



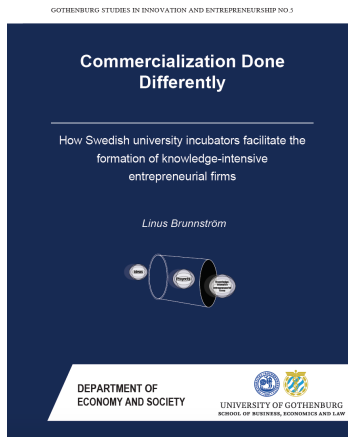
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INCUBATORS, PERFORMANCE OF INCUBATOR FIRMS AND RESEARCHERS AS FOUNDERS *IN SWEDEN*



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- Defended my thesis January 2021
- Have previously worked briefly as a business coach at a university incubator
- Research foci: Role of universities in society, commercialization, incubators and firm survival & growth + university impact on Blue growth.
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Three main questions guiding this presentation

1. Are researchers a different type of founder and how to treat them in incubators?
2. What are the chances of different types of project founders completing incubation in Swedish incubators?
3. What happens with those firms that “succeed” in completing incubation at incubators in Sweden?

Q1. Researchers in incubators

Background question 1 (researchers in incubators)

- Researchers are seen as different:
 - They tend to have more embryonic ideas (Jensen and Thursby, 2001)
 - Requiring inventor cooperation to achieve commercialization through a company
 - Entrepreneurial attitude is not the (main) driving force behind venture creation by academics (Fini, Grimaldi and Sobrero, 2008)
 - Rather they are driven by the desire to further their own academic position
 - However, researchers with a more entrepreneurial attitude tend to be more similar in what motivates them to other entrepreneurs, like a financial motif, other intrinsically motivations (Lam, 2011)
 - Evidence by a patent study suggests researchers tend to commercialize in specific fields such as biotechnology and medicine and through large existing companies (Lissoni et al., 2008).
 - Also, important to keep in mind for the Swedish context is the teacher's exemption (inventor own idea and outcomes from research, not university – which is common in other Western countries)

Background question 1 (researchers in incubators)

- However,...we can also see that **Swedish researchers in science and engineering are positive towards commercialization in general as well as patenting and venture creation** (Bourellos, Magnusson & McKelvey, 2012).

What emerges from interviews with Swedish (university) incubator CEOs and business coaches?

- (based on results from thematic coding of interviews conducted in 2015-2016 at three Swedish universities)
- Like the literature suggests, they see researchers as different as well, in that they tend to take longer to develop their ideas into businesses due to (often):
 - being stuck with technical verification
 - lack motivation to become entrepreneurs themselves
 - lack time to devote on firm creation
- In order to deal with this, they employ, or have historically employed, several strategies to still be able to commercialize good researcher ideas:
 - Create a firm anyway (using students as entrepreneurs for example)
 - Sell or give away the ideas/IP

Q2. Type of project and chances of completing incubation

Background question 2 (Type of project and chances of completing incubation)

- Proposition: *The goal of incubators is turning projects into firms that can compete on the marketplace and thereby: generating income, employment and innovation.*
- Sweden's innovation agency (Vinnova) that finance the Swedish incubators to a large degree says the goal of the national incubator financing-program is to support:
 - *"...high quality incubators, [who] support the development of and value creation in new knowledge intensive growth firms in Sweden."*
(Vinnova, 2015)
- Knowledge-intensive entrepreneurial firms is seen as more likely to bring transforming innovations into the market and thus changing the economy (Malerba & McKelvey 2018)

Background question 2 (Type of project and completing incubation)

- A lot of previous incubator-studies have lumped together projects/firms that enter incubation at a university incubator into one category and called them university spin-offs (USOs) for example. These has then:
 - been compared to other spin-offs from private incubators (Ratinho et al. 2010; Rosenwein 2000)
 - compared to non-incubated matched firms in terms of performance (Lasrado et al. 2016)
 - been studied to uncover the importance of incubator projects' connections to a university (Lasrado et al. 2015; Rotharmel & Thursby 2005)
 - Studied from the perspective of prior founder-experience (McAdam & Marlow 2008)

Research design (in order to answer Q2)

What do we have...

