0.999*** | 0.999*** | 0.999*** | 1.000*** |
| | (0.001) | (0.001) | (0.000) | (0.000) | (0.001) | (0.001) | (0.001) | (0.000) |
| *Stockholm* | 0.924*** | 0.924*** | 0.926*** | 0.925*** | 0.915*** | 0.924** | 0.917*** | 0.917*** |
| | (0.019) | (0.019) | (0.019) | (0.019) | (0.019) | (0.024) | (0.019) | (0.020) |
| *Gothenburg* | 0.968 | 0.994 | 0.970 | 0.959 | 0.986 | 0.943 | 0.991 | 0.964 |
| | (0.037) | (0.038) | (0.036) | (0.037) | (0.043) | (0.051) | (0.042) | (0.042) |
| *Malmo* | 0.899*** | 0.919** | 0.901*** | 0.892*** | 0.899*** | 0.877*** | 0.905*** | 0.883*** |
| | (0.027) | (0.027) | (0.026) | (0.026) | (0.028) | (0.031) | (0.027) | (0.027) |
| Observations | 60,512 | 60,512 | 60,512 | 60,512 | 49,295 | 49,295 | 49,295 | 49,295 |
| Nr of unique new firms | 22,736 | 22,736 | 22,736 | 22,736 | 18,485 | 18,485 | 18,485 | 18,485 |
| Nr of failures | 15,597 | 15,597 | 15,597 | 15,597 | 13,388 | 13,388 | 13,388 | 13,388 |

***Notes***: The table reports the estimated hazard ratio of Cox proportional hazard model, which is the exponential of raw coefficients. A hazard ratio<1 means a positive effect on the survival rate of new firms and a hazard ratio>1 means a negative effect on the survival rate. Robust standard errors are reported in the parentheses. Significance level: *** p<0.001, ** p<0.01, * p<0.05, + p<0.1. The sample refers to the population of newly-established single-founder firms in the KIBS (Knowledge Intensive Business Services) sector, which refers to NACE 72-74. In all models, sets of industry and time dummies are included.

## Appendix

**Table A1- Variable description**

| Variable | Description | Source |
|---|---|---|
| ***Explanatory Variables*** | | |
| *Local Total Entrepreneurs* | Total number of local entrepreneurs in local labor market (LLM) region *r,* in which the new firm founder *i* is located, in year *t* (log)* | Establishments Dynamic database, Statistics Sweden (SCB) |
| *Local HER Entrepreneurs* | Number of local entrepreneurs in LLM region *r*, who have high experiential background relatedness (HER) with the new firm founder *i,* in year *t* (log) | " |
| *Local IER Entrepreneurs* | Number of local entrepreneurs in LLM region *r*, who have intermediate experiential background relatedness (IER) with the new firm founder *i,* in year *t* (log) | " |
| *Local NER Entrepreneurs* | Number of local entrepreneurs in LLM region *r*, who have no experiential background relatedness (NER) with the new firm founder *i,* in year *t* (log) | " |
| ***Control Variables_ Individual Level (new firm founder)*** | | |
| *Founder Age* | Founder *i*'s age in the given year *t* | LISA Employment Register Database, SCB |
| *Founder Gender* | A dummy indicating the founder *i*'s gender, 0 for Female and 1 for Male | " |
| *Founder STEM* | A dummy indicating the founder *i*'s education field, 1 if the entrepreneur studied in STEM, 0 otherwise | " |
| ***Control Variables_ Firm Level*** | | |
| *Firm Size* | New firm's size, measured by the number of employees in year *t (log)* | Business Register Database, SCB |
| *Educated Employees* | New firm's share of highly educated employees (at least three years of university education) in year *t* | " |
| *Physical Capital* | New firm's physical capital, including buildings and machines in year *t* | " |
| *Productivity* | New firm's value added per employee. Value added is measured by the difference between the value of the production of goods/services and the value of the consumption for that production | " |
| *Spin-off* | A dummy indicating whether the new firm is the result of a spin-off from a parent firm (1) or not (0) | " |
| ***Control Variables_ Local Labor Market region Level*** | | |
| *R&D investment* | The amount of corporate and university R&D investments in Local Labor Market (LLM) region *r* in year *t* (log) | " |
| *Skilled Labor* | The share of skilled labor (at least three years of university education) in LLM region *r* in year *t* | " |
| *KIBS Cluster* | $\frac{\text{Employment in KIBS industry in LLM r year t} / \text{Employment in LLM r year t}}{\text{Total employment in KIBS industry year t} / \text{Total Employment in Sweden year t}}$ | " |
| *Competition* | $\frac{\text{Nr firms in industry j LLM r year t} / \text{Nr employees in industry j LLM r year t}}{\text{Nr firms in industry j in Sweden year t} / \text{Nr employees in industry j in Sweden year t}}$ | " |
| *Population Density* | Total population divided by square kilometers in LLM region *r* in year *t (log)* | " |
| *Stockholm* | A dummy indicating whether the new firm is founded in Stockholm LLM (1) or not (0) | " |
| *Gothenburg* | A dummy indicating whether the new firm is founded in Gothenburg LLM (1) or not (0) | " |
| *Malmo* | A dummy indicating whether the new firm is founded in Malmo LLM (1) or not (0) | " |

