



Grande École

The Predictive Strength of Absorptive Capacity on New Firm Performance

Frédéric Delmar, EM Lyon
Erik Wetter, Stockholm School of Economics

Agenda

- Problem of understanding the link between innovation and new firm performance
- Absorptive capacity in new firms
- Hypotheses
- Method: using multi-industry longitudinal data and several performance measures
- Results
- Conclusions

Problem

- New and small firms bring more (radical) innovations to the market
- New firm vary in innovation capacity
- ACAP is a strong predictor of economic performance and innovation capacity
 - At least on larger established firms where R&D expenditures can be measured
- We propose the level of technological or science university education in a firm's workforce as a proxy for ACAP instead
- Contribution: a theory and operationalization that allows us to explain which new firms are likely to innovate.

Defining Absorptive Capacity

- **Absorptive Capacity (ACAP)** is the **capability** of a firm to **discover** and to **assimilate** technological knowledge, thereby also enabling it to **exploit** advances in technological fields (e.g. Cohen & Levinthal, 1990; Zahra & George, 2002).
- In comparison to Dynamic Capabilities, **ACAP explicitly focuses on the acquisition of technological knowledge**, and not on the acquisition and development of general capabilities and business skills (e.g. Teece, Pisano & Shuen, 1997).
 - Strategy => Determinants of firm performance
 - Entrepreneurship=> Determinants of **new** firm performance

Common Application of Constructs

CONSTRUCT	Dynamic Capabilities	Absorptive Capacity	Human Capital
Level	Firm	Firm	Individual
Empirical locus	Management team	R&D department	Entrepreneur/ founding team
Scope	Managerial skill	Technological knowledge	General/ firm-specific/ industry-specific
Common operationalization	Change outcomes	R&D intensity/staff	Level of education/experience
Application	Dynamic (develops over time)	Dynamic (develops over time)	Static (e.g. initial endowment)

Two problematic issues with current empirical work

- **Issue 1:** Unreflecting application of the construct in a way that does not consider the underlying assumptions of the construct (Lane et al., 2006).
- **Issue 2:** The common operationalization of ACAP is the **proportion of R&D-staff** relative to the total number of employees, or **R&D investment** .
- **Conclusion:** The established use of ACAP is less useful for new firms, as they often do not have the resources or size to operate dedicated R&D departments or staff.

Absorptive Capacity in Entrepreneurship

- We propose the level of technological or science university education in a firm's workforce as an alternative proxy for ACAP [*proportion of employees with 3-year technology/science university education*]
- Use this to examine whether ACAP is a relevant construct when predicting the survival and performance of **start-up firms in technological fields**.

Hypotheses

- **Hypothesis 1:** New firms with **high absorptive capacity** will have a **higher probability of survival** than new firms with lower levels of absorptive capacity.
- **Hypothesis 2:** New firms with **high absorptive capacity** will **perform better** than new firms with lower levels of absorptive capacity.

Data

- Matched employer-employee data set from Statistics Sweden.
- All new incorporated firms in Sweden in knowledge-intensive industries **between 1995 and 2002**.
- Firms can enter the population by multiple modes; *de novo* startup (n=23,753), entry into the population by a firm with previous activity in another industry, split or by merger.
- Unit of analysis: the firm > 1 employee (**N=52,449**).

Dependent Variables

- H1: Firm survival
 - Hazard rates
- H2: Firm performance
 - H2a: Employee growth
 - H2b: Total salaries paid
 - H2c: Average salary
 - H2d: Return-on-Assets (ROA)
 - Random effect regression

Independent & Control Variables

- Independent: Proportion of employees with 3-year technology/science university-level education
- Controls:
 - **General human capital = Proportion of employees with 3-year university education (technology/science included)**
 - Type of entry
 - Size
 - Sales and assets
 - Industry
 - Patents
 - *et cetera*

(H1) New Firm Survival: Results

Hypotheses	Results	Outcome
H1: New firms with high absorptive capacity will have a higher probability of survival than new firms with lower levels of absorptive capacity	-.363***	Supported
<i>H1a: ACAP will have a negative impact on negative exits (terminations)</i>	-.362***	Supported
<i>H1b: ACAP will have a positive impact on positive exits (acquisitions)</i>	-.315***	Rejected
<i>H1c: ACAP will have no significant effect on neutral exits (de alio/splits)</i>	.042/- .625** *	Supported/ Rejected d

[* p < .05, ** p < .01, *** p < .001]

(H1) New Firm Survival: Results

- Proportion of employees with university-level technology/science education has a negative effect on the hazard rate, implying that our proxy for **ACAP** has a **positive effect on new firm survival**.
- No significant differences between terminations and acquisitions, strong effect on splits.
- The negative effect is significantly stronger than the effect of the proportion of employees with general university education, thus separating the positive effect of ACAP on firm survival from general human capital effects.

(H2) New Firm Performance: Results

Hypotheses	Results	Outcome
H2. New firms with high absorptive capacity will display stronger performance than new firms with lower levels of absorptive capacity		
<i>H2a: ACAP will have a positive impact on Employee growth</i>	-.011*	Rejected
<i>H2b: ACAP will have a positive impact on Total salaries paid</i>	.049**	Supported
<i>H2c: ACAP will have a positive impact on Average salaries paid</i>	.301***	Supported
<i>H2d: ACAP will have a positive impact on Return-on-Assets (ROA)</i>	.031***	Supported

[* p < .05, ** p < .01, *** p < .001]

(H2) New Firm Performance: Results

- ACAP (the proportion of employees with university-level technology/science education) had a
 - **Negative effect** on (H2a) employee growth
 - Minor effect on (H2b) total salaries paid
 - **Strong positive effect on (H2c) average salaries paid and (H2d) ROA.**
- The ACAP proxy was 4.2 times stronger than general human capital in predicting average salaries and 3 times stronger when predicting ROA.

Conclusions

- The proportion of employees with university-level technology/science education might be a **working operationalization** for ACAP.
- ACAP seems to be a **relevant theory for predicting new firm survival** and entrepreneurial dynamics in technological industries.
- ACAP seems to be a reliable predictor of survival and profitability, but not organic growth, for new firms in knowledge-intensive fields.

Contributions

- **Research:**
 - New operationalization of ACAP
 - Providing multifaceted picture of new firm performance
- **Policy-makers & practitioners:**
 - Jobless growth: prediction and analysis
 - Credit risk assessment models

Limitations

- Does not capture ACAP in the form of board members, consultants, network position, etc.
- Variables and analyses need to be developed (by age and size).
- Further research
 - Previous work experience
 - Intensity-of-rivalry
 - Geography
 - In depth industry studies

Absorptive Capacity: Discussion

- Firm ACAP has been ascribed to organizational routines and processes, and not just the sum of ACAP of individuals in organizations (e.g. Cohen & Levinthal 1990).
- But if routines and processes were key for absorbing ACAP, large and old firms would always be better at exploring and exploiting technological opportunities (innovation). This is not the case (e.g. Christensen 1996, Baumol 2002).
- We know from entrepreneurship research that opportunity discovery and exploitation is an inherently individual-level activity (Kirzner 1997, Shane 2000).