

Universities and Knowledge-Intensive Enterprises in the United States

Lessons From a Systematic Review of the Literature

Christopher S. Hayter

**Center for Organization Research and Design
School of Public Affairs**

Academic Entrepreneurship

Defined:

The establishment and development of knowledge-based enterprises with involvement from faculty, postdocs, students, or affiliated personnel based on university technology

Project Goals

Given prior research on academic entrepreneurship:

- (1) Review recent academic entrepreneurship research (2000 – 2017)**
- (2) Develop a typology of the literature based on a network (ecosystem) perspective**

Policy Genres in the U.S.

1980s

**Legislative Reform
(Bayh-Dole + slow adoption)**

1990s

**Scale and Technology Transfer
(NIH, TT, state policy, VC)**

2000s

**Uncertainty and Change
(Crises, Biotech model 'fails', state programs)**

2010s

**Commitment
(America Competes, Presidential support, iCorps)**

Literature Review: Approach

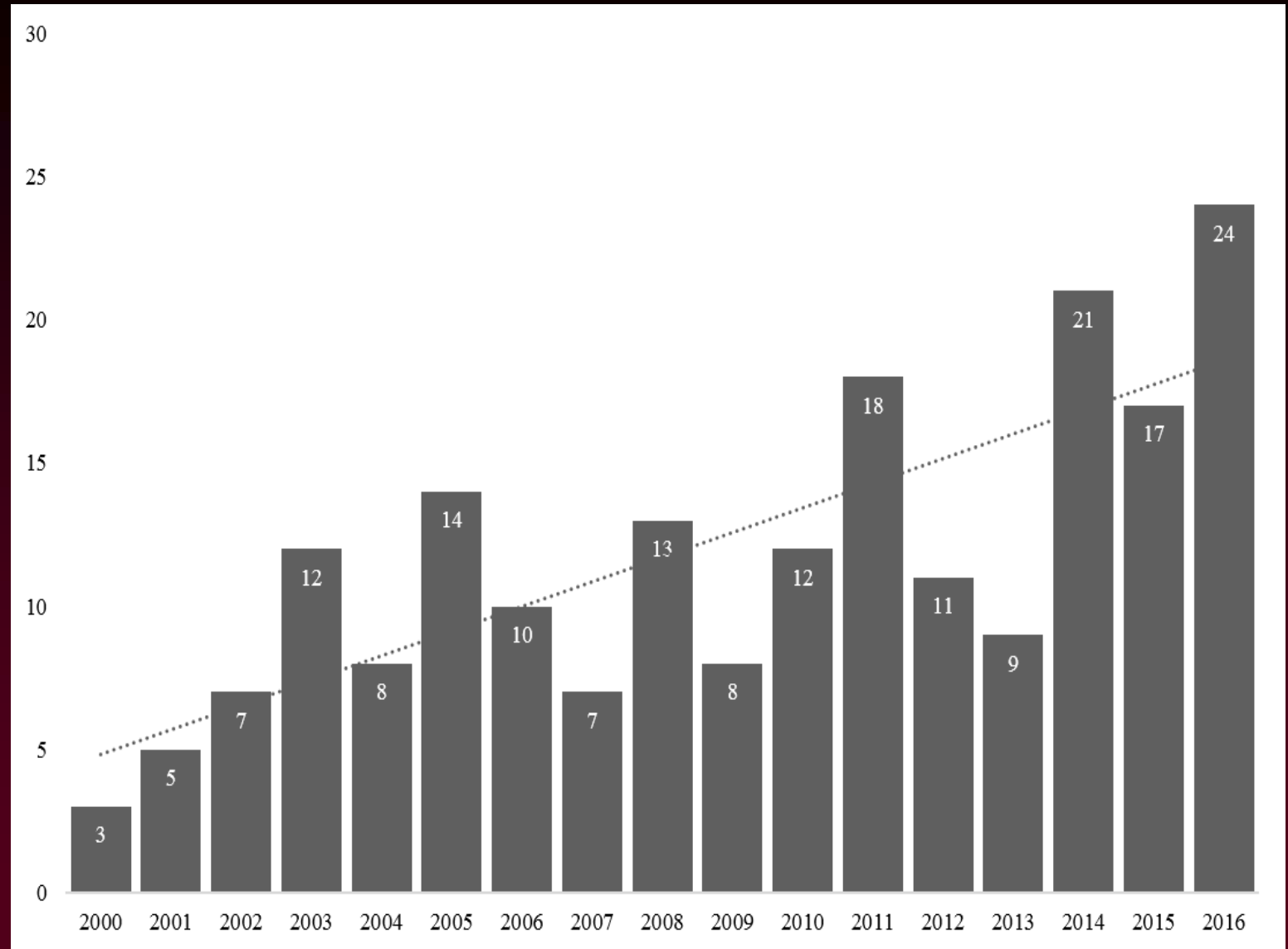
Sample:

- Chose FT Top 50 management publications, adding:
 - *Journal of Technology Transfer, Small Business Economics, Technovation*
- 250 identified as relevant; 201 after filtering for fit and empirical criteria

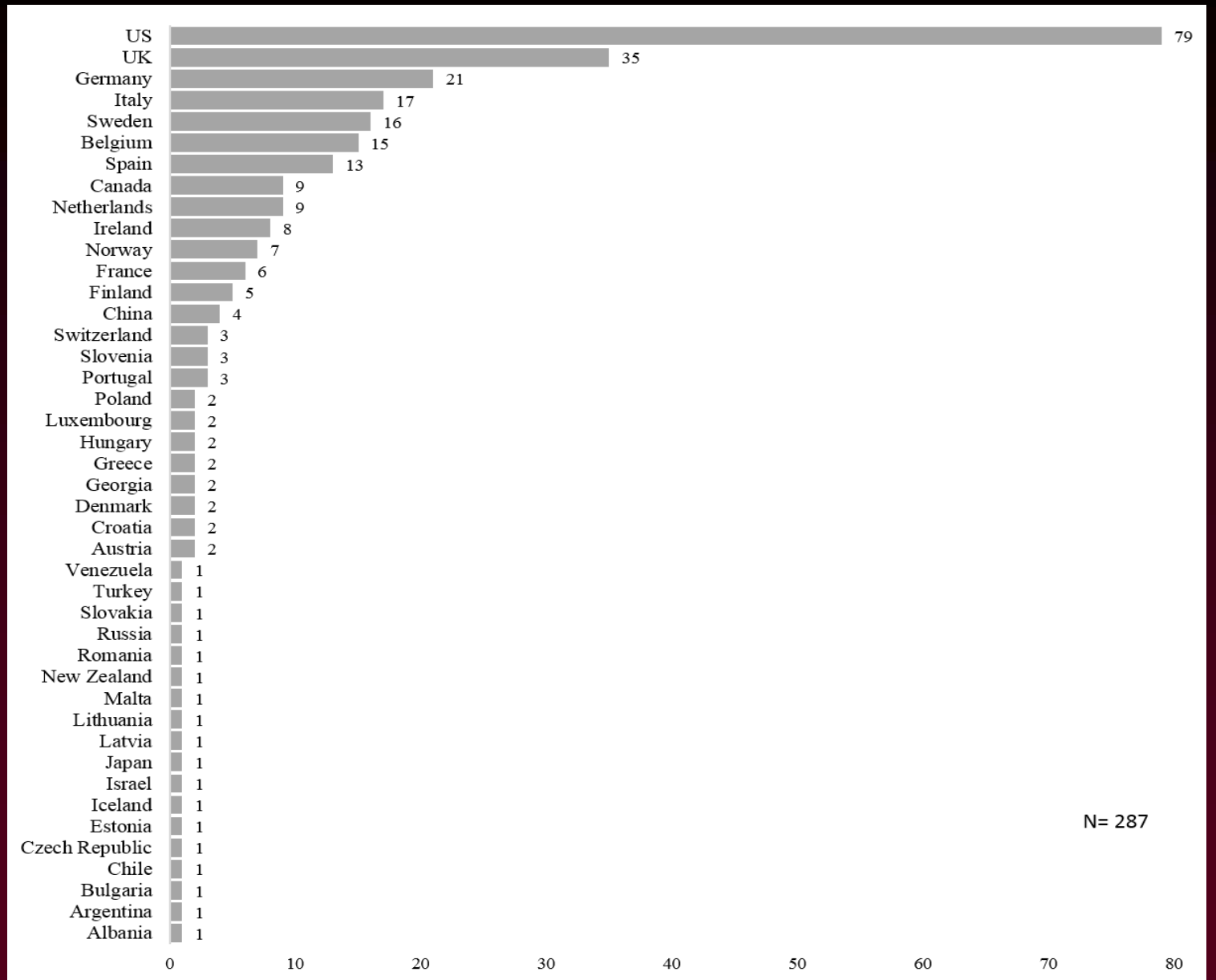
Methods:

- Grounded Theory Systematic Review:
 - Inductive coding → identified themes
 - Emphasis on networks, inter-connectivity of themes

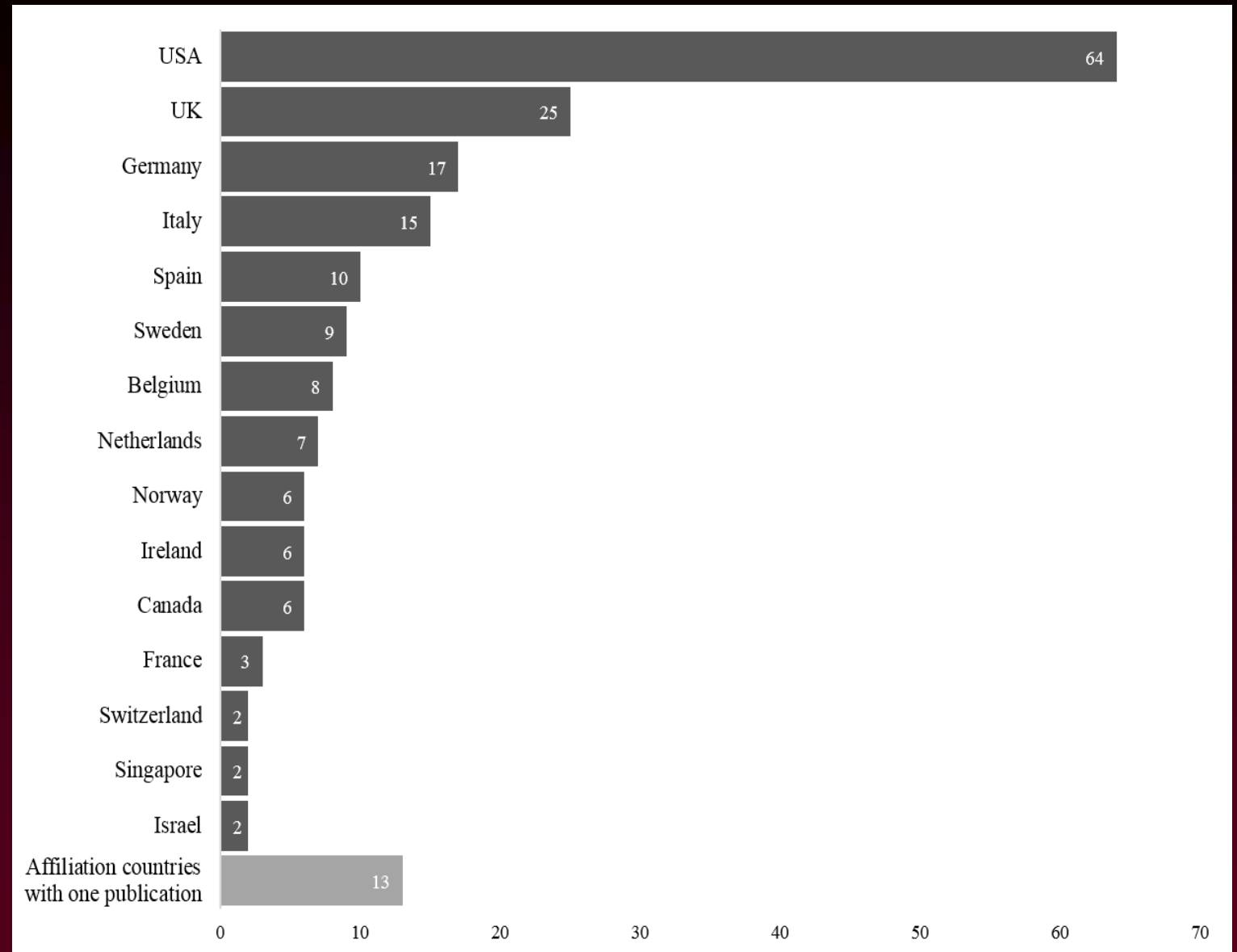
**Publication
Frequency by Year
(N = 198)
3 in 2017**