* All log-transformations of variables in this study are based on *ln* (natural logarithm).

**Table A2.1- Robustness check for main results (Table 2): Using only education background in constructing experiential relatedness variables**

| VARIABLES | (A2.1.1) | (A2.1.2) | (A2.1.3) | (A2.1.4) |
|---|---|---|---|---|
| Explanatory variables | | | | |
| *Local Total Entrepreneurs* | 0.982* | | | |
| | (0.008) | | | |
| *Local HER Entrepreneurs* | | 0.961*** | | |
| | | (0.005) | | |
| *Local IER Entrepreneurs* | | | 0.992*** | |
| | | | (0.002) | |
| *Local NER Entrepreneurs* | | | | 0.994 |
| | | | | (0.008) |
| Controls Variables | Included | Included | Included | Included |

**Table A2.2- Robustness check for main results (Table 2): Using only occupation background in constructing experiential relatedness variables**

| VARIABLES | (A2.2.1) | (A2.2.2) | (A2.2.3) | (A2.2.4) |
|---|---|---|---|---|
| Explanatory variables | | | | |
| *Local Total Entrepreneurs* | 0.982* | | | |
| | (0.008) | | | |
| *Local HER Entrepreneurs* | | 0.947*** | | |
| | | (0.005) | | |
| *Local IER Entrepreneurs* | | | 0.947*** | |
| | | | (0.005) | |
| *Local NER Entrepreneurs* | | | | 0.989 |
| | | | | (0.008) |
| Controls Variables | Included | Included | Included | Included |

**Table A2.3- Robustness check for main results (Table 2): Using only new firm's industry affiliation in constructing experiential relatedness variables**

| VARIABLES | (A3.2.1) | (A3.2.2) | (A3.2.3) | (A3.2.4) |
|---|---|---|---|---|
| Explanatory variables | | | | |
| *Local Total Entrepreneurs* | 0.982* | | | |
| | (0.008) | | | |
| *Local HER Entrepreneurs* | | 0.927*** | | |
| | | (0.006) | | |
| *Local IER Entrepreneurs* | | | 0.937*** | |
| | | | (0.005) | |
| *Local NER Entrepreneurs* | | | | 1.005 |
| | | | | (0.009) |
| Controls Variables | Included | Included | Included | Included |

**Notes:** The same robustness check (based on only education, or only occupation, or only industry affiliation) for Table 3 reveals similar results, which is available upon request.

**Table A3.1- Robustness check for main results (Table 2): Restricting the sample to entrepreneurs who lived in the same LLM region for the past 10 years**

| VARIABLES | (A3.1.1) | (A3.1.2) | (A3.1.3) | (A3.1.4) |
|---|---|---|---|---|
| Explanatory variables | | | | |
| *Local Total Entrepreneurs* | 0.970* | | | |
| | (0.012) | | | |
| *Local HER Entrepreneurs* | | 0.913*** | | |
| | | (0.008) | | |
| *Local IER Entrepreneurs* | | | 0.929*** | |
| | | | (0.008) | |
| *Local NER Entrepreneurs* | | | | 0.996 |
| | | | | (0.012) |
| Controls Variables | Included | Included | Included | Included |

