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Vienna University of Technology

The Impact of Human and Social Capital on University Startup Performance

Evidence from Entrepreneurship Ecosystems
in USA and Europe

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Literature Review

Entrepreneurship Ecosystems

- Moore's (1993): "*an economic community supported by a foundation of interacting organizations and individuals*"
- Isenberg (2010, 2011)
- Aspen Network of Development Entrepreneurs (2013): Research Summary/Overview

Entrepreneurial University

- Etzkowitz (1998): coined the term *entrepreneurial university*
 - Etzkowitz and Viale (2010): role of academic scientists is changing [...] move from academia to industry and vice versa
- **Third mission of universities:** transfer of academic knowledge & technology

Technology Transfer Offices

- Lockett & Wright (2005), Lowe (2006), Sigel et al. (2007), Faltin (2008), Grimaldi et al. (2011), Valdivia (2013): **TTOs play limited role in supporting spin-off development**
 - Bradley et al. (2013): New model of tech transfer
- Towards a "**nurturing start-ups model**"

(University) Incubators

- Hansen et. Al (2000), Etzkowitz (2002), Bøllingtoft & Ulhøi (2005): **Networked incubators**
 - **Impact of incubators rather limited** throughout Europe (European Court of Auditors 2014) and the USA
- **Social network approach of incubation**

Problem Statement & Research Gap

Problems with university startup support infrastructure (e.g. TTOs)

- How do universities develop and access **boundary spanners** between TTOs and industry and within universities? (Grimaldi et al. 2011)
- Call for a new generation of '**systemic incubators**' that aim to transform or create institutions to address the institutional challenges that constrain startup activity. (van Weele et al. 2018)

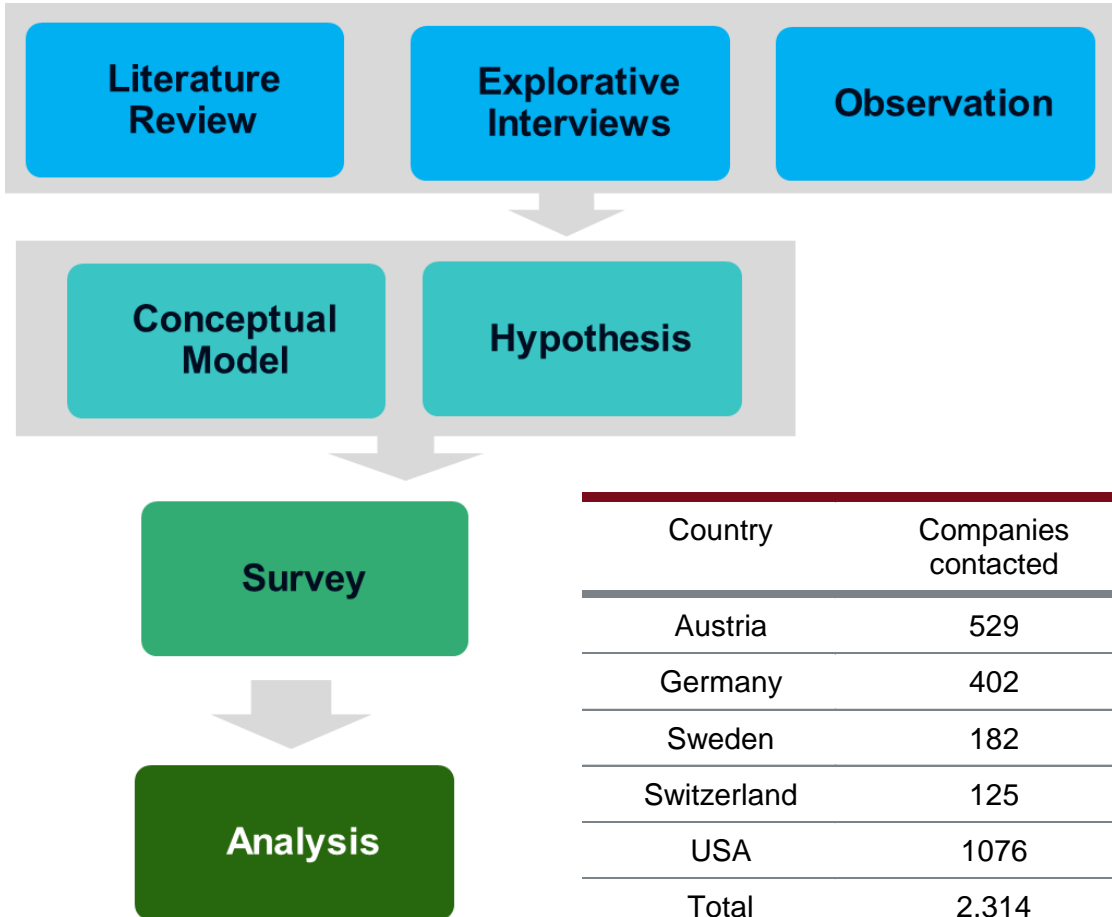
Structural holes between scientific research networks and industry networks

