

HALF A CENTURY OF INNOVATION RESEARCH: ACHIEVEMENTS AND CHALLENGES

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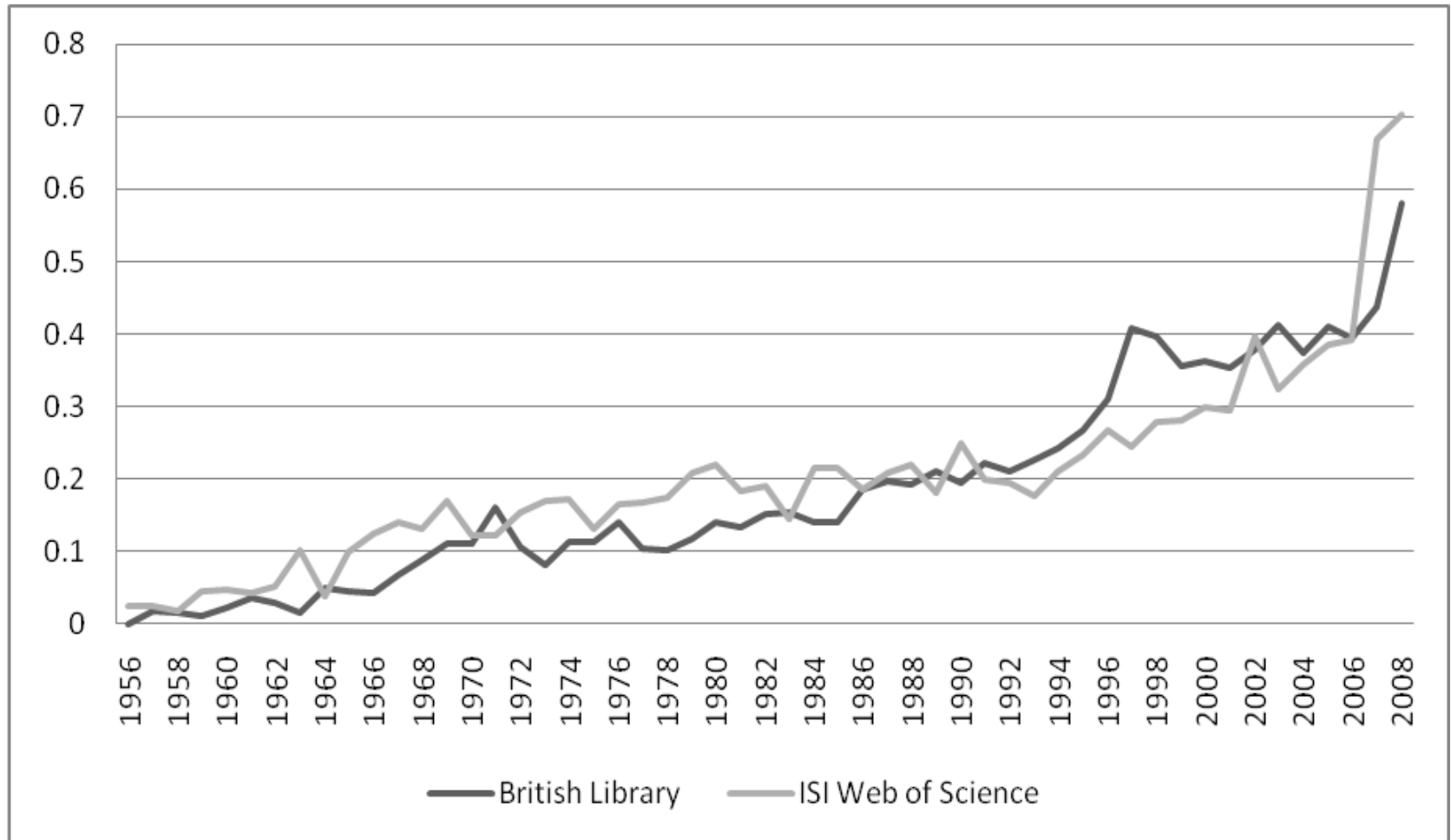
**TIK, University of Oslo, Norway

