

# Networking to death: on the dark side of start-ups' external networking

Start-ups'  
external  
networking

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Aristides I. Ferreira

*Business Research Unit (BRU), ISCTE-Instituto Universitário de Lisboa, Lisboa, Portugal*

Timo Braun

*Darmstadt Business School, Darmstadt University of Applied Sciences, Darmstadt, Germany*

Helena Carvalho

*Centro de Investigação e Estudos de Sociologia (CIES-IUL), ISCTE-Instituto Universitário de Lisboa, Lisboa, Portugal*

António C.M. Abrantes

*TBS Business School, Toulouse, France, and*

Jörg Sydow

*School of Business and Economics, Freie Universität Berlin, Berlin, Germany*

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## Abstract

**Purpose** – Many start-ups do not survive the first few years of business. Previous studies suggest that networks play a role in start-ups' success, but this positive effect has limits. The purpose of this paper is to answer the call for a better understanding of the dark side of networks and the variables that condition variables' effect on the likelihood of start-ups' survival.

**Design/methodology/approach** – A longitudinal research design includes 139 start-ups (102 from Germany and 37 from Portugal) and a total of 252 participants. A generalized linear mixed model (GLMM) was applied to estimate all the coefficients, to test the mediation (H1), the moderation (H2) and the moderated mediation (H3) while considering the economic situation of the start-up (sales growth), start-ups' networking behavior, creativity orientation and ultimately the likelihood of survival.

**Findings** – Based on an empirical study from two different countries, the results show that effective networking is contingent on the start-up's economic situation and creative potential. Specifically, the results point to situations in which early sales growth may lead to external networking, which, in contexts of low creativity-oriented start-ups, can compromise the start-ups' success.

**Originality/value** – Based on the findings, the authors compare scenarios in which networking increases the chances for start-up survival with situations where networking can have adverse effects. This study highlights the importance of considering specific start-up parameters, such as start-ups' economic situation and level of creativity orientation, in the business venturing literature.

**Keywords** Networking, Creativity, Sales growth, Start-up survival, Mortality

**Paper type** Research paper

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## Introduction

The establishment and development of start-ups is considered a key element in the growth of economic wealth (Aaboen and Aarikka-Stenroos, 2017), and for the innovation capacity of regions and nations, contributing to the creation of new jobs and the maintenance of high levels of competitiveness (Baraldi *et al.*, 2019). It is, therefore, crucial to ensure that an increasing number of start-ups survive their early stages and flourish while creating value for society. Start-ups are new business ventures that did not previously exist (Birley and Westhead, 1994). Like other small and medium-sized enterprises (SMEs), start-ups have to deal with the liabilities of smallness. Yet, unlike older established SMEs, they also have to deal with the liabilities of newness (Gimenez-Fernandez *et al.*, 2020). This dual liability may lead start-ups to higher failure rates, reducing their chances of survival (Audretsch *et al.*, 2020). The factors that contribute to an increase in the survival ratio of start-ups, therefore, deserve attention (e.g. LeBrasseur *et al.*, 2003). Two of the most relevant factors pointed out in the entrepreneurship literature as being fundamental to the success of start-ups are the creation or emergence of social networks (e.g. Brass *et al.*, 2004; Braun *et al.*, 2018; Elfring and Hulsink, 2007; Hallen *et al.*, 2020) and the creativity necessarily involved in a business idea or model (e.g. Fillis and Rentschler, 2010) or organization creation more broadly (Gartner, 2012).

Although networking and creativity interact in the context of start-up establishment and development (Perry-Smith and Mannucci, 2015, 2017), their impact is more granular than a simple positive direct effect. The social networking literature has also revealed some inconsistent conclusions regarding the relationship between social ties and business venturing survival (c.f., Baraldi *et al.*, 2019). For example, Stam *et al.* (2014) point to the positive effects of networks on the development of start-ups, in particular with regard to network diversity. By contrast, Lechner *et al.* (2006) argue that over-reliance on social networks can become a constraint to growth by preventing firms from forming other potentially important ties. A study conducted by Zhou *et al.* (2007) revealed that networking is correlated with profitability growth, but not with sales performance. In fact, generating and maintaining networks, as well as the capacity to manage them, is important for the success of new firms (Adomako *et al.*, 2018; Walter *et al.*, 2006). Thus, the effect of networking may be less linear, and more like an inverted U-shape, indicating that there is an optimal level of networking (Arregle *et al.*, 2015). If a network grows beyond the firm's ability to manage it, the network may overload, hampering the success of the firm (Mariotti and Delbridge, 2012; Steier and Greenwood, 2000). This dark side of networking deserves further research (Elfring and Hulsink, 2007; Hallen *et al.*, 2020; Klyver *et al.*, 2011), considering both entrepreneurial creativity and the distinct economic situation of the start-up.

In fact, little research has been conducted on the initiation of business relationships during the start-up process (Edvardsson *et al.*, 2008; Kalyanasundaram *et al.*, 2021). Drawing on the dynamics of network structural holes theory (Burt, 1992, 2019), this study aims to understand how early growth in sales could reveal the dark side of networking, and how an orientation toward creativity may curb this pernicious facet of networks. Different patterns of this interaction may make it possible to reconcile some conflicting findings in the entrepreneurship literature informed by network theory (c.f., Baraldi *et al.*, 2019).

Drawing on objective longitudinal data for survival/mortality, this study delves into the early stages of organization creation and start-up development, and aims to shed more light on how the use of networks may interact with the characteristics of newly created firms (Stam *et al.*, 2014). Therefore, the present study helps reconcile contrasting perspectives (c the positive and negative effects of networks) by identifying a firm characteristic that can mitigate the perverse effects of networks. There are already some studies that analyze the moderating effect of some contextual variables and firm characteristics on networks' effect on firms' survival and mortality (e.g. Hallen *et al.*, 2020; Stam *et al.*, 2014). Nevertheless, there is still much to cover within this line of research.

For instance, it is worth exploring the moderating effect of creativity on the use of networks for the success of start-ups, as especially high-growth start-ups have to come up

with a novel and at least potentially useful idea (Anderson *et al.*, 2014) regarding either the final product or service or the business model, for instance. Thereby, networks may enhance the value of creativity, whereas it is also possible that an orientation towards creativity enhances the value of networks. The potential of structural holes can also be best harnessed when start-ups have a creativity orientation (Burt, 2004), especially when they have the ability to connect novel ideas and contexts for the generation of valuable new products, services, or processes (Camarero *et al.*, 2019; Jeffcutt and Pratt, 2002).

In view of these considerations, this study aims to investigate the limits of networking for new ventures in order to understand how economic performance at an early stage, expressed by sales growth, can condition the survival of start-ups, and how this constraint depends on the start-ups' creativity orientation. Accordingly, start-ups dealing with increasing sales growth may be tempted to increase their external networks with suppliers, customers or other external partners (Hite and Hesterly, 2001). This, in turn, may limit important resources required for firm survival (Steier and Greenwood, 2000; Watson, 2007). However, this effect may well apply to the creative efforts of the start-up, which may benefit from different types of networking (see Figure 1).

