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INNOVATION POLICY LAB

Entrepreneurship Education and Firm Creation

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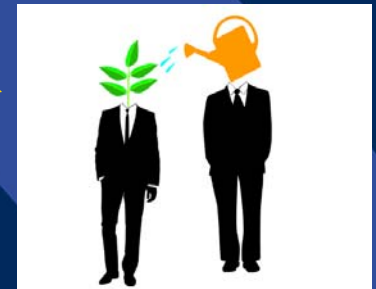
We Study Universities

- Policy makers view universities as significant contributors to entrepreneurship, job creation, and economic growth (Breznitz and Feldman, 2012; Lockett and Wright, 2005; Zucker et al., 2002).
- *The emergence of entrepreneurial universities* (Etzkowitz, 1983; Clark, 1998; Feldman and Desrochers, 2004; Bramwell and Wolfe, 2008; Youtie and Shapira, 2008),
- *The operation of technology transfer offices* (Siegel et al., 2003; Chapple et al., 2005)
- *The performance of spin-off companies founded by academics* (Lawton Smith and Ho, 2006; Harrison and Leitch, 2010)
- *The wider influence of government policies that encourage academic entrepreneurship* (Mowery and Sampat, 2004; Shane, 2004b).

Universities and Firms' Growth

- **Universities contribute to the development social capital and local economic growth (Feldman 1994, Saxenian 1996, Lawton Smith 2006, Breznitz 2014).**
- **University research parks positively impact the economic performance of resident firms (Leyden, Link, and Siegel 2006; Link and Scott 2003; Yang, Motohashi, and Chen 2009).**
- **University incubators provide access, which promotes the growth of tenant firms (Link and Scott, 2005, 2006; Rothaermel and Thursby, 2005; Mian, 2011, Breznitz et al 2018).**

Investment in Entrepreneurship



What is the impact of the EE investment ?



Entrepreneurship Education

Studies show that entrepreneurship education programs contribute to -

- The development of **ENTREPRENEURIAL INTENTIONS** among students (Fayolle et al. 2006, Bae et al 2014, Sanchez et al 2018, Kariv et al 2018).
- The **SURVIVAL AND GROWTH OF STARTUPS** (Kolvereid and Moen 1997, Kolvereid and Amo 2007, Martin et al 2013, Osborne et al 2000, Dickson et al 2008, Menzies and Paradi 2002).

Table 1
Summary of studies included in meta-analysis.