National Research Focus (N = 287)



Country Affiliation of (Co)Author (N = 195)



Dependent (Impact) Variables

- **Number of Spinoff Companies Established**
- **Spinoff Establishment Antecedents**
- **Spinoff Outcomes**
- **Spinoff Intermediate Outcomes**
- **IP Related-outputs**
- **University Role**
- **Traditional Academic Outputs**
- **Industry engagement as antecedent for commercialization**
- **Multiple Dependent Variables**

- Constrain
- Non-academic Contacts
- Provide Advice and Mentoring
- Resource Provision

Individual Networks

Social Networks

- Can Enable (or Constrain)
- Entrepre. Support Programs

Program Support Networks

- Advice and Support
- IP Protection May Harm Entrepre.
- Capabilities and Resources
- Structure

TTOs

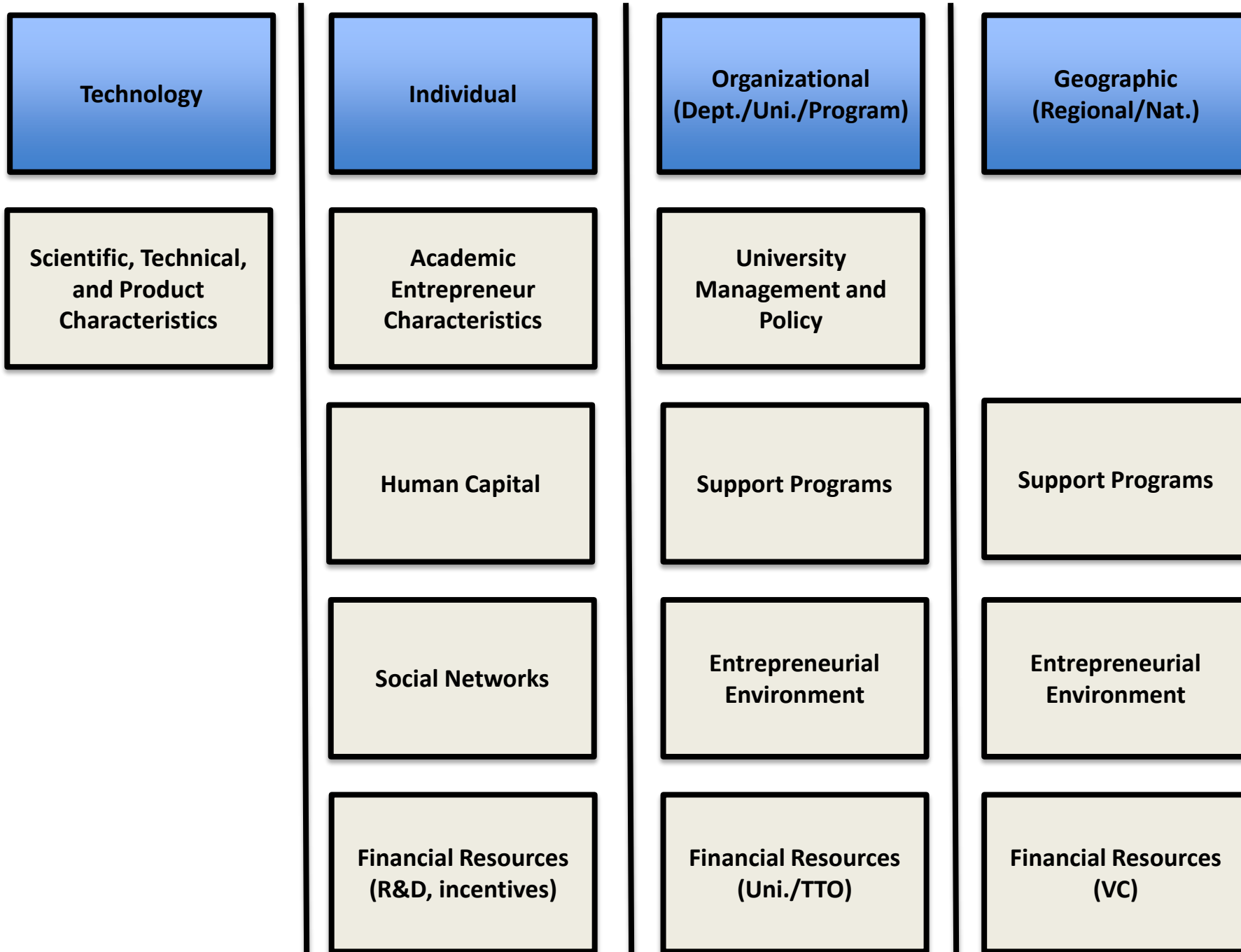
Support Programs and Policies

- Business Plan Competitions
- Early-stage Seed Funds
- Incubators
- Industry Research Centers
- Proof-of-Concept Centers
- Science Parks