- Further research needs to **explore both institutional mechanisms and the informal networks** that allow potential entrepreneurs to access expertise for academic entrepreneurship (Mosey and Wright 2007).
- Also a study from Mody (2006) has found that **informal channels could be extremely effective in commercializing new inventions.**

Research Questions

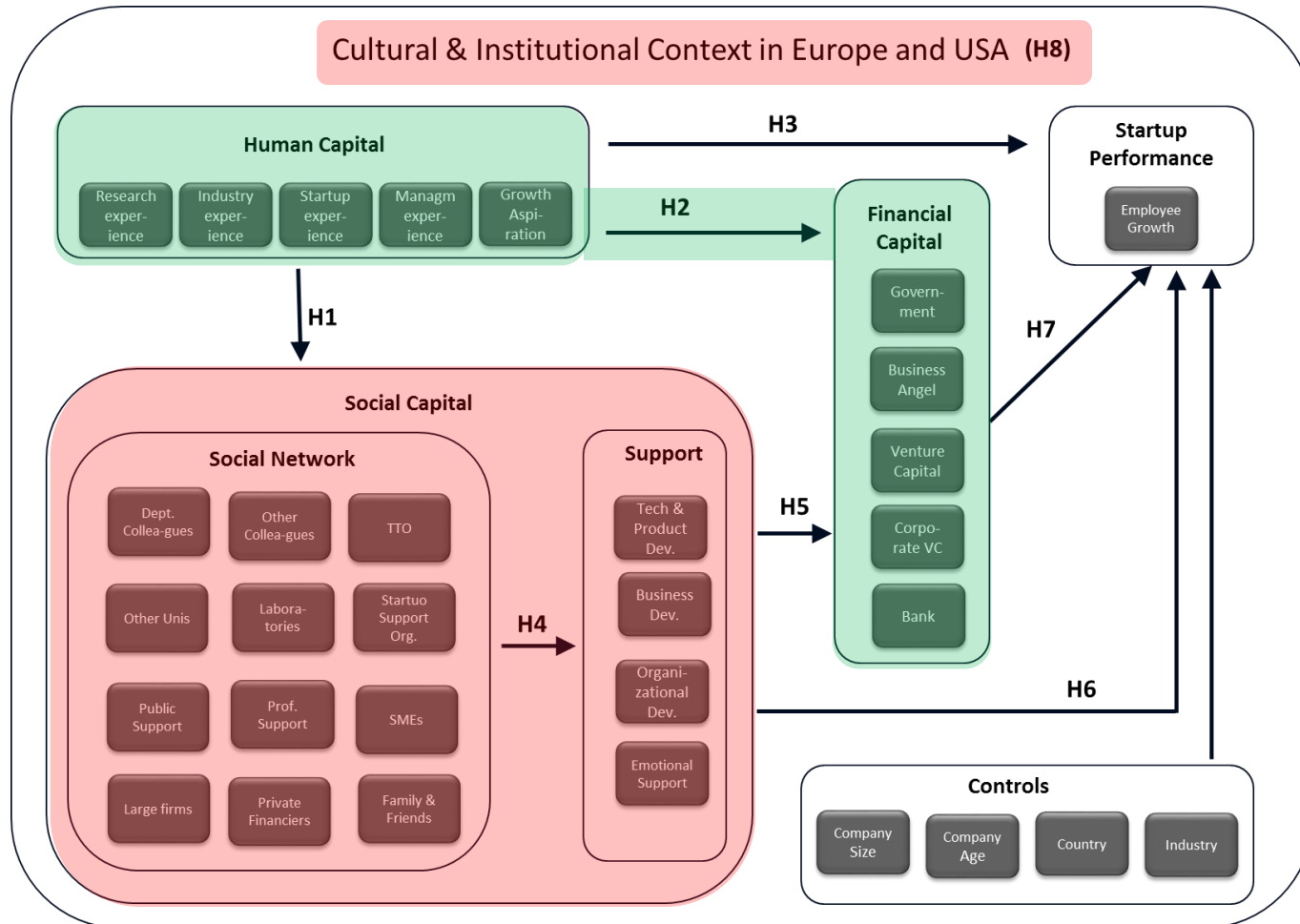
1. How does the **entrepreneurship ecosystem** (cp. cultural and institutional environment) influence university startup development in the USA and Europe?
2. How does **human capital** affect social capital development of university startups?
3. How does **social capital** affect university startup development?
 - What is the **difference** between the social capital of university startups in the **USA and Europe**?
 - Who are the **most important actors** within and outside the research network and how do they support the early stages of university startup development?
 - How do **startup support organizations** at universities (e.g. incubators and accelerators) contribute to the development of the spin-off's social capital by providing contacts to actors outside the research network?
4. How do human, social and financial capital affect **university startup performance**?

