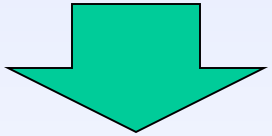
Fostering the Growth of Student Start-ups from University Accelerators

Shiri M. Breznitz and Qiantao Zhang
Munk School of Global Affairs,
University of Toronto

The Short Version

- Evaluating universities economic impact
- Innovation ecosystem approach
- Focusing on students'' startups



How does the university's ecosystem (UofT Accelerators) impact students' entrepreneurship (Product and employment growth)?

We find that certain accelerator characteristics contribute to firm and product growth.

LITERATURE

Why Study Students' Startups?

- Universities are important players in innovation ecosystems (Bagchi-Sen and Lawton Smith ,2012; Breznitz and Feldman, 2012; Jaffa et al, 1999; Wolfe 2016).

- Research has focused almost exclusively on faculty and staff – patents, licenses (Mowery and Sampat, 2005; Siegel et al., 2007).

- However, Studies show that universities have a major economic impact through student start-ups (Astebro et al., 2012).

Universities and Entrepreneurship

- Universities are ***investing heavily in entrepreneurship education, incubators***, and, more recently, ***accelerators*** (Wright et al., 2017, Barbero et al 2014).
- Studies show that ***entrepreneurship education programs*** contribute to the development of entrepreneurial ***intentions*** among students (Fayolle et al., 2006).

Little research has been conducted on the impact of entrepreneurship learning in general and university accelerators in particular as a means to launching successful student start-ups (Thompson, 2013).

Theoretical framework: Entrepreneurial ecosystems (EE)

- Explaining the persistence of high-growth entrepreneurship within regions (Isenberg, 2010).

- “A set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory” (Stam and Spigel, 2017).

- It highlights the importance of both individual agency (entrepreneurs) and context (Acs et al., 2014).

Entrepreneurial ecosystems for Students (wright et al. ,2017)

- University environment (disciplines, resources)
- External context (policy, institutions)
- Investors (government grants, crowdfunding, angels)
- Support (departments, TTO)

- Entrepreneurs (fa , students, post-docs, alumni)
- Activities (incuba , accelerators, science parks)

Accelerator Level Factors

- Habitual entrepreneur director - Past entrepreneurial endeavors of directors play an important role in the outcomes of incubators (Wright et al., 1997; Westhead et al., 2003; Siegel et al., 2004).

- Accelerator program - Duration of programs has a positive influence on the ability of firms in forming ties with other members (Birdsall et al., 2013; Breznitz et al., 2017).

- Selection process - A screening process is helpful in increasing the likelihood of tenant success and incubator performance (Hackett and Dilts, 2004; Aerts et al., 2007; Soetano and van Geenhuizen, 2007; Vanderstraeten and Matthyssens, 2012).

Firm Level Factors

- R&D expenditure and patent counts (Arvanitis and Stukci, 2012).
- Human capital of founders and the entire founding team (Shane and Stuart, 2002; Shane, 2004).
- Faculty involvement in student start-ups (Mosey and Wright, 2007; Wright et al., 2017).
- Availability of funding, e.g. government funding and venture capital (Lynskey, 2004; Wright et al., 2009; Owen and Mason, 2017).

EMPIRICAL SETTING

University of Toronto

- 31st or 22ndin the world and first in Canada (QS 2017; THE 2018).
- 88,766 students/14,240 faculty members .
- $1.1 billion in research funding in 2015-16.
- In 2013, the Government of Ontario - $20 million over two years for CLAs.
- $3 million has been received by the U of T.

Accelerators

Accelerator	Year founded	Faculty/academic unit association	Department/ institutional affiliation
The Hatchery	2011	Faculty of Applied Science & Engineering	
Creative Destruction Lab (CDL)	2012	Rotman School of Management	
University of Toronto Early Stage Technology (UTEST)	2012	Innovation and Partnerships Office and MaRS Innovation	
The Hub	2013	University of Toronto Scarborough (UTSC)	
Impact Centre	2013	Faculty of Arts & Science	
ICUBE	2014	University of Toronto Mississauga (UTM)	Institute for Management & Innovation
Start@UTIAS[1]	2014	Faculty of Applied Science & Engineering	Institute for Aerospace Studies
Department of Computer Science Innovation Lab (DCSIL)	2015	Faculty of Arts & Science	Department of Computer Science
Health Innovation Hub (H2i)	2015	Faculty of Medicine	

METHODOLY

Data

Primary data sources -

- 11 interviews with accelerator directors between January and February 2017.
- A survey sent to firm founders – 39.2% (69/176).