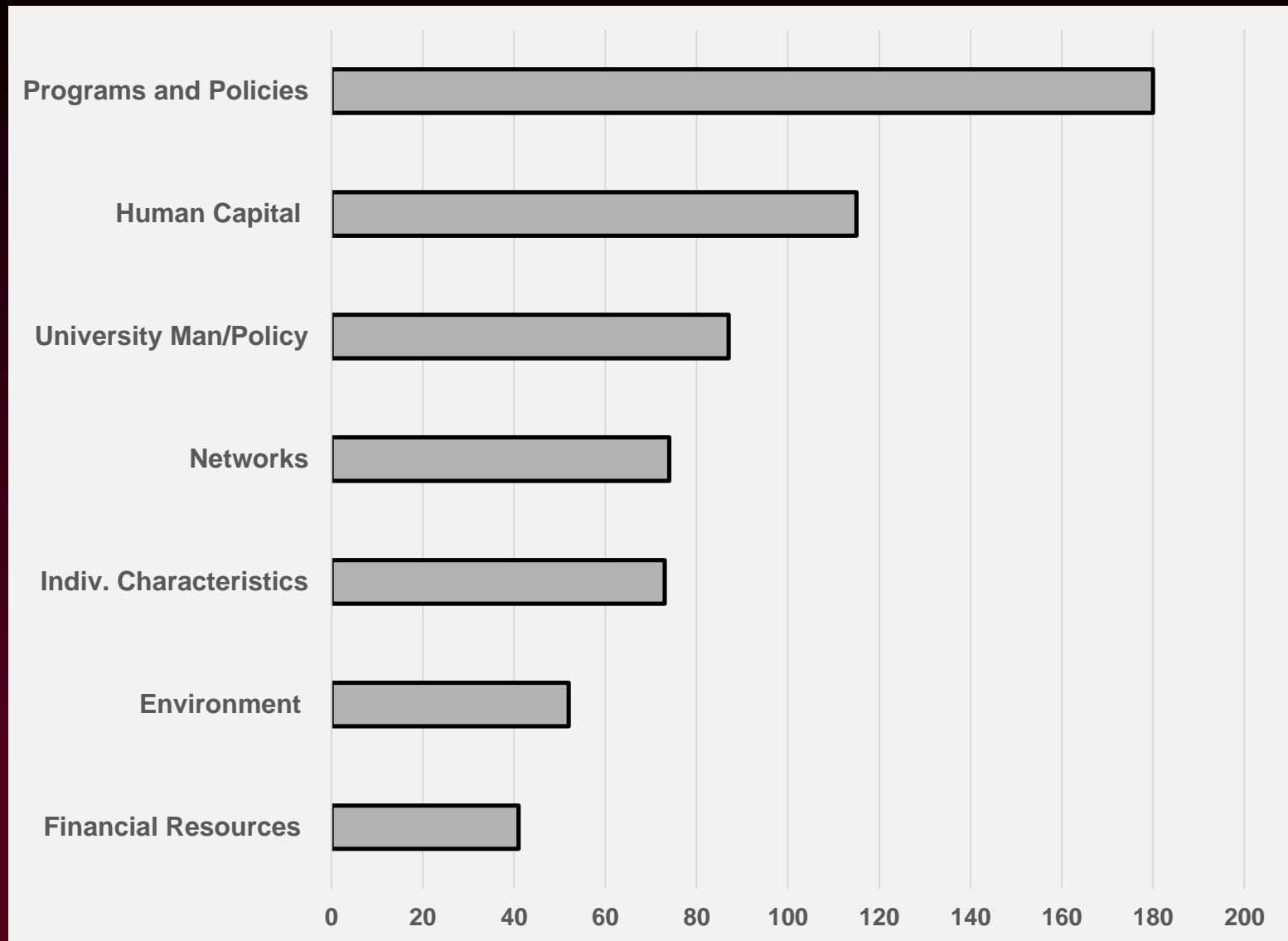
Univ. Acad. Entre. Support

- Entrepre. Support Programs
- IP Policy Frameworks
- Legislation
- Tax Benefits
- Regulatory Reform

Nat. Policies and Programs



IV Coding by Reference (N = ~650)



Empirical Network Research

From the literature, we know:

- **(7) Proxies for network relationships**
 - Number of industry contacts, joint ventures, co-publication, frequency of interactions
- **(8) Empirical examinations of networks**
 - SNA measures (size, density, centrality), network composition and contributions

Comparing Policy and Research

Legislative Reform

Emergence of TTOs, Impact of Bayh-Dole

Scale and Technology Transfer

Growth in Technology Transfer, Emergence of VC, Incubators/Science Parks, Number of Spinoffs, Organizational Factors at Universities

Uncertainty and Change

Spinoff Survival, Antecedents, Outcomes, State Programs

Commitment

Program focus (PoCCs, iCorps, University Venture Funds), Little Evaluation, Network Studies

Next?

Findings

From the literature, we know:

- **The academic entrepreneurship literature *follows* policy (often slowly)**
- **Biggest barriers to academic entrepreneurship:**