Methodological Approach



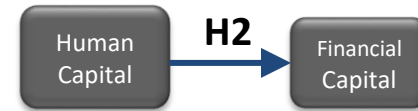
Country	Companies contacted	Completed surveys	Response rate
Austria	529	155	29%
Germany	402	64	16%
Sweden	182	40	22%
Switzerland	125	26	21%
USA	1076	124	12%
Total	2,314	409	18%

Conceptual Model & Hypotheses



Hypotheses (selected)

Human Capital → Financial Capital

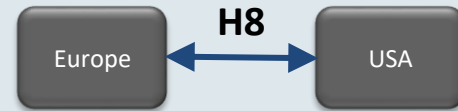


H.2a	Prior business ownership experience has a positive impact in gaining equity finance from network actors external to the university.
H.2b	Prior business ownership experience is more important than industrial experience c) management experience d) research experience in gaining equity finance from network actors external to the university.
H.2c	Higher level of an entrepreneur's growth aspiration will lead to a higher probability of equity financing by private financiers (business angels and venture capitalists).
H.2d	A higher number of full-time committed founders will lead to higher probability of equity financing by private financiers (business angels and venture capitalists).

Human & Social Capital in EU vs US



H.8a	Entrepreneurs in Europe exhibit a lower level of growth aspiration than entrepreneurs in the USA.
H.8b	University startups in the USA grow faster than their counterparts in Europe.
H.8c	The supporting actors of university startups differ between the USA and Europe.
H.8d	In the USA , university startups use actors from the business network (private financiers, entrepreneurs & small firms, large firms, professional support) more often compared to Europe
H.8e	In Europe , the central supporting actors are more often government-related (public support) than in the USA



Human Capital across Countries

	Austria	Switzerland	Germany	Sweden	USA	Chi-Square
Count (N)	153	26	64	41	123	
Entrepreneurs with prior startup experience ¹	34.6%	19.2%	46.9%	68.3%	58.5%	31.43**
Entrepreneurs with prior industry experience	71.4%	69.2%	59.4%	56.1%	57.4%	7.97 ⁺
Entrepreneurs with prior management experience	58.8%	23.1%	34.4%	63.4%	56.6%	22.67**
Entrepreneurs with prior research experience	58.2%	92.3%	59.4%	31.7%	54.9%	24.36**
Entrepreneurs with PhD	29.6%	80.8%	23.8%	17.1%	34.4%	35.18**
Expected revenue in 5 years is > 10 mio	16.4%	47.1%	19.1%	41.9%	55.8%	42.32**