- No data on what happens after the firms exit the incubators (in the Vinnova databases accessed, see Q3 for this)
- The exit event, however, indicates if the participating individuals/incubator staff considers the project to be ready to enter the market-place and compete, without further support.
- Exiting the incubator as a firm or becoming merged/acquired can be seen as a proxy for being able to compete without further support.
- Therefore, a higher probability of exiting successfully is preferable to a lower probability.

Method: Competing risks

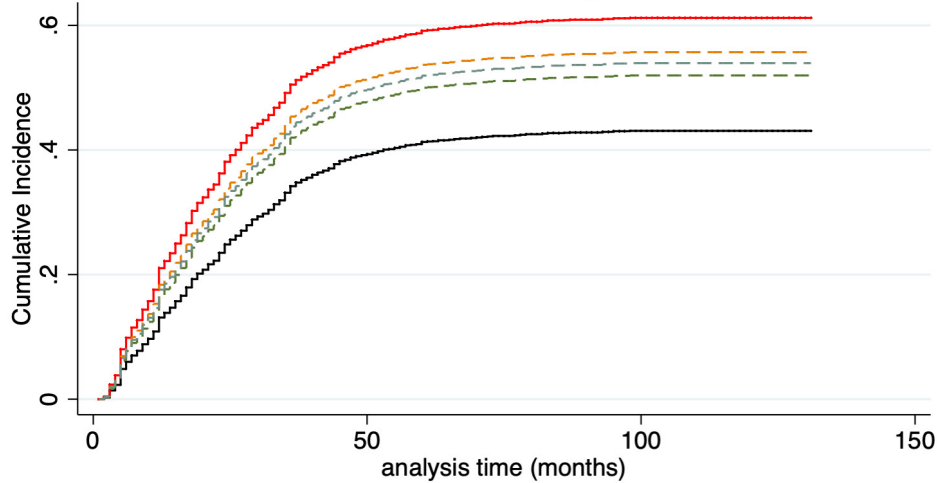
- Allows for investigating survival time in relation to a number of predictor variables.
- Competing risks regression (Fine & Gray 1999)
 - Adds the possibility of controlling for more variables than one as in a (*uni-variate*) Kaplan-Meier model.
 - We can use non-categorical variables (like in a cox model)
 - But also allows for different types of (but mutually exclusive) death-events. i.e:
 - Exited the incubator by 1. graduation or 2. was cancelled
 - Censors the projects that remain in the incubators
- Exit event 1 = completed incubation exit event 2= was cancelled
- Hazard = the probability of an event in an infinitely short period, given that the event or a competing event has not happened before.

Data (Vinnova databases)

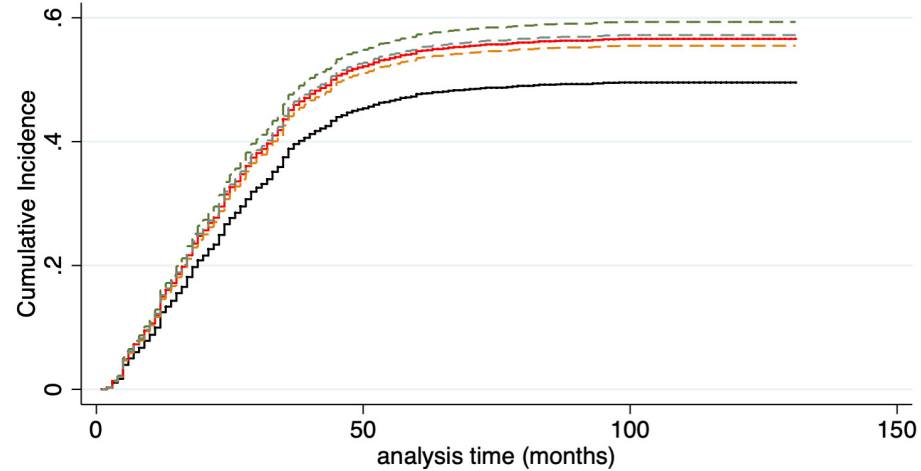
- Approximately 40.000 project ideas evaluated between 2005-2015 (monthly data)
- 3.383 projects incubated at the 42 incubators
- 1044 still in incubation at end of 2014 (censored)
- 776 projects were cancelled, and 1563 projects completed incubation during this period

