

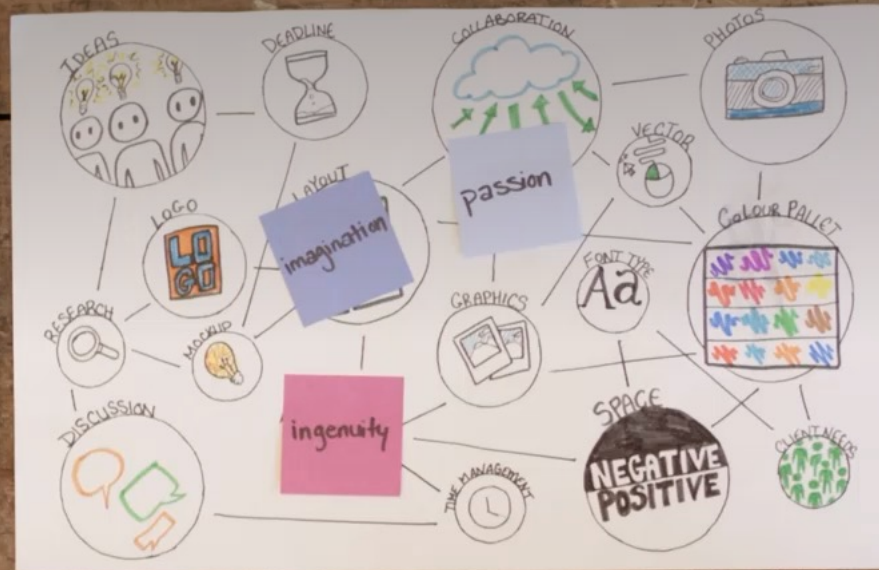
# Early-stage venture incubation and mentoring promote learning, scaling, and profitability among disadvantaged entrepreneurs

Stories of Successful Collaboration at the Colloquium on the Multi-dimensional Impacts of Business Accelerators

Valentina Assenova

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London School of Economics



# Study context



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- The setting for both studies was an early-stage venture incubator in South Africa
  - founded to help promising entrepreneurs from Soweto and surrounding areas near Johannesburg develop high-growth businesses
  - serves socially and educationally disadvantaged entrepreneurs from low-income backgrounds
  - receives funding from a combination of government grants, equity providers, and donors supporting job creation and economic development in South Africa
  - most applicants were attracted to the incubator because of the opportunity to learn the knowledge and skills necessary to grow and develop their businesses



# Study 1: Baseline Effect of Incubation

- Matched case-control design
- Evaluated effects of incubation on those that completed the full program compared to also-selected businesses that were not incubated
- Used data from applicants to the incubator, collected anonymously end-to-end using mobile-phone surveys with no individual identifying information collected about respondents.
  - Surveys asked applicants about their business performance over time, both at the time of applying (T0) and six months after applying (T1)
  - This method prevented the data from being individually identifiable to ensure accurate responses and confidentiality
  - Mobile-phone surveys are recommended for hard-to-access populations (Firchow and Mac Ginty 2017, Vicente et al. 2018) and combine potentially higher response rates than using alternative landline methods

# Study 1 Results

**Table 1.** Average Treatment Effect (ATE) of Being Incubated for Selected Applicants

	(1)	(2)	(3)	(4)
	Log(1 + Sales T1/ Sales T0)	Log(1+ Costs T1/ Costs T0)	Log(1+ Employees T1/ Employees T0)	Log(1+ Registered T1/ Registered T0)
	Difference in sales revenue	Difference in operating costs	Difference in employees	Difference in registration
ATE				
Hypothesis 1: Treated (incubated) compared with control	0.202* (2.23)	0.109 (1.30)	0.144** (2.85)	0.0290 (0.80)
Potential outcomes mean Control (selected, but not incubated)	0.846*** (13.75)	0.754*** (13.06)	0.597*** (17.10)	0.616*** (22.31)
IPW regressor				
<i>Residual distance to incubator</i>	0.0000346 (0.47)	0.0000156 (0.20)	0.0000677 (0.81)	0.0000313 (0.31)
Intercept	0.0312 (0.17)	0.0334 (0.18)	-0.265 (-1.11)	-0.0841 (-0.46)
N (treated)	120	120	120	120
N (control)	30	30	30	30

*Notes.* *t* statistics in parentheses. T0 denotes the time of applying. T1 means six months after applying, corresponding to the 24-week incubation period for selected applicants that joined the incubator. Inverse probability weighed (IPW) estimator using selected applicants' distance to the incubator (in kilometers) as a predictor of the probability of joining the incubator conditional on being selected. *Residual distance to incubator* is the residual of the geodesic distance on an ellipsoid (in squared kilometers) from each applicant's home address latitude and longitude coordinates to the incubator's address coordinates, after predicting this distance from the following pretreatment covariates: gender, age, ethnicity, business revenue at the time of applying, business operating costs at the time of applying, employees at the time of applying, and registration status at the time of applying.