To achieve the objectives of this study, 139 German and Portuguese start-ups were analyzed. Through the analysis of objective sales data collected less than five years after the foundation of the firm, and the use of a longitudinal design with follow-up measures (i.e. four years after data collection) to assess the mortality/survival of the start-ups, this study has shown how early sales growth does indeed lead to an increase in the intensive use of external networks, causing a negative effect on the probability of start-up survival. Moreover, it is shown that this effect depends on the firm's creativity orientation.

Our study provides four contributions to the entrepreneurship literature. Firstly, it sheds light on the dark side of external networking, which can in fact reduce the chance of start-up survival. Hence, it is not always beneficial to cultivate the use of external networks (Burt, 2019; Granovetter, 2005; Watson, 2007). Secondly, this study adds to the network theory of entrepreneurship (Stam *et al.*, 2014) by showing how sales growth influence the use of external networks, which in turn negatively influence start-up survival. Thirdly, this study demonstrates that the dark side of external networking only applies to firms with a low creativity orientation. This outcome is explained by the network closure theory (Coleman, 1988), where we find support to explain the need for firms with a low creativity orientation to maintain only a few strong ties. In fact, the use of these sorts of ties can help low creativity-oriented start-ups to exploit their strengths, without benefiting from the advantages of an extended network, or even being hampered by their inability to maintain essential strong ties (Stam *et al.*, 2014). Lastly, through a robust methodological approach, this research answers the call to adopt a longitudinal analysis (e.g. Hanage *et al.*, 2021) that complements the many extant cross-sectional studies in order to understand early stage entrepreneurial processes and how they relate to the survival of business ventures.

The paper is structured in five sections. First, it reviews the literature on entrepreneurship that makes use of network theory and research with a special focus on the extent of external

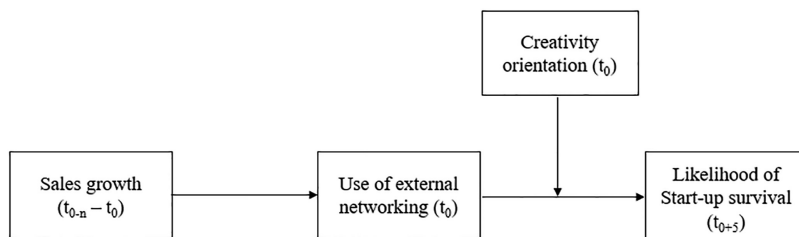


Figure 1. Conceptual model

networking. Then it discusses the literature on creativity orientation and its connection to the use of networks, followed by an exposition of the research methodology. This is followed by the presentation and analysis of the results. The study concludes with a discussion regarding the theoretical and practical implications, as well as limitations and suggestions for future research.

## **Theoretical framework and hypotheses development**

### *The bright and dark sides of external networking*

Over the last few decades, the literature has considered both the characteristics of the entrepreneur and the context in which entrepreneurship unfolds in order to explain start-up survival or success (Baraldi *et al.*, 2019). An important concept that brings entrepreneurship and context closer together is networks. Hence, it comes as no surprise that research on entrepreneurial networking has flourished over the last two decades (Hallen *et al.*, 2020, for a recent review). Networking usually refers to individuals' actions or practices associated with the capacity to build, maintain, and use (mostly informal) relationships in order to facilitate daily activities at work, to overcome obstacles and to pursue personal advantages (Forret and Dogherty, 2001). One of the key insights of research on networking is that the ability of individuals to use their external networks to access resources outside their control can influence the success of entrepreneurial ventures (Watson, 2007).

The role of networks is explained by two contrasting theories. Network closure theory argues that social capital is created by a network of tightly interconnected actors, where everyone is ideally connected to everyone else (Coleman, 1988). In these types of structure, all network elements have access to the same information in a complementary way, and trust between them is facilitated by the level of interconnectedness. In contrast, the theory of structural holes suggests that social capital is created when networks have holes, that is, some elements of the network are not or are only weakly connected (Burt, 1992). Structural holes create a brokerage opportunity for those who bridge these connections, by revealing networking capacities and giving them a competitive advantage. According to this theory, a structural hole refers to an "empty space" between connections within the network. Accordingly, there is a lack of direct contact or tie between two or more entities (Burt, 1992) because these individuals do not have opportunities to interact closely, belong to different sides of the structural hole, and, therefore, have access to different flows of information.

The network closure theory reveals that entrepreneurs with networking skills more easily gain access to important business-related information such as new market opportunities, develop innovative ideas, and are also able to benefit from greater financial advantages. Networks help start-ups to utilize complementary skills and assets which they do not have themselves. Also, networks can provide access to valuable information, open new business opportunities with suppliers and customers, and broaden the financial support base (Baraldi *et al.*, 2019; Bruderl and Preisendorfer, 1998; Stam *et al.*, 2014), as well as develop reputation networks that foster start-up development (Lechner *et al.*, 2006). For example, a study conducted with 149 small US manufacturing companies revealed that several networking activities developed by their employees increased the number of their inter-organizational alliances (BarNir and Smith, 2002) to gain access to financial support from banking institutions (Honig, 1998). Other studies suggest that investing in intangibles such as networking significantly improves important performance measures that enable firm survival, and increases profit, along with the capacity to generate employment (Bosma *et al.*, 2004). Zhou *et al.* (2007) found that with regard to the process of gathering business advice, networking seemed to be an important factor that explained the success of 129 entrepreneurial and internationally oriented SMEs in China.

However, the dark side of external networks, highlighted in certain respects by the structural hole theory, has been empirically explored less. This less appealing side of networks is the central tenet of this study. It shows how the value of networking for actors can be reduced to the point where it becomes detrimental to their success (Burt, 1992). For the very strength and density of the ties created in a cohesive network can hinder cooperation by reducing the autonomy of network elements to develop social ties beyond existing networks (Gargiulo and Benassi, 2000). Similarly, Granovetter (2005) argues that newer and important information passes more through weak rather than strong ties. According to this author, in more cohesive networks, circulating information is somewhat repetitive, whereas in weaker tied networks, information may be more innovative and complementary.