Hazard of being ready to compete (graduating)

Competing-risks regression



Competing-risks regression



- Researchers have a lower probability to complete incubation than all other types of founders, the difference becomes less when controlling for the whole model.
- However, a larger share of researchers in the incubator at the same time, increases the probability of completion for all types of projects (less so for researchers).
- Breadth of admitted projects, as measured by the number of different types of project-founders the incubator admits, is negative on the probability. I.e., more likely to graduate a more specialized incubator in Sweden.

- Researchers seem to have another function in university incubators apart from starting new KIE firms: they may create a spill-over effect which increase the probability of all other types of projects to become KIE firms if there is a higher share of researcher-founders in the incubator.
- This empirical finding relates to Markman's (2005) finding that researchers have a positive impact on the innovation speed if they are involved in the project.
 - However, this spill-over effect seem to have the smallest effect on other researcher-based projects' probability.

Q3. What happens to firms after incubation?

Background question 3 (what happens to firms after incubation)

- Here we'll explore what happens after firms graduate Swedish incubators.
- Limited to the firms that graduate as limited companies.
- The study analyses the relationship between venture success after incubation and knowledge specialization (but as this is an unpublished paper in development, I will limit my talk to descriptives and some preliminary results).

Research design and data

- Follow the fate of the 852 **limited firms** that graduated Swedish incubators between 2005 and 2015.
- Matched SCB and Swedish Companies Registration Office data (adding to the Vinnova data) on these firms 0, 3 and 5 years after graduation (i.e., up to 2021)
- Data on the incubators (size, founder types incubated, firm industries etc.), firm data on founder type, industry, revenues, number of employees, status etc.
- Methods employed: survival analysis (Kaplan-meier, Cox regressions), Log-linear OLS regressions (Heckman correction regressions)

Descriptive statistics (Preliminary (unpublished) findings, please do not cite!)

- The dataset records five founder types:
 - 1) *researchers*, that conduct research or teach at a Swedish university or research institute ($Researcher_i$, 17%);
 - 2) *students*, that are admitted to a course or program at a Swedish university ($Student_i$, 13.2%);
 - 3) *university staff*, both technical and administrative ($UnivEmployee_i$, 10.5%);
 - 4) *independent inventors*, i.e., individuals unaffiliated with a firm or university ($Inventor_i$, 22%);
 - 5) *corporate spin-offs*, i.e., projects started by an incumbent firm ($Spinoff_i$, 37.4%).
- What is success?

Key takeaways: answering Q3 (Preliminary (unpublished) findings, please do not cite!)

- Most firms that graduate, survive (80% of firms in the dataset survive for more than 10 years)
- Not many discernable patterns in those that perform better (i.e., have higher growth rates in revenues or employees), however:
 - Researcher founded firms create more employment than other types of firms three years after graduation (albeit starting out smaller).

References and further reading

- For question 1 and 2, see: Brunnström, Linus. 2020. Commercialization Done Differently: How Swedish University Incubators Facilitate the Formation of Knowledge-Intensive Entrepreneurial Firms. University of Gothenburg. PhD Thesis. Defended the 19th of January 2021, Gothenburg.
- For question 1, see also: Brunnström, L., & McKelvey, M. 2021. Managing the Process of Turning Researchers into Knowledge-Intensive Entrepreneurs: A Perspective of University Incubators. Paper presented at AOM Annual Meeting 2021.
- For question 2, see also: Brunnström, L., Buenstorf, G. & McKelvey, M., 2020. Exploring the Role(s) of Researcher-Based Projects in Swedish University Incubators. *Proceedings*, 2020.
- For question 3, see: Brunnström, L., Bagley, M., Buenstorf, G. & McKelvey, M. 2021. Venture Success After Incubation: Public incubator knowledge specialization and knowledge-intensive innovative entrepreneurial firms. Draft paper, accepted to *the 2021 Schumpeter Conference*, but not presented.