 - **Information asymmetries, development and managerial capabilities, and connectivity**
 - **Low Relative Importance of Finance**
- **Studies typically focus on single units of analysis (individual, spinoff, university)**
 - **Some have network criteria (e.g. iCorps)**

Findings

From the literature, we know:

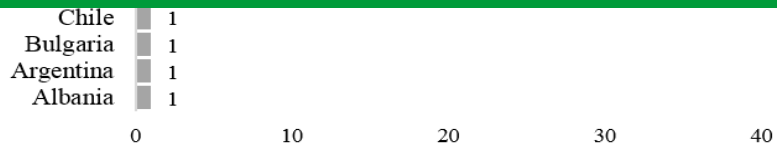
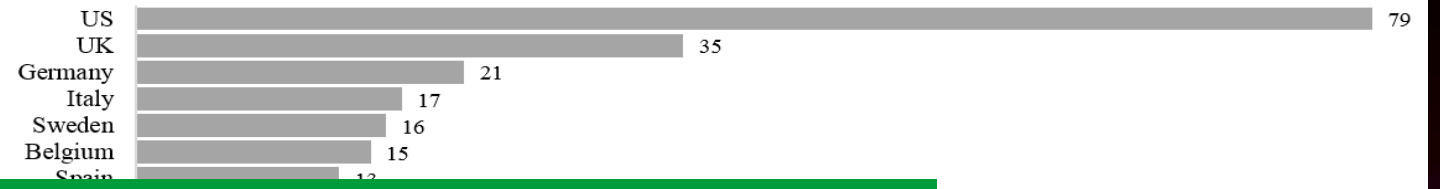
- **Exceptions: Multi-level, multi-program case studies of single (Rasmussen 2008) or multiple (Swamidass 2013) universities**
 - **May discuss networks but not examined empirically**
- **Network research examines individual/spinoff-level networks**
 - **Not yet expanded to multi-institutional (ecosystem) views**

Looking Ahead

- **Ecosystem Views have Entered the Research Lexicon**
 - Multiple Special Issues; little progress on conceptualization
 - Policymakers are likely to take ex ante action
- **Network-centric Approaches Hold Promise**
 - Multi-institutional, multi-agency views
 - Multi-sector collaboration
 - Multi-level linkages

How do We Conceptualize Network Change and Governance?

Opportunity for Brazil and other Rapidly-developing Countries



Questions?

Christopher S. Hayter

**Center for Organization Research and Design
School of Public Affairs**