Some entrepreneurship studies have also addressed the effects of external networks on the success of start-ups. Several factors have been identified as contributing to the value of a network for a new firm, such as the quality of the management of the respective relationships, or the way in which these relationships are fostered (Steier and Greenwood, 2000). The process of creating a network of strong ties, however, is emotional and closely linked to social exchange (Jack *et al.*, 2010). It, therefore, requires a large investment in time, which can distract the owner of the firm from other aspects that are crucial to its proper functioning (Adler and Kwon, 2002). Using longitudinal data from the Australian Institute of Statistics, Watson (2007) found that the relationship between a firm's survival and its network use was best represented by an inverted U curve. In other words, the use of networks is beneficial for the firm to a certain degree, above which the probability of its failure increases. Another study conducted through telephone interviews with 515 entrepreneurs from China, France, Russia, and the United States suggested that the use of family networks can hamper start-up growth because of superfluous and overlapping networks (Arregle *et al.*, 2015). These findings are in line with research on embeddedness, which posits that frequent interactions within strong ties facilitate resource sharing and tacit transfer of information and knowledge, but that over-embeddedness can render firms vulnerable to external shocks and make it difficult for them to access information beyond their existing network of relationships (Uzzi, 1997). This line of research supports the idea that if a network grows too much, it can become overloaded and very difficult to manage, thus contributing to the company's failure (Steier and Greenwood, 2000). New firms are in fact very dependent on the owner-manager, who is their main resource and decision maker (LeBrasseur *et al.*, 2003). The management skills of this actor are one of the most important contributing factors to the success or failure of a new venture (Albuquerque *et al.*, 2016). An excessive investment of time in networking may compromise the owner's other actions.

Given the arguments put forward for and against the use of external networks in the context of start-ups, and the imbalance in the number of studies in favor of the positive aspects of networks (cf. Hallen *et al.*, 2020), several academics have called for the study of the dark side of network use (e.g. Adler and Kwon, 2002; Elfring and Hulsink, 2007; Klyver *et al.*, 2011). One of the reasons highlighted by Klyver *et al.* (2011) for the greater attention given to the positive aspects of using networks is the proximity between the concepts of network and social capital. According to the authors, social capital is the value created and stored in social networks, i.e. it refers to the means and resources from which the entrepreneur benefits through his or her network. However, a line of research focusing on the dark side of network usage and network inertia is particularly important to ward off a perception of networking as being infallibly good and to avoid moralistic statements (Klyver *et al.*, 2011).

As companies grow, they need more resources and tend to increase their external and more formalized networks to obtain the required resources to survive (Hite and Hesterly, 2001). It would, therefore, be realistic to assume that as sales grow, the relationship between the use of external networking and start-up survival becomes more pronounced, even if some of the formerly externalized functions may have been internalized in the meantime.

Therefore, an awareness of how the dark side of networking can affect different contexts and explain start-up mortality would seem to be an interesting avenue for research in the fields of business venturing.

*When early growth (in sales) may lead to demise through the excessive use of networks*

Over time, and as companies go through different phases, the resources needed to make them operate successfully and survive gradually change (Hite and Hesterly, 2001; Kalyanasundaram *et al.*, 2021). Baraldi *et al.* (2019) propose three phases of start-up development that correspond to three distinct stages of the network embedding process: *establishment*, *consolidation*, and *stabilization*. The *establishment* phase consists of the initial launch of the company and the building of its first ties with external partners. At this stage the network supports the creation and development of ideas and businesses but does not yet contribute to their direct revenues or economic gains. Network closure can bring advantages to the entrepreneur during this phase, as the network provides a safe space for the firm to survive the trial and error process typical of new projects (Burt, 2019). The *consolidation* phase follows, with first revenues and economic gains. During this stage the start-up increases its number of business partners, widening its network. Now network closure is no longer beneficial, and structural holes become generative of social capital (Burt, 2019). At this stage entrepreneurs must be able to move beyond their initial networks to create brokerage opportunities. The last period is the *stabilization* phase, in which the firm reaches a turnover that makes it sustainable (McGrath *et al.*, 2017).

In the early stages of rapid growth (establishment and consolidation), the owner's ability to execute is decisive for sustaining the business (Churchill and Lewis, 1983). During these stages, the enterprise requires the full dedication of the owner. At this stage of a start-up's development, networking is a somewhat unclear process, as it may involve many and diverse actors (Aarikka-Stenroos, 2008; Edvardsson *et al.*, 2008). As such, taking care of networks becomes an organizational task, and not only the personal responsibility of the entrepreneur (Braun *et al.*, 2018). This evolution creates pressure on the growing firm's network development in reaction to its evolving resource needs and the challenges it faces due to resource acquisition. The firm actively seeks new resources to support growth by incorporating arm's-length ties into its network, lending it greater diversity (Hite and Hesterly, 2001). Networking should, therefore, be a proactive task for entrepreneurs, but a proper relational mix may be a more relevant structure through which to explain the value of a network, rather than just its size (Lechner *et al.*, 2006). The enterprise must be able to secure the advantages of a broad and diverse network without getting locked into an overly dense and tightly coupled network (Uzzi, 1997) or simply succumbing to the disadvantages of having too many ties, which can be a difficult task to manage (Steier and Greenwood, 2000).

The expansion and diversification of the network in the initial phase of growth is achieved by forming initially weak ties (Elfring and Hulsink, 2007). The strength of a tie is given by the "combination of the amount of time, the emotional intensity, the intimacy, and the reciprocal services which characterize the tie" (Granovetter, 1973, p. 1361). Weak ties allow access to new industry information and business contacts, but strong ties tend to be long-term and trust-based, allowing for the transfer of more in-depth information and tacit knowledge (Elfring and Hulsink, 2007), increasing the chances of success for new firms in exploiting opportunities (Adomako *et al.*, 2018). It has been shown that successful small businesses tend to have a network based on key customers, and the production of innovations founded on careful product development in turn built on strong ties (Littunen, 2000). Although weak ties make it possible to identify new opportunities, they are more difficult to exploit (Stam *et al.*, 2014).

Thus, when new firms are in a consolidation phase, characterized by rapid growth, and entrepreneurs should be concentrating on internal processes, they may be tempted to increase their network to make up for resource shortages (Hite and Hesterly, 2001). In doing so, they take time and dedication away from developing the business. At the same time, they may create weak ties that they need fewer of, and overload the network by making it difficult to manage (Steier and Greenwood, 2000; Watson, 2007). The situation, therefore, deteriorates, and this behavior contributes to an increased likelihood of the company's demise. In other words, growth, for instance measured in sales, may lead to an excessive increase in the external network and unveil the dark side of networks' usage. Given this argument, we propose that:

- H1. The use of external networking mediates the relationship between sales growth and the likelihood of start-up survival, such that its indirect effect predicts the likelihood of survival negatively.

#### *Creativity orientation "brightens" the dark side of networking*

There have been several calls for a study of moderators on the value of networks in the entrepreneurship literature (e.g. Stam *et al.*, 2014), and several moderators have already been studied. For example, Martinez and Aldrich (2011) found that the value of the type of network, based on either strong or weak ties, was contingent on the stage of development that the company had reached. The degree of radical or incremental innovation has also been proposed as a contingency factor with an impact on the effects of networks with strong and weak ties in various business processes (Elfring and Hulsink, 2003). Start-ups involved in incremental innovation are focused on building their business and do not require much new information, which means they gain few benefits from an expanded network of weak ties; it is more useful for them to exploit rather than to explore and, therefore, resources are obtained through strong ties (Elfring and Hulsink, 2007). Moving forward along this research avenue, our study examines how creativity orientation influences the effect of network use on the likelihood of start-up survival.