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$  (two-tailed tests).

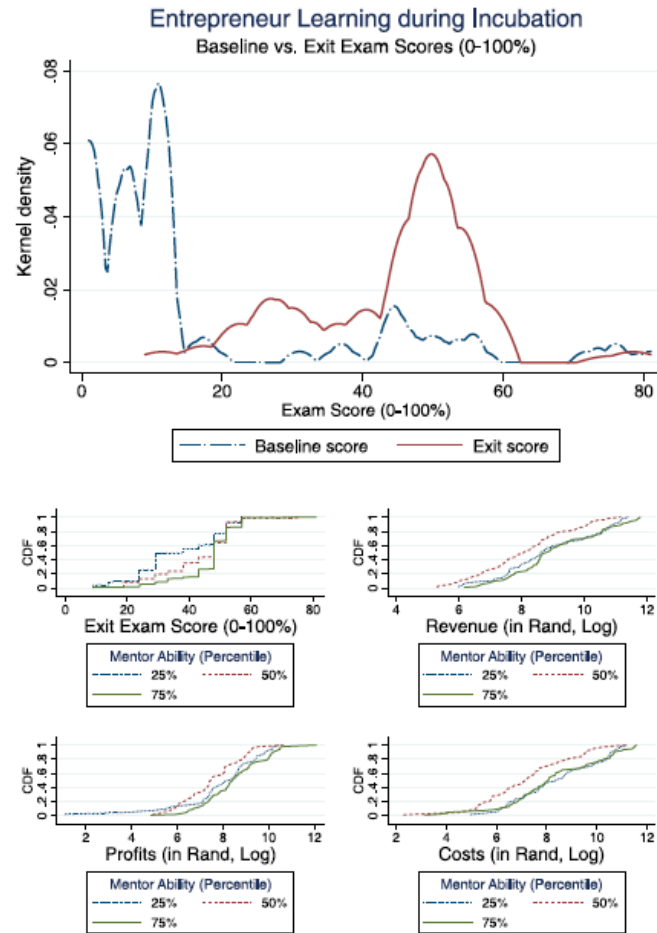


## Study 2: Effect of Mentor Ability

- Random assignment to mentors within a cohort
- Evaluated whether being paired with high-ability (versus low-ability) mentor in the incubator resulted in higher business revenue and profitability for entrepreneurs who participated in the incubator
- Data from seven cohorts of participants paired with expert mentors
- Mentors varied in their track records and ability, observed from their work with prior participants.
- Design used instrumental variable models to identify the causal effects of mentors' expertise on participants' business performance after incubation. These models provided estimates of the impact of mentoring on participants' score improvements on tests of managerial knowledge and subsequent business performance.

# Study 2 Results

**Figure 3.** (Color online) Effects of Mentoring on Entrepreneur Learning and Performance



CDF = cumulative distribution functions (empirical). Log denotes the natural log.

**Table 2.** 2SLS IV Regressions: Effect of Mentor Ability on Participant Learning and Performance

	(5)	(6)	(7)	(8)
	Second-stage 2SLS IV	First-stage 2SLS IV	Second-stage 2SLS IV	First-stage 2SLS IV
	Performance: <i>Business revenue</i> (Log, Rand), 12 months after incubation	Learning: <i>Score improvement</i> (Log, 0%–100%)	Performance: <i>Business profit</i> (Log, Rand), 12 months after incubation	Learning: <i>Score improvement</i> (Log, 0%–100%)
Hypothesis 2b: Learning: <i>Score improvement from baseline</i> (Log, 0%–100%)	3.250*** (3.43)		3.519*** (3.50)	
Hypothesis 2a: Mentor ability: <i>Lagged average score improvement of prior participants paired with the mentor</i> (Log)		1.149*** (11.80)		1.108*** (10.68)
Motivation: <i>Percent sessions attended</i> (0%–100%)	0.0451*** (4.15)	0.00274*** (4.06)	0.0366** (3.15)	0.00311*** (4.40)
Peer effects on learning: <i>Average score improvement in cohort</i> (Log, 0%–100%)	–0.0177 (–0.01)	–0.304 (–1.30)	–1.441 (–0.49)	–0.371 (–1.45)
Peer effects on revenue: <i>Average revenue in cohort after incubation</i> (Log, Rand)	0.208 (0.59)	0.00141 (0.05)	0.184 (0.50)	–0.00962 (–0.31)
Peer effects on profits: <i>Average profits in cohort after incubation</i> (Log, Rand)	–0.315 (–0.78)	0.00940 (0.29)	–0.00568 (–0.01)	0.0197 (0.56)
Intercept	–9.456 (–0.80)	1.117 (1.30)	–8.920 (–0.75)	1.584 (1.71)
Under-identification test (Kleibergen–Paap rk LM statistic) <sup>a</sup>	64.149		59.467	
$\chi^2(1)$ P-value	0.0000		0.0000	
Weak identification test (Cragg–Donald Wald F statistic) <sup>b</sup>	141.167		114.738	
Sargan–Hansen J statistic (over- identification test of all instruments)	0.000 (exactly identified)		0.000 (exactly identified)	
R <sup>2</sup> (uncentered)	0.73		0.68	
R <sup>2</sup> (centered)	0.42		0.36	
N	284	284	284	284