Secondary data sources -

- Information on the accelerators.
- An initial list of 228 firms (background information, founder information, funding data, patent data).

Variables

	Variables	Obs	Mix	Max	Mean	SD
1 (DV1)	Employment growth	70	0	1	0.63	0.49
2 (DV2)	Product growth	70	0	1	0.64	0.48
3 (IV1)	Habitual entrepreneur director	70	0	1	0.57	0.50
4 (IV2)	Accelerator program	70	0.02	1	0.51	0.38
5 (IV3)	Selection process	70	0	1	0.34	0.48
6 (CV1)	Firm age prior entry	70	0	8	0.79	1.33
7 (CV2)	Firm size prior entry	70	1	10	3.21	1.99
8 (CV3)	Patent prior entry	70	0	1	0.16	0.37
9 (CV4)	Funding prior entry	70	0	1	0.27	0.48
10 (CV5)	Faculty involvement	70	0	1	0.17	0.38
11 (CV6)	Length of period since entering the CLA	70	1	6	2.19	1.37

Model

- A binomial logistic regression model.
- Correlation finds a coefficient of 0.57 between two independent variables: accelerator program and selection process .
- Running the same regressions for two pairs of variables: habitual entrepreneur director and accelerator program, and habitual entrepreneur director and screening process.

RESULTS

Employment Growth

Dependent variable: Employment growth	Baseline model	Model 1	Model 2
Habitual entrepreneur director		-0.26	-0.02
Accelerator program		0.61	
Selection process			1.43*
Firm age prior entry	-0.33	-0.26	-0.24
Firm size prior entry	-0.03	-0.07	-0.11
Patent prior entry	0.40	0.36	0.21
Funding prior entry	1.19	1.01	1.02
Faculty involvement	0.76	0.66	0.15
Length of period since entering the CLA	0.24	0.28	0.18
Constant	-0.11	-0.21	-0.02
Number of observations	70	70	70
-2 Log likelihood	84.93	83.88	80.61
R Square	0.14	0.16	0.21