Creativity focuses on the generation of something novel and at least potentially valuable (Anderson *et al.*, 2014). Hence, creativity orientation involves promoting the organization's capacity for the generation of new and valuable ideas (Camarero *et al.*, 2019). The aim of this orientation is not only to provide innovative products, services and/or processes but to promote the collective belief that firm survival depends on creativity and innovation (Braun *et al.*, 2018). Towards this end, creativity-oriented firms tend to cultivate interpersonal and interorganizational networks deliberately in order to increase the knowledge flow and foster innovation (Singh, 2005). For example, Bandera and Thomas (2019) have shown that the relationship between the use of social capital in start-ups, which emanates from their networks, and their survival is stronger among high-tech companies, which are characterized by a high level of creative orientation, as defined by Camarero *et al.* (2019).

Companies with high creative orientation need to recombine different ideas and resources to foster creativity and, as such, benefit from a diverse network in which disparate knowledge increases the likelihood of identifying and disseminating innovative opportunities. Contrarily, companies with little creative orientation benefit from small, cohesive networks based on strong ties, as they capitalize on the effective mobilization of resources around new specific projects (Stam *et al.*, 2014). These companies can share and absorb knowledge through few but strong ties more easily. They do not benefit from the extensive use of networks because their competitive advantage does not lie in access to innovative and diverse knowledge and opportunities, but in exploiting the specific expertise they already have.

As such, creativity orientation plays a relevant role in the effects of using networks. Strategies used by start-up companies do indeed vary in the degree of innovation (Woschke *et al.*, 2017), which signals their creativity orientation. In turn, the degree of

innovation and, therefore, the degree of creativity orientation has an influence on how companies relate to and use their networks (Stam *et al.*, 2014; Perry-Smith and Mannucci, 2017). This may suggest that by depending on their orientation towards creativity, start-ups benefit from different forms of networking. We, therefore, posit that the effect of network use on the mortality/survival of start-ups is contingent on their creativity orientation. Thus, the second hypothesis proposes that:

*H2. Creativity orientation moderates the relationship between the use of external networking and the likelihood of start-up survival.*

**Hypothesis 1** proposes that when sales increase rapidly at an early stage in the life of a start-up, this can negatively affect its future success and decrease the probability of its survival. This is because with the sharp increase in sales, new companies may be tempted to increase their network to such an extent that they exceed their capacity to manage it, which may impair the success of their business. **Hypothesis 2** suggests that the effect of the network increase on the likelihood of start-up survival is contingent upon the degree of creativity orientation. Similar arguments are presented to suggest that the indirect effect of increased sales on the likelihood of survival through the use of networks is contingent on the degree to which start-ups are oriented towards creativity. We propose that the indirect effect of increased sales on the likelihood of survival through increased use of networks is only negative when start-ups have a low creativity orientation.

In line with network theories that emphasize the advantages of either network closure (Coleman, 1988) or brokerage (Burt, 1992), external networks play an important role in the development of the new information flows that are required to build and maintain social capital. Firms that have a high orientation towards creativity will benefit from the increased use of networks due to increased sales, although the types of relationship (e.g. to manufacturing capacities *vs.* knowledge sources) may matter as well. Early meta-analytical studies on the innovation–performance relationship suggest that the creativity orientation of start-ups is positively correlated with performance (e.g. Rosenbusch *et al.*, 2011; Song *et al.*, 2008). Creativity-oriented start-ups can benefit from an increased use of the network induced by sales growth, as they use external networks to increase their access to disparate sources of knowledge (Singh, 2005). A study conducted by Walker *et al.* (1997) of biotech start-ups (i.e. with high creativity orientation) showed that network closure theory explains how cooperation works better throughout, and that the network becomes more structured over time – in the end, even too structured. In this study, network formation and the growth of creative-oriented start-ups are positively influenced by the development and maintenance of social capital. The authors explain that in biotech start-ups, networks last longer (Walker *et al.*, 1997). The start-up growth (e.g. in terms of sales) makes creative start-ups seek opportunities externally to access additional resources and organize for growth, and thus they acquire external creativity that can be found in a wider network (Harryson, 2008).

By contrast, less creativity-oriented start-ups, which deal with more stable environments and benefit from smaller networks with strong ties, may experience the dark side of networking earlier. The increased use of networks, prompted by increased sales, can have negative consequences on their ability to exploit valuable links (Stam *et al.*, 2014) and, therefore, decrease their likelihood of survival. These companies benefit from the exploitation of their competitive advantage, which requires the strengthening of carefully selected relationships (Harryson, 2008) after they may have turned toward more formal, market-like relationships before (Hite and Hesterly, 2001). Contrarily to this, when companies increase the use of the network due to an increase in sales, they weaken privileged relationships without reaping the benefits of expanding the network. In line with structural holes theory (Burt, 1992), at later stages of sales growth the social network may have negative effects on start-up performance, as strong ties may reduce innovativeness because they can increase the dominance of strong network effects



(Granovetter, 2005; Walker *et al.*, 1997), and thus reduce the focus on business and organization creation (Baraldi *et al.*, 2019), affecting start-up survival. To our knowledge, no studies have been conducted to simultaneously examine the roles of external networking and start-up creativity orientation in the relationship between sales growth at different phases of start-up development and subsequent survival. Therefore, we hypothesize that:

- H3. Creativity orientation moderates the indirect relationship between sales growth and the likelihood of start-up survival through the use of external networking.

## Research methodology

### *Sample and procedure*

Following the suggestion to include heterogeneity when studying entrepreneurship (Honig, 1998), the data in this study include samples of new German and Portuguese start-ups, accounting for maximum cultural heterogeneity (Latin cluster *vs.* Germanic cluster). This allows us to control or check for cultural differences in the hypotheses studied. With the subsequent inclusion of the start-up nationality as a control variable in the statistical models, this methodological strategy allowed us to increase external validity (Gupta *et al.*, 2002).

Similar to Hyttinen *et al.* (2015), the current sample builds on one previous survey that targeted 98 different start-ups that, in 2014, had survived for a mean of 3.75 years since their foundation (see Braun *et al.*, 2018, for more details). The initial database is derived from different sources, including the German Gruenderszene.de website and the Portuguese Start-up-Index. Venture capitalists, business angels, and incubators were first contacted in 2014, either in person or by telephone. Among them, about 70% of the start-ups were willing to participate in the study. Participants, having been authorized to do so, filled in the questionnaire in either paper or pencil format or electronically. The original dataset included 324 useable questionnaires measuring *the use of external networking*, *creativity orientation* and *sales growth* (where they had to report scores from different moments in time). However, some of the companies were not included in the previous study and some of them had not survived more than five years after foundation. Overall, this research includes 139 start-ups (102 from Germany and 37 from Portugal) and a total of 252 participants. Therefore, the database used in the study was formed as follows: in 2014, data were collected on the use of external networks, creativity orientation and sales growth; the latter indicator corresponds to the sales growth in the years of foundation ( $t_{0-n}$ ), 2011 ( $t_{0-2}$ ), 2012 ( $t_{0-1}$ ) and 2013 ( $t_0$ ); the likelihood of survival was collected in 2018 ( $t_{0+5}$ ).