**Table A3.2- Robustness check for main results (Table 3): Restricting the sample to entrepreneurs who lived in the same LLM region for the past 10 years**

| VARIABLES | (A3.2.1) | (A3.2.2) | (A3.2.3) | (A3.2.4) | (A3.2.1) | (A3.2.2) | (A3.2.3) | (A3.2.4) |
|---|---|---|---|---|---|---|---|---|
| | Novice Founders | | | | Experienced Founders | | | |
| Explanatory variables | | | | | | | | |
| *Local Total Entrepreneurs* | 0.981 | | | | 0.956* | | | |
| | (0.016) | | | | (0.018) | | | |
| *Local HER Entrepreneurs* | | 0.953*** | | | | 0.994 | | |
| | | (0.010) | | | | (0.010) | | |
| *Local IER Entrepreneurs* | | | 0.988** | | | | 0.952*** | |
| | | | (0.004) | | | | (0.010) | |
| *Local NER Entrepreneurs* | | | | 0.994 | | | | 0.967+ |
| | | | | (0.016) | | | | (0.018) |
| Control Variables | Included | Included | Included | Included | Included | Included | Included | Included |

**Table A4.1- Robustness check for main results (Table 2): Using different hierarchical level in constructing experiential relatedness variable**

| VARIABLES | (A4.1.1) | (A4.1.2) | (A4.1.3) | (A4.1.4) |
|---|---|---|---|---|
| Explanatory variables | | | | |
| *Local Total Entrepreneurs* | 0.982* | | | |
| | (0.008) | | | |
| *Local HER Entrepreneurs* | | 0.945*** | | |
| | | (0.005) | | |
| *Local IER Entrepreneurs* | | | 0.946*** | |
| | | | (0.005) | |
| *Local NER Entrepreneurs* | | | | 1.000 |
| | | | | (0.008) |
| Controls Variables | Included | Included | Included | Included |

**Table A4.2- Robustness check for main results (Table 3): Using different hierarchical level in constructing experiential relatedness variable**

| VARIABLES | (A4.2.1) | (A4.2.2) | (A4.2.3) | (A4.2.4) | (A4.2.1) | (A4.2.2) | (A4.2.3) | (A4.2.4) |
|---|---|---|---|---|---|---|---|---|
| | Novice Founders | | | | Experienced Founders | | | |
| Explanatory variables | | | | | | | | |
| *Local Total Entrepreneurs* | 0.996+ | | | | 0.966** | | | |
| | (0.010) | | | | (0.013) | | | |
| *Local HER Entrepreneurs* | | 0.920*** | | | | 0.978** | | |
| | | (0.011) | | | | (0.007) | | |
| *Local IER Entrepreneurs* | | | 0.936*** | | | | 0.974*** | |
| | | | (0.010) | | | | (0.007) | |
| *Local NER Entrepreneurs* | | | | 1.009 | | | | 0.957* |
| | | | | (0.016) | | | | (0.018) |
| Control Variables | Included | Included | Included | Included | Included | Included | Included | Included |

**Table A5.1- Robustness check for main results (Table 2): Adding regional fixed effects**

| VARIABLES | (A5.1.1) | (A5.1.2) | (A5.1.3) | (A5.1.4) |
|---|---|---|---|---|
| Explanatory variables | | | | |
| *Local Total Entrepreneurs* | 0.999+ | | | |
| | (0.010) | | | |
| *Local HER Entrepreneurs* | | 0.971*** | | |
| | | (0.003) | | |
| *Local IER Entrepreneurs* | | | 0.967*** | |
| | | | (0.003) | |
| *Local NER Entrepreneurs* | | | | 1.001 |
| | | | | (0.011) |
| Controls Variables + regional fixed effects | Included | Included | Included | Included |

**Table A5.2- Robustness check for main results (Table 3): Adding regional fixed effects**

| VARIABLES | (A5.2.1) | (A5.2.2) | (A5.2.3) | (A5.2.4) | (A5.2.1) | (A5.2.2) | (A5.2.3) | (A5.2.4) |
|---|---|---|---|---|---|---|---|---|
| | Novice Founders | | | | Experienced Founders | | | |
| Explanatory variables | | | | | | | | |
| *Local Total Entrepreneurs* | 0.993+ | | | | 0.964* | | | |
| | (0.010) | | | | (0.016) | | | |
| *Local HER Entrepreneurs* | | 0.975*** | | | | 0.984* | | |
| | | (0.007) | | | | (0.007) | | |
| *Local IER Entrepreneurs* | | | 0.995+ | | | | 0.960*** | |
| | | | (0.003) | | | | (0.007) | |
| *Local NER Entrepreneurs* | | | | 1.041** | | | | 0.981 |
| | | | | (0.014) | | | | (0.017) |
| Control Variables + regional fixed effects | Included | Included | Included | Included | Included | Included | Included | Included |