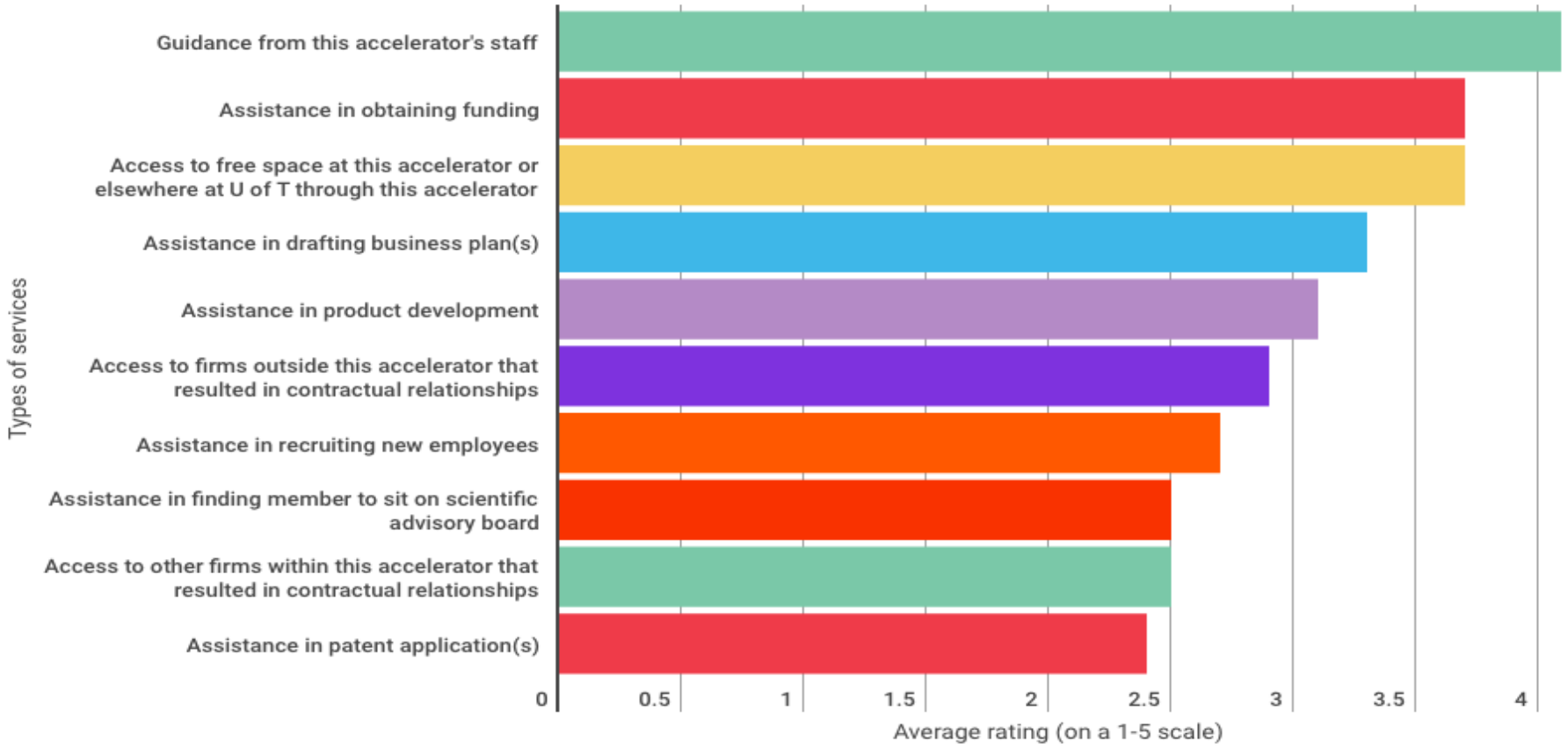
***1*; **5%; *10%

Product Growth

Dependent variable: Product growth	Baseline model	Model 1	Model 2
Habitual entrepreneur director		1.21*	1.39*
Accelerator program		1.70*	
Selection process			2.07**
Firm age prior entry	0.03	0.08	0.10
Firm size prior entry	-0.00	-0.03	-0.07
Patent prior entry	-0.55	-0.38	-0.68
Funding prior entry	-0.23	-0.07	-0.09
Faculty involvement	0.36	0.64	-0.17
Length of period since entering the CLA	0.59**	0.59**	0.41
Constant	-0.51	-2.09*	-1.30
Number of observations	70	70	70
-2 Log likelihood	84.00	79.15	75.80
R Square	0.14	0.22	0.27

***1*; **5%; *10%

Importance of services provided by accelerators



Average rating on a 1-5 scale

CONCLUSIONS

Habitual Entrepreneur Director

Accelerators with habitual entrepreneurs directors have a positive impact on graduates' product growth.

- Ability to connect firms with industry.
- Experience from multiple ventures.
- Product growth than on employment growth? accepting firms that work on technologies in the director's field of expertise.

(Siegel et al. 2004, Wise and Valliere, 2014)

Entrepreneurship Programs

Intensive programs – positive impact on product growth.

- Quality networks take time to build and maintain Firms that stay in the programs longer might also be better supported.
- Survey - guidance from staff was viewed as the most important service.

(Johanson and Mattsson, 2015; Lechner and Dowling, 2003).

Screening Process

Accelerators that have a screening process—that is, that require all applicants to have a proof of concept—elicit stronger performance from their participating firms.

Policy Implication

- The Ontario CLA - No particular path or specific expectations from accelerators or firms, but gives a general push for entrepreneurship.

- Existing CLAs create their own programs and guidelines, which leads to a large variance in programs and could be viewed as ‘Experimentation in entrepreneurship’.

- As a next step of the CLA program, the province should consider which of these experiments should be scaled up

Shiri.Breznitz@utoronto.ca

THANK YOU!

Limitation

- Our analysis is based on student start-ups from a single university, and caution should be used when generalizing the findings
- The firms considered in the study are those which have participated in university accelerators, while many more could bypass the system
- It is possible that some firms are still in the R&D process before they can grow rapidly
- We have limited information on the amount of funding received by the firms or accelerator budgets
- Future research could explore the nature of networks formed by firms at accelerators

Discussion and future research (cont.)

- Accelerators that have a screening process, i.e. requiring all applicants to have a proof of concept, witness stronger performance of their participatory firms
  - Should all university accelerators adopt the same standard?
  - Measurement of success of accelerator programs (interviews with directors and founders)
  - Length of program offered by accelerator is also influenced by their objectives

Research Framework

- How does the university's ecosystem impact students' firm growth?

  - ✓ Habitual entrepreneur director
  - ✓ Accelerator program
  - ✓ Selection process

- Case study – The growth of U of T student start-ups that have participated in its accelerators