The IT sector was represented to a greater extent (50.4%), followed by trade (8.7%), art (5.2%), marketing (4.4%) and others (i.e. <3%) (e.g. construction, biotechnology and consulting). We always sought to involve at least one CEO/entrepreneur per start-up and, if possible, multiple employees familiar with the company's business. A CEO/entrepreneur belonging to each start-up and zero to three additional employees agreed to participate. The sample thus consisted of 140 CEOs/entrepreneurs (55.6%) and 112 (44.4%) employees. In order to aggregate data at the start-up level (i.e. involve multiple answers per start-up), participants (entrepreneurs and employees) were nested within the same level of analysis.

The entrepreneurs were between 18 and 65 years old, with an average of 31.77 years old ( $SD = 6.63$ ), and 72.6% of the employees were males. The participants completed the questionnaire in 2014. One company had been founded that year, 24 in 2013, 43 in 2011 and 2012, and 28 in 2010. The average seniority of the employees was 1.65 years ( $SD = 1.13$ ). Most of the participants (72.2%) were full-time employees, whereas those remaining contributed on a part-time basis (5.6%), as free-lancers/in self-employment (7.1%) or during an internship (7.5%), as well as with other non-specified activities. None of the employees worked less than 50% of a full-time schedule (i.e. for a minimum of 20 working hours per week).

Early in 2018, follow-up approaches and interviews (via personal contacts or telephone) were scheduled, four years after the initial screening in 2014. Participants were asked if the firm was still operational, or if they had completely abandoned their start-up. About 30% of the initial contacts were no longer active. However, the following signals of mortality could be identified: (1) bankruptcy; (2) no website or physical address available anymore; (3) no post/news or update of the website since 2014; and (4) a change in the company's name without success (e.g. successful exit). As for the indication of survival, the following signs were identified: (1) name was partly integrated into that of another company (e.g. as a brand or subtitle); (2) successful exit/acquisition; and (3) re-location of the company/new address available. After four years, it could be established that 88 (63.3%) of the start-ups had survived and remained active since they had started their business, and that 51 (36.7%) of the start-ups had failed.

### *Measurement*

*Use of external networking.* This construct measures the extent to which organizational members use external personal contacts in order to obtain important information or other resources for the individual or the organization. All the eight items were adapted from the external contacts subscale (using external networking) developed by Wolff *et al.* (2011). Participants answered on a scale ranging from 1 “never/very seldom” to 7 “very often/always”. Examples of items are: “I discuss business matters with acquaintances after working hours” and “If I meet acquaintances from other organizations, I approach them to catch up on news and changes in their professional life”. A confirmatory factor analysis (CFA) validated the unidimensionality of the scale *use of external networking*, providing a good model fit  $\chi^2(5) = 5.64, p = 0.34$  with the Normed Chi-square  $\chi^2/df = 1.23$ , supported by the cut-off values  $\leq 2$ ; the Comparative Fit Index (CFI) and the Tucker–Lewis Index (TLI) were above the cut-off of  $\geq 0.95$ , with CFI = 0.99 and TLI = 0.99; the Root Mean Square Error of Approximation (RMSEA = 0.03) was lower than the cut-off value of  $\leq 0.08$  (Hu and Bentler, 1999; Kline, 2016). All factor loadings were significant ( $p < 0.001$ ) and ranged between 0.54 and 0.76. The scale presented a Cronbach alpha of 0.86. Combining the eight items, a single composite measure was created by the average score of the variables (Hair *et al.*, 2019), with higher scores meaning more external networking use.

*Creativity orientation.* A scale adapted from Braun *et al.* (2018) was included to measure the creativity orientation of start-ups using five items. The scale ranges from 1 “totally disagree” to 5 “totally agree”. Examples of items are as follows: “Our company survives due to creativity and innovation” and “This business would not exist without outstanding new ideas”. The CFA for the *Creativity orientation* scale yielded a good model fit:  $\chi^2(18) = 36.55, p = 0.006; \chi^2/df = 2.03; CFI = 0.98; TLI = 0.96; RMSEA = 0.07; \text{ and } SRMR = 0.05$ . All factor loadings were significant ( $p < 0.001$ ) and ranged between 0.59 and 0.81. The scale presented a Cronbach alpha of 0.80. Combining the five items, a single composite measure was created by the average score of the variables, with higher scores meaning more creativity orientation.

*Sales growth.* Growth measures included four objective indicators of sales volume (in Euros) between the first business period and the latest business period. The entrepreneur was asked to indicate the sales volume of the enterprise in 2014: (1) at the end of the first business period ( $t_{0-n}$ ; i.e. foundation date); (2) two years earlier ( $t_{0-2}$ ; i.e. in 2011); and (3) one year earlier ( $t_{0-1}$ ; i.e. in 2012); (4) at the end of the latest business period ( $t_0$ ; i.e. in 2013). As the sales volume was a highly skewed variable, the logarithmic transformation was used.

*Likelihood of start-up survival.* In line with previous studies, the concepts of survival and mortality were adopted as the measures of start-up success and failure (outcome variable). At the beginning of the 2018 follow-up (including interviews via personal contacts or telephone), a dummy variable was used, which, for statistical purposes, was assigned 1 – for Survival

and 0 – for Mortality. The results were calculated based on the proportion of survival, thus a measure of the likelihood of survival was created.

*Control variables.* The current study controls for years since foundation, country of origin, and the total number of employees (i.e. firm size) at different times of the data collection. As firm size presented a highly skewed distribution, the log-transformation of the number of employees was used. Despite dependence on the degree of internalization/externalization of activities, firm size and age are commonly associated with sales growth in the literature (e.g. Florin *et al.*, 2003). Previous research has found a positive correlation between firm size and start-up survival (Adams *et al.*, 2016). Furthermore, there is evidence that start-up innovativeness and networking practices appear to be affected by the variable country when considering both countries Portugal and Germany (Braun *et al.*, 2018).

### Data analysis

The data in this research had a time-varying predictor in level 1, as *sales volume* was nested in time periods within enterprises (level 2). The other variables, *use of external networking* (mediator), *creativity orientation* (moderator) and *likelihood of start-up survival* (outcome variable), were measured at enterprise level (level 2). The outcome was a binary variable (mortality *vs.* survival). Therefore, the hypotheses were tested with non-linear multilevel regression analyses, using a binomial distribution with a logit link function (Raudenbush and Bryk, 2002). As the design was longitudinal with binary outcome data, a Generalized Estimating Equations (GEE) method was applied to estimate all the coefficients in order to test the mediation (H1, Table 2), the moderation (H2, Table 3) and the moderated mediation (H3, Table 4). To test and probe the two-way interaction estimated in multilevel regression, the procedures suggested by Aiken and West (1991) were implemented.