***Note***: In all models in Tables A5.1 and A5.2, we added 21 counties in Sweden (*län* in Swedish), as regional fixed effects control variables, in order to control for regional heterogeneity in terms of munificent conditions for entrepreneurship. Counties in Sweden are equivalent to NUTS3 developed by the EU. The 21 counties in Sweden are as follows: Stockholm, Västerbotten, Norrbotten, Uppsala, Södermanland, Östergötland, Jönköping, Kronoberg, Kalmar, Gotland, Blekinge, Skåne, Halland, Västra Götaland, Värmland, Örebro, Västmanland, Dalarna, Gävleborg, Västernorrland, Jämtland.

**Table A6- Robustness check for main results (Table 2 & 3): Using the number of startup which are members in incubators instead of Local Total Entrepreneurs**

| VARIABLES | (A6.1) | (A6.2) | (A6.3) |
|---|---|---|---|
| | All Founders | Novice Founders | Experienced Founders |
| Explanatory variables | | | |
| *Startups in incubators* | 0.98*** | 0.99*** | 0.97*** |
| | (0.000) | (0.000) | (0.000) |
| Individual-level controls | | | |
| *Founder Age* | 1.003*** | 0.999+ | 1.008*** |
| | (0.000) | (0.001) | (0.001) |
| *Founder Gender* | 1.033** | 1.036* | 1.028 |
| | (0.013) | (0.017) | (0.018) |
| *Founder STEM* | 0.979+ | 0.981 | 0.985 |
| | (0.011) | (0.015) | (0.016) |
| Firm-level controls | | | |
| *Firm Size* | 0.975** | 0.970* | 0.980 |
| | (0.009) | (0.013) | (0.013) |
| *Educated Employees* | 0.910* | 0.945 | 0.882* |
| | (0.040) | (0.059) | (0.054) |
| *Physical Capital* | 1.006+ | 1.009* | 1.002 |
| | (0.003) | (0.005) | (0.004) |
| *Productivity* | 0.986*** | 0.989*** | 0.984*** |
| | (0.001) | (0.002) | (0.001) |
| *Spin-off* | 0.885 | 1.044 | 0.750* |
| | (0.066) | (0.103) | (0.085) |
| LLM region-level controls | | | |
| *R&D Investments* | 1.107*** | 1.093*** | 1.124*** |
| | (0.004) | (0.005) | (0.006) |
| *Skilled Labor* | 0.998*** | 0.999*** | 0.998*** |
| | (0.000) | (0.000) | (0.000) |
| *KIBS Cluster* | 0.754*** | 0.741*** | 0.779*** |
| | (0.025) | (0.030) | (0.042) |
| *Competition* | 1.270*** | 1.270*** | 1.263*** |
| | (0.036) | (0.045) | (0.060) |
| *Population Density* | 0.999*** | 1.000*** | 1.000** |
| | (0.000) | (0.000) | (0.000) |
| *Stockholm* | 0.917*** | 0.923*** | 0.909*** |
| | (0.013) | (0.019) | (0.019) |
| *Gothenburg* | 1.444*** | 1.441*** | 1.432*** |
| | (0.046) | (0.062) | (0.068) |
| *Malmo* | 0.850*** | 0.859*** | 0.834*** |
| | (0.017) | (0.025) | (0.025) |
| Observations | 99,937 | 55,136 | 44,801 |
| Nr of unique new firms | 37761 | 20,838 | 16,923 |
| Nr of failures | 26,375 | 14,199 | 12,176 |

***Notes***: Dependent variable is the survival of new firms. The table reports the estimated hazard ratio of Cox proportional hazard model, which is the exponential of raw coefficients. A hazard ratio<1 means a positive effect on the survival rate of new firms and a hazard ratio>1 means a negative effect on the survival rate. Robust standard errors are reported in the parentheses. Significance level: *** p<0.001, ** p<0.01, * p<0.05, + p<0.1. The sample refers to the population of newly-established single-founder firms in the KIBS (Knowledge Intensive Business Services) sector, which refers to NACE 72-74. In all models, sets of industry and time dummies are included.