**p<0.01 *p<0.05 +p<0.1 Note: Separate Chi Square tests were conducted for each type of experience; 1 as non-founding or founding member of 1 or more startups

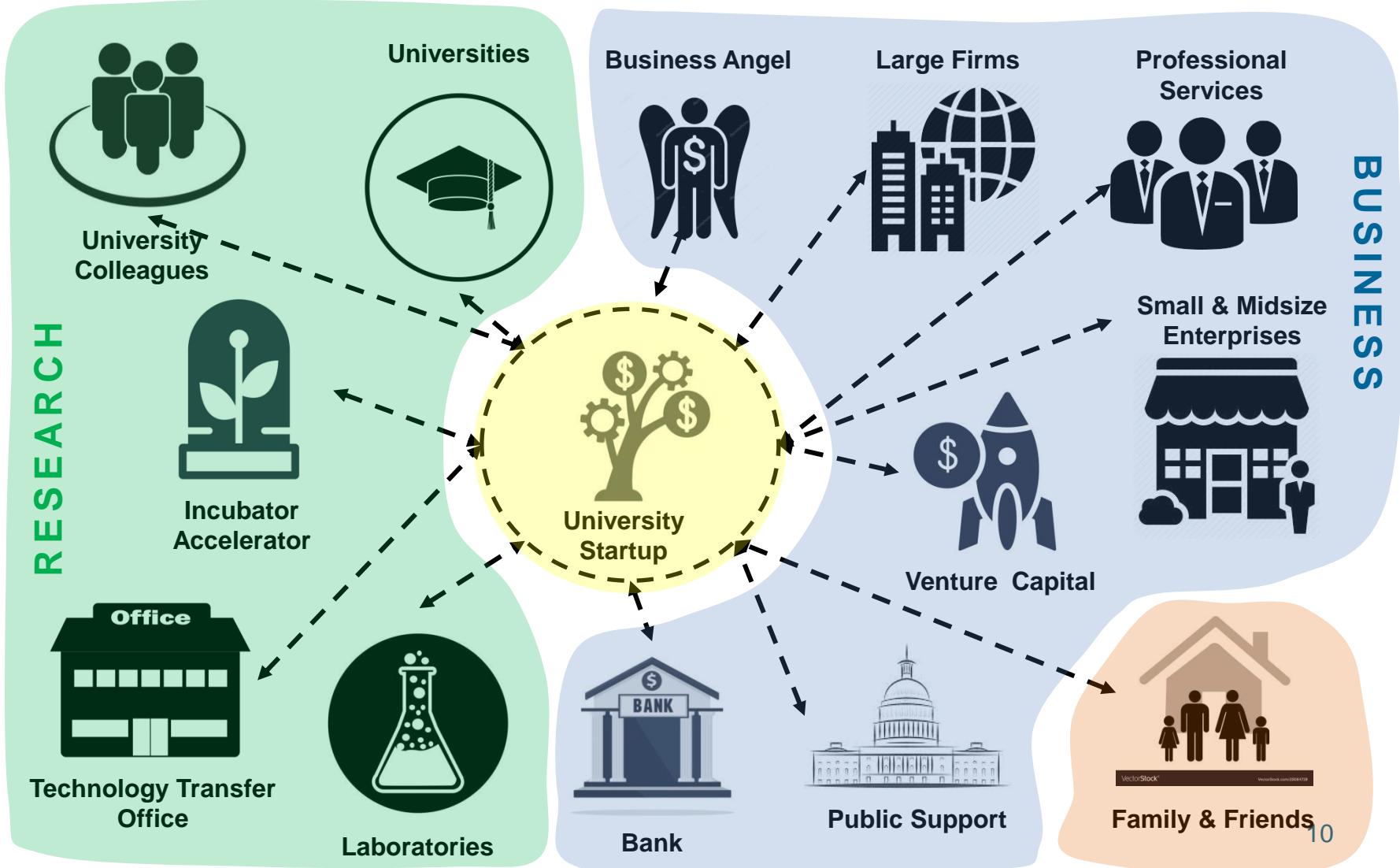
Human Capital → Startup Financing

Model	1	2	3	4	5
	Government funding	Business Angel funding	Venture Capital (VC) funding	Corporate Venture funding	Bank funding
Company Age	.054	-.079	-.006	-.057	.209***
Company Size	.005	.022	.103**	.084*	.032
Continent (USA)	-2.139***	.468	2.416***	2.180***	-1.629**
Software & IT	.416	.044	-.219	-1.115 [†]	-.078
Life Science & Medical Devices	.634	-.111	-.466	-1.014	.122
Light Manufacturing & Hardware	.690	-.054	-1.210	-.632	.330
Founder Age	-.068	.067	-.229	-.122	.100
Founder Gender	.623 [†]	.676	.622	.259	-.673