The *indirect effect*  $ab$  is a function of the compound pathway  $a$  and  $b$ . As the predictor and the mediator were continuous variables, a linear regression was used to estimate  $a$  ( $X \rightarrow M$ ). In turn, as the outcome was a binary variable, a logistic regression was implemented to estimate  $b$  ( $M \rightarrow Y$ ). Thus, the indirect effect is affected by a change in scaling. To get around this before calculating the indirect effect, the estimates for  $a$  and  $b$  were standardized (MacKinnon *et al.*, 2007). The significance of the hypothesized indirect effect and conditional indirect effects were assessed by the Monte Carlo (MC) method in order to compute 95% confidence intervals based on 20,000 simulated draws from the distributions for  $a$  and  $b$  parameters (Preacher and Selig, 2012).

## Results

Table 1 presents the means, standard deviations, and correlations of the variables.

### Hypotheses testing

Hypothesis 1 predicted that the use of external networking would mediate the relationship between sales growth and the likelihood of start-up survival such that its indirect effect would predict the likelihood of survival negatively. Firm age, firm size and country were included as controls in the model. As shown in Table 2, the indirect effect between sales growth and start-up mortality was in fact negative (estimate  $ab_S = -0.59$ ). Thus, the results showed that one standard deviation increase in sales growth indirectly produces, using external networks, a decrease of 0.59 standard deviation units in the likelihood of start-up survival. The 95% confidence interval for the estimated effect ( $-0.92, -0.29$ ) did not include zero, indicating significant mediation. The results provide support for Hypothesis 1.

	Level	Mean	SD	1	2	3	4	5	6
1. Firm size <sup>a</sup>	1	0.73							
2. Sales growth <sup>b</sup>	1	4.50	1.15	0.49***					
3. Country <sup>c</sup>	2	0.27	—	0.07	0.42***				
4. Firm age	2	4.18	0.78	0.02	0.25**	-0.25**			
5. Use of external networking	2	2.60	0.51	0.15*	0.16*	0.12	-0.17*		
6. Creativity orientation	2	3.92	0.68	0.20**	0.03	0.08	-0.29**	0.24**	
7. Likelihood of start-up survival <sup>d</sup>	2	0.75	—	0.12	0.28***	-0.34***	0.10	-0.18*	-0.05

**Note(s):** Level 1 – within enterprises variables; Level 2 – between enterprises variables. Means, standard deviations (*SD*), and correlations for Level 2 variables were calculated between enterprises (*N* = 139)

<sup>a</sup> Firm size = log number of employees

<sup>b</sup> Sales growth = log sales volume

<sup>c</sup> Proportion of Portuguese enterprises (1)

<sup>d</sup> Measured as the proportion of survival

\*  $p < 0.05$

\*\*  $p < 0.01$

\*\*\*  $p < 0.001$

**Table 1.**  
Descriptive statistics,  
and correlations of the  
variables

**Hypothesis 2** predicted that creativity orientation moderates the relationship between the use of external networking and the likelihood of start-up survival. The control variables, the predictor (use of external networking) and the moderator (creativity orientation) were previously centered. **Table 3** shows that the interaction effect between the use of external networking and creativity orientation is significant ( $B = 3.92, Z = 3.38, p = 0.001$ ). These results support **Hypothesis 2**. **Figure 2** presents the relationship between the use of external networking and the likelihood of start-up survival at two levels of creativity orientation: one standard deviation below ( $-1$  SD) and one above the mean ( $+1$  SD) (Aiken and West, 1991). At low creativity orientation ( $-1$  SD), the use of external networking was related negatively and significantly to start-up survival ( $B_S = -4.64, Z = -3.67, p < 0.001$ ). However, when creativity orientation was high ( $+1$  SD), this relationship became positive and non-significant ( $B_S = 1.02, t = 1.46, p > 0.05$ ). Thus, the results show that for low creativity orientation, increasing one standard deviation in the use of external networking results in a 4.64 standard deviation decrease in the likelihood of start-up survival. Conversely, for high creativity orientation, the use of external networking yields a 1.02 standard deviation increase in the likelihood of start-up survival.

**Hypothesis 3** predicted that creativity orientation in start-ups moderates the indirect relationship between sales growth and the likelihood of start-up survival through the use of external networking. Using Preacher and Selig's (2012) procedure, our results showed that the indirect effect was moderated by creativity orientation (**Table 4**). Therefore, **Hypothesis 3** is supported. As can be seen in **Figure 2**, under low creativity orientation ( $-1$  SD), sales growth had a negative and significant indirect effect on the likelihood of start-up survival using external networking (estimate  $ab_S = -1.89, 95\% \text{ CI} = -2.95, -0.94$ ). When creativity orientation was high ( $+1$  SD), the indirect effect was positive but not significant (estimate  $ab_S = 0.23, 95\% \text{ CI} = -0.28, 0.75$ ). Regarding the significant conditional indirect effect, the results showed that under low creativity orientation, increasing one standard deviation in the use of external networking results in a 1.89 standard deviation decrease in the likelihood of start-up survival.

	Outcome: Use of external networking			
	B	SE	95% CI	
Intercept	2.42***	0.16	2.10	2.75
<i>Control variables</i>				
Firm size <sup>a)</sup>	0.03	0.03	-0.04	0.10
Country <sup>b)</sup>	0.07	0.10	-0.12	0.26
Firm age	-0.17***	0.04	-0.25	-0.09
Sales growth <sup>c)</sup>	0.15***	0.04	0.08	0.22
	Outcome: Likelihood of start-up survival			
Outcome variable model	B	SE	95% IC	
Intercept	-0.55	1.05	-2.63	1.52
<i>Control variables</i>				
Firm size <sup>a)</sup>	0.21	0.24	-0.27	0.69
Country <sup>b)</sup>	-1.33*	0.57	-2.46	0.21
Firm age	-0.01	0.27	-0.54	0.53
(Direct effect) Sales growth <sup>c)</sup>	0.45*	0.23	0.01	0.89
Use of external networking	-1.58***	0.44	-2.45	-0.70
Indirect Effect (ab) of sales growth on likelihood of start-up survival, via use of external networking (H1)	ab <sub>S</sub>	SE <sub>S</sub>	95% CI	
	-0.59	0.16	-0.92	-0.29

**Note(s):** H1 – Hypothesis 1. CI = Confidence interval. Monte Carlo method was used to compute a 95% CI based on 20,000 simulated draws from the distributions for the *a* and *b* parameters. *ab<sub>S</sub>* – *ab* indirect effect estimate is standardized (S). The B estimates for the outcome likelihood of start-up survival are on a log-odds metric

<sup>a)</sup> Firm size = log number of employees  
<sup>b)</sup> 0 = Germany, 1 = Portugal  
<sup>c)</sup> Sales growth = log sales volume

\* *p* < 0.05  
\*\*\* *p* < 0.001

**Table 2.** Nonlinear multilevel regression results for mediation

## Discussion and conclusion

The aim of this study was to examine how growth in sales and networking activities early in the life of a start-up may influence firm mortality or survival later; and how this effect may be moderated by creativity orientation. The results showed that a start-up's sales growth may indeed lead to excessive use of external networking and, thus, to a network overload (Steier and Greenwood, 2000) detrimental to the survival of less creativity-oriented new ventures.