Notes. *t* statistics in parentheses. Baseline categories: black, male, South African-born entrepreneurs. All models include controls for participants' age, gender, nationality, ethnicity, baseline exam score (human capital), program dropout status (attrition), the quarter reported for performance data (seasonality), and operating costs (a proxy for firm size). Log denotes the natural logarithm.

\**p* < 0.05; \*\**p* < 0.01; \*\*\**p* < 0.001 (two-tailed tests).

<sup>a</sup>H0: Matrix of reduced form coefficients has rank = K1-1 (under-identified).

<sup>b</sup>H0: The equation is weakly identified.

# Study 2

## Moderating Effect of Entrepreneurs' Pre-Entry Knowledge

**Table 3.** Moderators of the Benefits of Mentoring

	(9)	(10)	(11)	(12)
	Moderator: <i>Pre-entry knowledge</i>	Moderator: <i>Ethnicity</i>	Moderator: <i>Age</i>	Moderator: <i>Gender</i>
	<i>Exit exam score</i> (0%–100%)	<i>Exit exam score</i> (0%–100%)	<i>Exit exam score</i> (0%–100%)	<i>Exit exam score</i> (0%–100%)
Mentor ability: <i>Lagged average score improvement of prior participants paired with the mentor (Log)</i>	45.67*** (10.89)	25.15*** (12.33)	46.42*** (6.18)	40.97*** (9.55)
Pre-entry knowledge: <i>Participant's baseline score (0%–100%)</i>	6.262*** (6.39)	0.894*** (8.21)	0.894*** (8.17)	0.944*** (8.75)
Hypothesis 3: <i>Mentor ability × Pre-entry knowledge</i>	–1.474*** (–5.48)			
Ethnicity: <i>Coloured</i>	–2.420 (–1.39)	–198.6** (–3.10)	–2.447 (–1.36)	–2.467 (–1.45)
<i>Mentor ability × Coloured</i>		53.98** (3.07)		
<i>Entrepreneur age</i>	–0.0161 (–0.29)		1.532** (2.92)	
<i>Mentor ability × Age</i>			–0.425** (–2.90)	
Gender: <i>Female</i>	1.265 (1.25)	1.464 (1.50)	0.912 (0.88)	68.95*** (4.18)
<i>Mentor ability × Female</i>				–18.83*** (–4.12)
Nationality: <i>Foreign-born</i>	0.543 (0.25)	2.012 (0.89)	1.346 (0.59)	0.984 (0.44)
Status: <i>Program dropout (attrition)</i>	18.18** (2.86)	15.89* (2.44)	15.27* (2.34)	17.21** (2.67)
Motivation: <i>Percent sessions attended (0%–100%)</i>	0.0464** (2.77)	0.0492** (2.86)	0.0510** (2.96)	0.0509** (2.99)
Peer effects on learning: <i>Average score improvement in the cohort (Log, 0%–100%)</i>	6.129 (1.05)	7.942 (1.33)	7.816 (1.30)	6.868 (1.16)
Intercept	–149.6*** (–6.84)	–82.40*** (–4.10)	–158.5*** (–5.29)	–135.8*** (–6.12)
Adjusted R <sup>2</sup>	0.50	0.48	0.47	0.49
N	284	284	284	284

Notes. *t* statistics in parentheses. Log denotes the natural logarithm.

\**p* < 0.05; \*\**p* < 0.01; \*\*\**p* < 0.001 (two-tailed tests).

# Results Summary



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- Study 1: Incubated businesses grew 22% more in revenue and 15% more in employment than not incubated ones over the six months between applying to and graduating from the incubator.
- Study 2: Incubator participants assigned to high-ability (versus low-ability) mentors had 3.2% higher revenue and 3.5% higher profits one year after incubation. Further, the benefits of being mentored were more significant for businesses whose entrepreneurs had less pre-entry knowledge and experience, suggesting that mentoring supplemented gaps in human capital.



# Lessons



Be willing to commit to a long horizon for a partnership

Need to build trust

Need to adapt – started with a “pilot”, provide pro-bono consulting



Collect as much data as possible, even data you don’t think you will need (e.g., geolocations and coordinates)



Understand what elements can be randomized and what cannot



Be creative in how you collect data – some populations are hard to reach, difficult to observe (e.g., mobile-phone surveys)