Founder's startup experience	-.223	.761*	1.171**	.846[†]	.079
Founder's industry experience	.476[†]	-.635*	.095	.127	.284
Founder's management experience	-.093	.044	.003	-.715	.116
Founder's research experience	.572*	-.142	.744	.699	-.108
Growth aspiration	-	.855**	.687	-.403	-2.703
Full-time founders	-	.411*	-.117	.061	.209
Constant	-.166	-2.185***	-3.847***	-3.227***	.032***
-2 Log likelihood	386.993	329.645	175.240	141.159	194.276
Pseudo R² (Nagelkerke)	.305	.227	.438	.267	.165

***p<0.001 **p<0.01 *p<0.05 [†]p<0.1



Social Capital in Research & Business



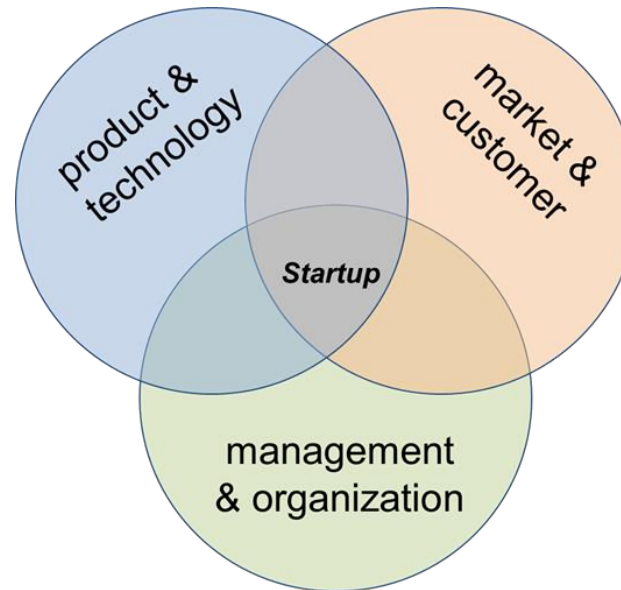


Three Startup Development Domains

Technological & product development

the transformation of new research findings, technologies and prototypes into viable products or services.