	Authors	Year	Published	EET type	Criterion variable	Country	Sample size	Rigor/random
1.	Athayde	2009	Yes	1	Human capital assets	UK	249	1
2.	Berge, Bjorvatn and Tungodden	2009	No	2	Entrepreneurship outcomes	Tanzania	430	2 and 3
3.	Brown, Bowlus and Seibert	2010	No	1	Human capital assets	USA	454	1
4.	Charney and Libecap	2000	No	1	Entrepreneurship outcomes	USA	511	1
5.	Chrisman and McMullan	2004	Yes	2	Entrepreneurship outcomes	USA	141	1
6.	Cooper and Lucas	2007a	No	2	Human capital assets	Scotland	37	1
7.	Cooper and Lucas	2007b	No	2	Human capital assets	Scotland	94	1
8.	Cruz, Escudero, Barahone and Leitao	2009	Yes	2	Human capital assets and entrepreneurship outcomes	Spain	354	1
9.	DeTienne and Chandler	2004	Yes	1	Human capital assets	USA	130	2
10.	Fayolle and Gailly	2009	Yes	1	Human capital assets	France	158	1
11.	Fayolle, Gailly, and Lassas-Clerc	2006a	Yes	1	Human capital assets	France	20	1
12.	Fayolle, Gailly, and Lassas-Clerc	2006b	Yes	2	Human capital assets	France	144	1
13.	Fayolle, Lassas-Clerc and Tounes	2009	No	1	Human capital assets	France	383	1
14.	Friedrich and Visser	2006	Yes	1	Human capital assets	S. Africa	114	2
15.	Friedrich, Glaub, Gramberg, and Frese	2006	Yes	2	Human capital assets	S. Africa	34	2 and 3
16.	Garalis and Strazdiene	2007	Yes	2	Human capital assets	EU	103	1
17.	Gine and Mansuri	2009	No	2	Human capital assets and entrepreneurship outcomes	Pakistan	1461	2 and 3
18.	Hanke, Warren and Kisenwether	2009a	No	1	Human capital assets	USA	362	1
19.	Hanke, Warren and Kisenwether	2009b	No	1	Human capital assets	USA	43	1
20.	Harris, Gibson and Taylor	2008	Yes	1	Human capital assets	USA	358	1
21.	Izquierdo and Buelens	2011	Yes	1	Human capital assets	Ecuador	274	1
22.	Jones, Jones, Packham and Miller	2008	Yes	1	Human capital assets	Poland	50	1
23.	Karlan and Valdivia	2006	No	2	Human capital assets and entrepreneurship outcomes	Peru	3431 2807 ^a	2 and 3
24.	Klapper	2004	Yes	1	Human capital assets	France	142	1
25.	Kolvereid and Amo	2007	Yes	1	Entrepreneurship outcomes	Norway	627	1
26.	Kolvereid and Moen	1997	Yes	1	Human capital assets and entrepreneurship outcomes	Norway	370	1
27.	Kourilsky and Esfandiari	1997	Yes	2	Human capital assets	USA	95	1
28.	Lee, Chang and Lim	2005a	Yes	1	Human capital assets	Korea	217	1
29.	Lee, Chang and Lim	2005b	Yes	1	Human capital assets	USA	162	1
30.	Liñán	2004	No	1	Human capital assets	Spain	166	1
31.	Mentoor and Friedrich	2007	Yes	2	Human capital assets	S. Africa	463	2
32.	Menzies and Paradi	2002	Yes	1	Entrepreneurship outcomes	Canada	287	1
33.	Michaelides and Benus	2010	No	2	Entrepreneurship outcomes	USA	3450	2 and 3
34.	Miron and McClelland	1979a	Yes	2	Entrepreneurship outcomes	USA	20	1
35.	Miron and McClelland	1979b	Yes	2	Entrepreneurship outcomes	USA	52	1
36.	Miron and McClelland	1979c	Yes	2	Entrepreneurship outcomes	USA	14	1
37.	Oosterbeek, van Praag, Ijsselstein	2010	Yes	1	Human capital assets	Netherlands	250	2 and 3
38.	Peteman and Kennedy	2003	Yes	2	Human capital assets	Australia	220	2
39.	Souitaris, Zerbinati, and Al-Laham	2007	Yes	1	Human capital assets	UK, France	250	2
40.	Tam and Hansen	2009	No	1	Human capital assets	USA	76	1
41.	Von Graevenitz, Harhoff, Weber	2010	No	1	Human capital assets	Germany	196	1
42.	Zhao, Seibert, and Hills	2005	Yes	1	Human capital assets	USA	265	1

Human capital assets = entrepreneurship-related human capital assets. Rigor/random key: 1 = meets meta-analysis inclusion criteria, 2 = pre/post and treatment/control group comparisons, and 3 = random assignment of groups. EET type key: 1 = academic and 2 = training.

^a Included in larger, human capital assets sample.

Source: Martin et al 2013.

Entrepreneurship Intentions

- Entrepreneurial intentions are defined as the commitment to start a new business (Krueger, 1993).
- Impacted by personal traits and situational factors (Ajzen 1991, Krueger, Reilly and Carsrud 2000).
- Studies show that EE positively impacts (Linan 2008, Martinet al, 2013, Zhang et al. 2014 and reinforces entrepreneurial intentions (Fayolle and Gailly 2015, Lans e al 2010, Ferreira et al 2018, Von Graevenitz et al 2010).



But – does it contribute to firm formation?

Survival and Growth of Startups

- Significant and positive correlation between participation in the educational programs and selection into entrepreneurship (Martin et al 2013).
- Studies show a positive impact of a *university EE* on the creation of Startups (Kolvereid and Moen 1997, Kolvereid and Amo 2007, Osborne et al 2000, Dickson et al 2008, Menzies and Paradi 2002).
- *EE at other institutions* has also shown positive results (Michaelides and Benus 2010, Gine and Mansuri 2009, Cruz et al 2009).

Engineering and Management Degrees

- **Science and engineering** students in particular establish new firms (Astebro et al 2012, Kirchhoff 1994) and have favorable views on entrepreneurship (Luthje and Franke 2003).
- EE positively impacts both **science and engineering and business students** (Maresch et al 2016, Menzies and Paradi 2002).
- Management students receive more education in general on business management. Studies find **conflicting results** on the impact it has on their interest in entrepreneurship (Kuckertz and Wagner 2010).