### Theoretical implications

This paper contributes to entrepreneurship research using network theory (Borgatti and Halgin, 2011; Klyver et al., 2011; Watson, 2007) in three different ways. Firstly, by adopting structural holes theory (Burt, 1992) and empirically investigating the dark side of external network use, we understand how excessive use of these external ties can drive networks to grow beyond the entrepreneur's ability to manage them effectively and lead to a decrease in the likelihood of start-up survival. In fact, some authors have argued that networking benefits are important for entrepreneurs to increase profitability (Zhou et al., 2007), to attract financial resources (Honig, 1998), to develop interorganizational alliances (BarNir and Smith, 2002), and to generate employment and increase start-up survival (Bosma et al., 2004). Others, however, have noted that networking does not always bring

	Likelihood of start-up survival			
	B	SE	95% CI	
Intercept	1.21***	0.22	0.77	1.64
<i>Control variables</i>				
Firm size <sup>a)</sup>	0.24	0.22	-0.18	0.67
Country <sup>b)</sup>	-1.50***	0.50	-2.48	-0.51
Firm age	0.48*	0.23	0.04	0.92
<i>Independent variable</i>				
Use of external networking	-1.51**	0.54	-2.57	-0.46
<i>Moderator</i>				
Creativity orientation	-0.62	0.50	-1.61	0.37
<i>Interaction effect (H2)</i>				
Use of external networking * Creativity orientation	3.92**	1.16	1.64	6.19
Main effect at low level of creativity orientation (-1 SD) <sup>c)</sup>	-4.64	1.11***		
Main effect at high level of creativity orientation (+1 SD) <sup>c)</sup>	1.02	ns		
Pseudo R <sup>2</sup>	0.23			
<b>Note(s):</b> H2 – Hypothesis 2				
<sup>a)</sup> Firm size = log number of employees				
<sup>b)</sup> 0 = Germany, 1 = Portugal. The B estimates are on a log-odds metric				
<sup>c)</sup> The main effect estimate is standardized (S)				
* $p < 0.05$				
** $p < 0.01$				
*** $p < 0.001$				

**Table 3.**  
Non-linear multilevel  
regression results for  
moderation

benefits to companies (Watson, 2007). From the structural holes perspective (Burt, 1992), the findings of the current study underline that the creation of a network and the respective building of social capital requires a significant investment in time at a stage when the firm most needs the presence of its owner, impairing its proper functioning (Adler and Kwon, 2002). If a network becomes overloaded, it can become very difficult to manage the firm, thus increasing the likelihood of failure (Mariotti and Delbridge, 2012; Steier and Greenwood, 2000).

Secondly, our study reveals how networking overuse can be a consequence of a growth of sales in the early stages of a start-up's development, potentiating the negative effects of external networks, and reducing the firm's chances of survival. The study shows that start-up networking only produces initial temporary advantages if entrepreneurs do not deviate from their essential focus on the internal development of the organization (Albuquerque et al., 2016). A lack of internal focus may lead to the undesirable consequences of networking associated with the loss of important social capital, specifically the underutilization of skills that are critical for the survival of new ventures (Shepherd et al., 2000). Building on the structural holes theory (Burt, 1992, 2005; Klyver et al., 2011), which has gained a lot of attention in entrepreneurship research in recent years (Hallen et al., 2020), the results show that start-ups, in a phase of early growth, are more likely to survive if entrepreneurs do not focus too much on increasing the size of their network (Granovetter, 2005; Lechner et al., 2006). A network with too many participants and mostly weak ties may have drawbacks because it is difficult to manage (Elfring and Hulsink, 2007; Granovetter, 2005; Steier and Greenwood, 2000). It is true that ties of this kind allow access to more information and more business contacts, but at an early stage, what the company essentially needs are close and lasting relationships (Littunen, 2000).

Variables	Likelihood of start-up survival			
	B	SE	95% CI	
Intercept	0.35	1.13	-1.87	2.57
<i>Control variables</i>				
Firm size <sup>a)</sup>	0.12	0.28	-0.43	0.66
Country <sup>b)</sup>	-1.53*	0.66	-2.82	-0.23
Firm age	0.28	0.28	-0.28	0.82
<i>Independent variable</i>				
Sales growth <sup>c)</sup>	0.24	0.25	-0.25	0.72
<i>Moderator</i>				
Creativity orientation	-1.08	0.67	-2.40	0.24
<i>Mediator<sup>d)</sup></i>				
Use of external networking	-2.10**	0.71	-3.50	-0.70
<i>Interaction</i>				
Use of external networking * Creativity orientation	4.51**	1.54	1.48	7.53
<i>Conditional indirect effect (ab) (H3)</i>				
	<i>ab<sub>S</sub></i>	<i>SE<sub>S</sub></i>	95% CI	
Low level of creativity orientation (1 SD below the mean)	-1.89	0.51	-2.95	-0.94
High level of creativity orientation (1 SD above the mean)	0.23	0.26	-0.28	0.75

**Note(s):** H3 – Hypothesis 3. CI = Confidence interval. The B estimates are on a log-odds metric

Indirect effect – Monte Carlo method was used to compute a 95% CI based on 20,000 simulated draws from the distributions for the *a* and *b* parameters. *ab<sub>S</sub>* – *ab* indirect effect estimate is standardized (S)

<sup>a)</sup> Firm size = log number of employees

<sup>b)</sup> 0 = Germany, 1 = Portugal

<sup>c)</sup> Sales growth = log sales volume

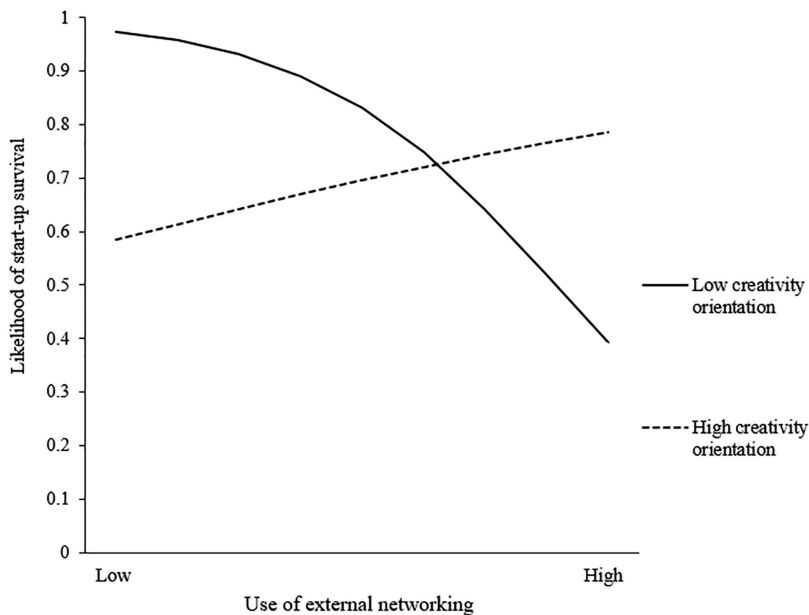
<sup>d)</sup> The significant effect of the predictor *sales growth* on the mediator *use of external networking* was already presented in Table 2, therefore, chosen not to repeat it in this table