cp. **Technology Readiness Level, Proof of Concept/Market**



Market & business development

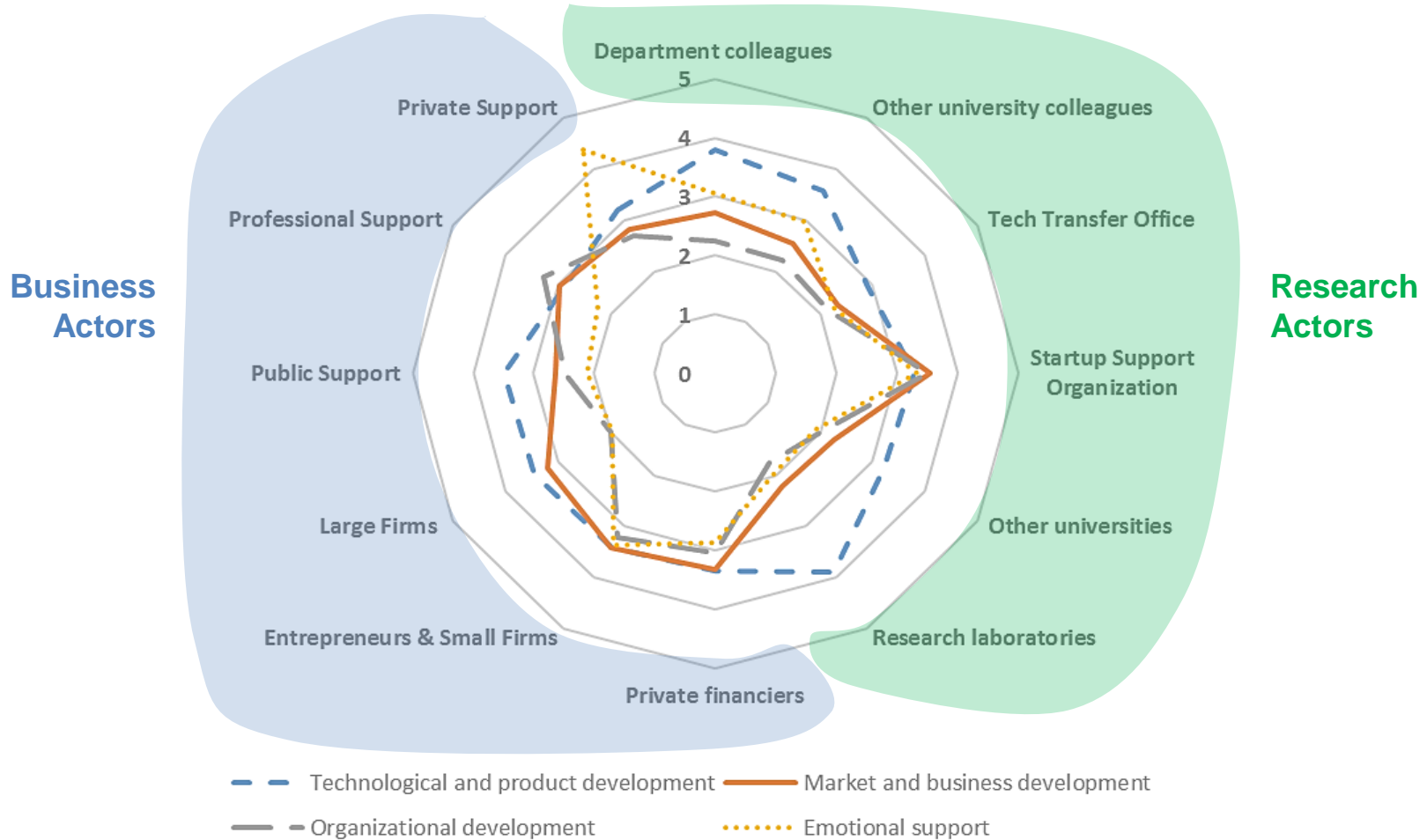
gathering market information and identifying customer needs, marketing and selling products or services.

Principles of **Customer Development** (Blank 2006), **Business Model Generation** (Osterwalder et al. 2010) and the **Lean Startup** (Roes 2011) are central concepts.

Organizational development starting, managing and growing a professional organization. The integration of a complementary founders and a team of business, technology and design experts is as important as financial, legal and strategic aspects.