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 (faculty, students, post-docs, alumni)
- Activities (incubators, accelerators, science parks)

Method

- **Two surveys –**
 - **Toronto (U of T) Alumni Impact Survey (AIS) 2017 - collected data on key aspects of U of T alumni (social, cultural, and economic impact). Sent to 238,768 alumni with valid email addresses, for an overall response rate of 8.1%. Of the 21,360 respondents, 13,485 provided complete information on the key variables.**
 - **Follow-up survey July 2019 - collected data on' employment history, experience in entrepreneurship courses, and services. Sent to 14,027 respondents were willing to be contacted. 4,059 complete responses, response rate of 29.2%.**
- **2,539 respondents who have provided complete information in both surveys.**



Hypotheses

- H1 – Entrepreneurship education will positive impact the creation of firms.
- H2 - Entrepreneurship education will positive impact the creation of High technology firms.
- H3 - Entrepreneurship education will positive impact the student entrepreneurship.

Descriptive Statistics

	Variables	Obs.	Min.	Max.	Mean	SD
1	Entrepreneur	2,539	0	1	0.27	0.44
2	High-tech entrepreneur	2,539	0	1	0.02	0.14
3	Student entrepreneur	2,539	0	1	0.12	0.33
4	No EC	2,539	0	1	0.88	0.32
5	EC universities	2,539	0	1	0.05	0.21
6	EC incubators	2,539	0	1	0.02	0.12
7	EC other organizations	2,539	0	1	0.03	0.18
8	EC universities and incubators	2,539	0	1	0.01	0.08
9	EC universities and other organizations	2,539	0	1	0.01	0.09
10	EC incubators and other organizations	2,539	0	1	0.01	0.09
11	Female	2,539	0	1	0.50	0.50
12	Age 20s	2,539	0	1	0.14	0.34
13	Age 30s	2,539	0	1	0.20	0.40
14	Age 40s	2,539	0	1	0.17	0.37
15	Age 50s	2,539	0	1	0.20	0.40
16	Age 60s	2,539	0	1	0.16	0.37
17	Age over 70s	2,539	0	1	0.13	0.34
18	Graduate degree	2,539	0	1	0.49	0.50
19	Computer sciences and engineering	2,539	0	1	0.16	0.36
20	Management	2,539	0	1	0.09	0.28
21	CSE and management	2,539	0	1	0.03	0.16
22	Other areas of study	2,539	0	1	0.73	0.44

Entrepreneurship Courses and Firm creation (vs no EC)

	Dependent variable: Entrepreneur	Dependent variable: High-tech entrepreneur	Dependent variable: Student entrepreneur
Independent variables			
EC universities	0.811*** (0.213)	0.640 (0.633)	0.989*** (0.238)
EC incubators	1.690*** (0.346)	0.259 (1.041)	1.362*** (0.364)
EC other organizations	1.005*** (0.233)	1.527*** (0.439)	1.047*** (0.274)
EC universities and incubators	1.795*** (0.554)	1.436 (1.008)	1.785*** (0.526)
EC universities and other organizations	1.229*** (0.470)	1.981** (0.805)	0.192 (0.648)
EC incubators and other organizations	1.388*** (0.442)	1.818** (0.787)	1.841*** (0.444)
Control variables			
Female	-0.213** (0.102)	-0.684** (0.332)	-0.312** (0.137)
Graduate degree	-0.052 (0.097)	-0.123 (0.292)	0.346*** (0.132)
Computer sciences and engineering	0.236* (0.134)	0.364 (0.354)	-0.058 (0.188)
Management	0.224 (0.166)	-0.359 (0.555)	0.468** (0.199)
CSE and management	0.242 (0.281)	-1.038 (1.075)	0.406 (0.321)
Age decade control	Yes	Yes	Yes
Constant			
Number of observations	2,539	2,539	2,539
-2 Log likelihood	2,748.028	470.421	1,764.447
R ²	0.110	0.095	0.085

Conclusions

- **Study supports existing literature on the contribution of entrepreneurial education.**
- **For Universities – this is an important investment, especially for students entrepreneurs.**
- **For policy makers– The entrepreneurship ecosystem is important.**



Thank you!

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