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## Does innovativeness reduce startup survival rates?

Ari Hyytinen <sup>a,1</sup>, Mika Pajarinen <sup>b,2</sup>, Petri Rouvinen <sup>b,\*</sup>

<sup>a</sup> Jyväskylä School of Business and Economics, University of Jyväskylä, P.O. Box 35, FI-40014, Finland

<sup>b</sup> ETLA, The Research Institute of the Finnish Economy, Lönnrotinkatu 4 B, FI-00120 Helsinki, Finland

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### ABSTRACT

There are two competing hypotheses explaining how innovativeness influences the survival of startups: On the one hand, innovativeness is argued to foster survival-enhancing attributes (e.g., market power and cost efficiency) and capabilities (e.g., absorptive capacity). On the other hand, an innovative startup faces (and bears the associated risks of) liabilities of newness and smallness that exceed those of its non-innovative counterparts. The available empirical literature addressing this theoretical tension mostly supports the former hypothesis; we suggest that this finding is, in part, driven by the common practice of employing an ex post measure that already embodies a degree of success in innovativeness. We use an ex ante measure and find that a startup's innovativeness is negatively associated with its subsequent survival. We also find that entrepreneurs' greater appetite for risk magnifies this negative association. These findings imply that pursuing innovations is not necessarily associated with survival during the early stages of firm development and entails a more complicated start-up process.

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### 1. Executive summary

The link between innovativeness and firm survival has been studied extensively in previous research. Theoretical considerations suggest that innovativeness might have either a positive or a negative effect on firms' survival prospects, whereas the previous empirical literature mostly suggests that the association is positive.

However, we find a negative association between innovativeness and subsequent firm survival, which we attribute to two factors. First, we employ an ex ante measure that mirrors the inherent uncertainty of innovativeness and mixes successful and unsuccessful innovative efforts. Second, we study the association between innovativeness and survival using data on startups, i.e., firms that are in the early stages of their development.

We suggest that future analyses of the innovativeness–survival nexus pay careful attention to two types of survivorship biases. First, there is a survivorship bias of ideas, when the empirical measures of innovativeness refer to ex post indicators that tend to capture successful innovations and innovators. For example, although patents and other intermediate innovation outcomes do not guarantee success in the marketplace, they do indicate a level of success with prior innovative effort. Second, there is a survivorship bias for firms, when the study sample consists of incumbent firms that are a selected subset of firms that originally entered the market. In such a selected sample, there is a risk that a spurious positive correlation will be found between innovativeness and survival.

Our data refer to two cohorts of 1165 Finnish startups surveyed shortly after their entry into the market. The data allow us to measure innovativeness by the startups' ex ante plans to employ innovations and to actively pursue innovations, which may (or may not) lead to desired outcomes.

\* Corresponding author. Tel.: +358 960990202.

E-mail addresses: [ari.t.hyytinen@jyu.fi](mailto:ari.t.hyytinen@jyu.fi) (A. Hyytinen), [mika.pajarinen@etla.fi](mailto:mika.pajarinen@etla.fi) (M. Pajarinen), [petri.rouvinen@etla.fi](mailto:petri.rouvinen@etla.fi) (P. Rouvinen).

<sup>1</sup> Tel.: +358 400777086.

<sup>2</sup> Tel.: +358 960990242.

We contribute to the sparse but growing literature that suggests that a startup's innovativeness may in fact hurt its survival prospects. Our baseline estimations suggest that the survival rate for innovative startups is approximately 6–7 percentage points lower than that of non-innovators. This negative association is consistent with the view that pursuing innovations appears to lead to a more complicated start-up process that may be disproportionately hindered by the liability of newness. We also find that the interaction of innovativeness and entrepreneurs' greater appetite for risk further reduces the prospects for survival, which is consistent with a trait–task dependency.

Our findings have important practical implications. On the one hand, they suggest that entrepreneurs should not regard innovativeness as a form of insurance against failure in the startup phase. On the other hand, our analysis casts doubt on the policy premise that innovating ventures should be supported because they are more likely than other startups to survive and create stable jobs. Of course, our findings by themselves do not undermine other policy reasons to support innovation in new ventures.

## 2. Introduction

Does innovativeness have a positive or negative effect on firms' survival prospects? We study these two competing perspectives empirically by focusing on the innovativeness–survival link during the early stages of firm development. Our motivation to examine the innovativeness–survival link in this particular context is that the theoretical literature suggests that the effect can be either positive or negative, whereas the empirical literature—with a few notable exceptions—suggests a positive relation.