\*  $p < 0.05$

\*\*  $p < 0.01$

**Table 4.** Non-linear multilevel regression results for moderator mediation

Thirdly, our study answers the call to study moderators of the effects of networks on the survival of start-ups, namely in what concerns firm characteristics, revealing the role of creativity orientation to avoid the destructive effect of over-embeddedness (Uzzi, 1997). By studying start-ups operating with different creativity-orientations, we gain a better understanding of the contingencies affecting how the use of external networks influences the survival of start-ups. Several reasons can be given as to why external networks interact differently with start-ups of low and high creativity orientation in predicting the likelihood of their mortality or survival. Creativity-oriented start-ups share a culture or praxis of innovation whereby flexibility and the use of external networks are key factors to success (Mintzberg, 1991). Furthermore, there is evidence that the use of external activities is important to develop creative scope (Long and Wang, 2019) and shows that high-tech firms that make use of such scope tend to have increased chances of survival (Bandera and Thomas, 2019). Creativity-oriented start-ups tend to prioritize intangible assets to help managers deal with the uncertainty (Singh, 2005; Stam et al., 2014) that is characteristic of all creative processes, including the creation of a new organization. By accessing an extended network, these companies are given the opportunity to recombine different ideas and resources, thus promoting creativity. On the contrary, when new ventures are not creativity-oriented, they need to create and maintain relationships that help them improve the technologies and skills they already have and so contribute to their competitive advantage



**Figure 2.**  
The moderating effect of creativity orientation on the relationship between the use of external networking and the likelihood of start-up survival

(Elfring and Hulsink, 2007). They, therefore, benefit from strong ties that require emotional investment and involve the cognitive resources of entrepreneurs (Stam *et al.*, 2014). These resources must not be consumed by a large number of ties, for they will completely monopolize the availability of the entrepreneur, creating favorable conditions for failure (Burt, 1992; Granovetter, 2005).

Research in the fields of business venturing and innovation has advanced our understanding of how creativity orientation in start-ups is linked to increased rates of survival (Rosenbusch *et al.*, 2011; Song *et al.*, 2008). However, little attempt has been made to understand how the relationship between the use of external networks and start-up survival is conditioned on the basis of different levels of creativity orientation. By revealing that in start-ups with low creativity orientation, the widespread use of networks considerably decreases their likelihood of survival, we contribute to an understanding of the factors that may moderate the dark side of network usage. Our findings suggest that start-ups develop over time and within a dynamic external network, characterized by both stability (i.e. inertia) and swiftly changing elements of networks that are influenced by different levels of start-up creativity orientation.

#### *Practical implications*

In view of growth in sales, entrepreneurs may be tempted to significantly increase their external network as a way of filling the resource gaps they face (Hallen *et al.*, 2020; Stam *et al.*, 2014). However, such a move may have disastrous consequences for the future (Mariotti and Delbridge, 2012; Steier and Greenwood, 2000; Watson, 2007), especially if the business venture is one that does not rely on organizational creativity. According to the current findings, at an early stage in their life cycle these companies need the constant presence of their owners with their respective business skills (LeBrasseur *et al.*, 2003). They also need someone to help them enhance their expertise, and specific knowledge and resources may well only be accessible through close and strong relationships.



Therefore, rather than seeking to expand the network without restraint (Adler and Kwon, 2002; Arregle *et al.*, 2015), entrepreneurs in low creativity-oriented start-ups should focus on the internal development of their company and the creation of a smaller network based on strong ties that add value to the firm. Specifically, the findings suggest that managers should monitor sales growth, as well as the role of creativity orientation, to provide suggestions relating to their use of the external networks needed for start-up survival.

Despite the advantages of networking, owners and managers of start-ups in a process of increasing sales growth must always remember that it can be risky to use external networks with competing businesses due to the potential increased dominance of strong network effects (Walker *et al.*, 1997) and reduced focus on business and strategy (Baraldi *et al.*, 2019). Hence, it is suggested that decision-makers should pay attention to the context in which social returns in early sales growth may compromise firm survival in contexts of low creativity-oriented start-ups.

At the societal level, government policy makers should keep in mind that networks of social relations, both formal and informal, should be managed (cf., Ngo *et al.*, 2021). However, the importance of such networks will depend partially on the level of creativity orientation in different stages of the start-ups. In order to promote economic growth in creative-oriented start-ups, policy-makers should stimulate the use of external networks with investments in incubators to non-incubated start-ups in order to alleviate weak network problems (van Rijnsoever, 2020).

Overall, this paper argues that there is a dark side of networking that entrepreneurs in specific contexts should reflect on and potentially avoid. Through a robust methodology that aggregated longitudinal data from several start-ups, the empirical findings explain how the use of external networks may influence start-up survival negatively. Indeed, the findings suggest that sales growth may lead low creativity-oriented start-ups to failure through an overload of external networks. These results may constitute a source of advantage for entrepreneurs who need to make strategic decisions about their use of network contacts.

#### *Limitations and future research directions*

Despite its relevance to theory and practice, this study is not without limitations. Hypotheses were studied by considering a small number of start-ups from only two European countries. Hence, an increase in the sample and the inclusion of start-ups from more countries would be of advantage.

This study included only a self-reported and cross-sectional measure to assess the use of external networks. However, it was at least possible to gather objective data on start-up survival. The absence of repeated measures of external networking suggests that reverse causality may be problematic (e.g. external networking may well contribute to sales growth) and thus question the validity of the first part of our model (Figure 1). Therefore, the authors invite future researchers to examine how entrepreneurs develop different forms of networking over time using process rather than variance approaches, or mixed and other less conventional methods (Bryman and Buchanan, 2018).

Studies can clarify how different forms of networking facilitate and constrain start-up outcomes, and how these variables interact with different contexts to ultimately affect start-up survival. Due to sales growth and throughout the start-up life, several external networks may be internalized and, therefore, networking in later phases may not be so detrimental to start-up survival, not even for those with low creativity orientation. Hence, future studies using complementary methodologies (e.g. qualitative approaches) may be considered, in order to understand the specific contribution of networking theory to start-up functioning.

Despite its limitations, this study advances previous studies (e.g. Hallen *et al.*, 2020; Stam *et al.*, 2014), suggesting the continued importance of network theory or more precisely

network theories in explaining start-up survival, albeit with a need to consider and better understand the role of contingencies or moderators, such as creativity orientation. Through start-up-aggregated data and a multiple waves research design, the current findings open avenues for further research focusing on the dark side of entrepreneurial networking.

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### Corresponding author

Aristides I. Ferreira can be contacted at: [Aristides.Ferreira@iscte.pt](mailto:Aristides.Ferreira@iscte.pt)

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