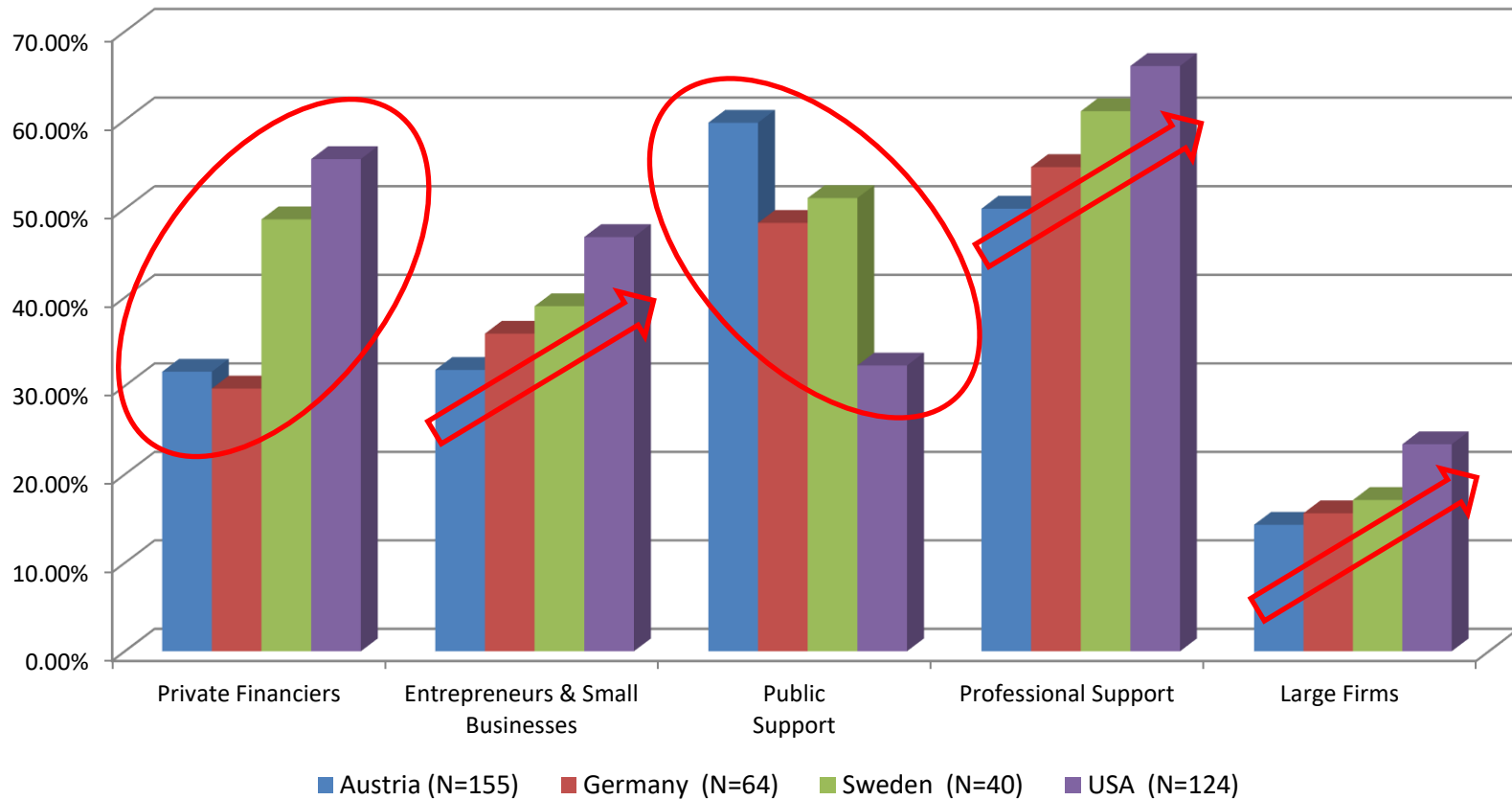


Actor Support Factors per Dev. Domain



Social Capital in USA and Europe

Support Actors used by University Startups for Company Development



Summary & Conclusions (selected)

- **Human Capital**
 - The entrepreneur's **prior startup experience and growth aspirations** („think big“ mentality) are crucial to raise funding from private investors and grow the company successfully
- **Social Capital**
 - **Importance of investors** as well as entrepreneurs and small businesses for **business and organizational development**.
 - Technology and product development needs research as well as business support.
 - **Adapt entrepreneurial university metrics** to incorporate measures on social capital .
- **EU vs USA**
 - Growth aspirations less pronounced in EU compared to USA.
 - Predominant **public actor support** in EU vs. **private actor support** in US

Understanding the social dynamics between the academic entrepreneur and the actors in the surrounding entrepreneurship ecosystem is crucial for **developing better innovation policies** (on university, regional and national level) and to **design more effective startup support programs**.

FRAGEN & KONTAKT



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