A number of *theoretical* arguments suggest a positive link between innovativeness and subsequent survival: In addition to making entry possible, innovativeness enhances firms' market power (Schumpeter, 1934), improve their ability to escape competition (Porter, 1980), reduce their production costs (Cohen and Klepper, 1996a, 1996b), improve dynamic capabilities (Teece et al., 1997), and lead to enhanced absorptive capacity (Zahra and George, 2002). However, another set of theoretical arguments suggest that the link may also be negative: Pursuing innovations leads to riskier, more complicated, and less linear start-up processes (Samuelsson and Davidsson, 2009) and (potentially) to more skewed returns (Scherer and Harhoff, 2000). An innovative startup may face a greater liability of novelty than its non-innovative counterparts (see, e.g., Amason et al., 2006). Other scholars argue that such firms suffer from having few collateralizable assets and long and uncertain payback times (Brown et al., 2012; Minetti, 2011). Therefore, innovative startups have more limited access to external financing, which leads to a greater likelihood of failure (Berger and Udell, 2006). Moreover, entrepreneurs who believe that they are exceptionally innovative may have a particular exit strategy in mind (e.g., DeTienne et al., *in press*) and may, as a result, seek to increase the firm's risk profile to achieve the desired exit.

The prevailing view in the *empirical* literature appears to be that there is a positive association between the innovativeness of firms and their subsequent survival (Arrighetti and Vivarelli, 1999; Audretsch, 1995; Calvo, 2006; Cefis and Marsili, 2005, 2006, 2011, 2012; Colombelli et al., 2013; Helmers and Rogers, 2010; Sarkar et al., 2006; Wagner and Cockburn, 2010). Nevertheless, there is emerging empirical evidence suggesting that these results may be context-dependent and not necessarily applicable to younger firms (Boyer and Blazy, 2013; see also Cader and Leatherman, 2011; Reid and Smith, 2000).

We contribute to this emerging empirical literature and argue that the widely documented positive association between innovativeness and survival does not necessarily apply to the youngest firms, particularly after two interrelated but separate selection biases are accounted for. *First*, there is a survivorship bias of ideas. As Buddelmeyer et al. (2010) note, the empirical measures of innovativeness are frequently *ex post* indicators that tend to capture successful innovations and innovators (Artz et al., 2010; Mairesse and Mohnen, 2002; Pandit et al., 2011; Santarelli and Vivarelli, 2007). Although patents, for example, in no way guarantee success in the market place, they do indicate a certain level of success regarding innovativeness. Because such success rarely decreases profits, innovative firms flagged by *ex post* indicators are more likely to survive than otherwise similar but not (yet) successfully innovating firms. In the context of patents, an unsuccessful innovation might be represented by a rejected application; a preferred *ex ante* indicator of innovativeness would capture both patent approvals and rejections, in addition to situations in which the innovator did not seek patent protection. *Second*, there is a survivorship bias with respect to firms that have successfully traded in the marketplace as independent businesses (Becchetti and Trovato, 2002; Kannebley et al., 2010). In other words, incumbent businesses are a selected subset of firms that originally entered the market (Cader and Leatherman, 2011). As we explain later, a typical survival regression may yield a spurious positive correlation between early-stage innovativeness and survival, if this type of selected sample is employed.

This paper examines whether innovativeness enhances or reduces startups' survival prospects. By considering these two competing perspectives, we shed new light on the theoretical tension discussed above in the specific context of young firms. Our contribution to the empirical literature is, first of all, that we address the two interrelated selection biases simultaneously. We measure innovativeness by firms' *ex ante* plans to employ new-to-the-market processes or products/services in the next three years and by firms' active engagement in such innovativeness. Compared with most of the firm-level measures used in the prior empirical literature, this measure better mirrors the uncertainty that characterizes (only potentially successful) innovativeness of a firm from an *ex ante* perspective. In this regard, we also differ from those prior papers that focus on the effects of the overall innovativeness of the industry (the technological environment) on firm survival. Moreover, our estimating sample consists of startups surveyed in the first few months after entering the market, which considerably reduces the survivorship bias of firms. We evaluate how innovativeness is associated with firm survival in this empirical setting. Second, we take a step further by empirically studying how the relation between innovativeness and firm survival is moderated by the risk appetite of the startups' founder-entrepreneurs. Our motivation to do so is that this interaction is one of the most salient trait–task dependencies that we can imagine in light of the received literature

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