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**DRUID ACADEMY 16-18 January, 2013
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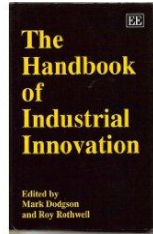
*Based on joint work with Morten Fosaas and Koson Sapprasert ,
published in special issue on “Exploring the Emerging Knowledge Base
of The Knowledge Society” , Research Policy (7) 2012*

The growth of the innovation literature



Publications with Innovation in title, as a percent of annual additions.

Exploring the innovation literature

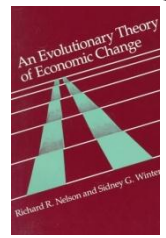


- Analyse the (evolution of) the innovation literature
- Use references in handbook chapters (**books**) to identify the most important (commonly cited) contributions (“**core** literature”)
- 11 handbooks, 277 chapters, 21 313 references
- J-index: Numbers of chapters citing a publication as a percentage of all chapters that potentially could have done it
- To be included in the “core” a publication needs to be cited by at least **three** handbooks and have a **J-index > 3.3**, 130 publications matched these criteria
- Explore the characteristics of the literature
- Identify the users of this literature through citations in scholarly journals (web of science)
- Analyse the structure of the knowledge base through cluster analysis

Source: 11 handbooks (21 313 references)

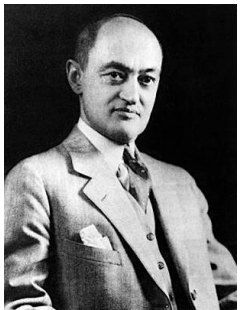
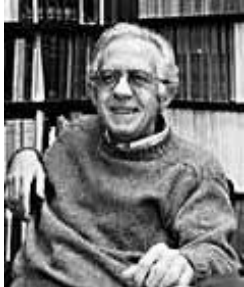
Name of author/(year)	Title	Thematic Orientation	Chapters (references)
Cozijnsen & Vrakking (1993)	Handbook of Innovation Management	Management/ Organization	9 (280)
Dodgson & Rothwell (1994)	Handbook of Industrial Innovation	General/ Industrial	35(1247)
Stoneman (1995)	Handbook of the Economics of Innovation and Technological Change	Economics of Innovation	13 (1630)
Shavinina (2003)	International Handbook on Innovation	General/ Industrial	71 (4303)
Fagerberg, Mowery & Nelson (2004)	The Oxford Handbook of Innovation	General/ Industrial	22 (1688)
Poole & Van de Ven (2004)	Handbook of Organizational Change and Innovation	Management/ Organization	13 (1958)
Karlsson (2008)	Handbook of Research on Innovation And Clusters	Geography & Development	24 (1465)
Shane (2008)	Handbook of Technology and Innovation Management	Management/ Organization	16 (1494)
Lundvall, Joseph & Chaminade (2009)	Handbook of Innovation Systems and Developing Countries	Geography & Development	13 (974)
Hall & Rosenberg (2010)	Handbook of the Economics of Innovation	Economics of Innovation	29 (4518)
Gallouj & Djellal (2010)	The Handbook of Innovation and Services	General/ Industrial	32 (1756)

Core literature: Top contributions



No	Author	Country	Title	Type	J-index	Citations (ISI/Year)
1	Nelson & Winter (1982)	USA	An Evolutionary Theory of Economic Change	Book	18.8	165.0
2	Nelson (1993)	USA	National Innovation Systems	Book	15.7	61.0
3	Porter (1990)	USA	The Competitive Advantage of Nations	Book	14.4	166.9
4	Schumpeter (1934)	Austria/ USA	The Theory of Economic Development	Book	14.1	39.5
5	Rogers (1962)	USA	Diffusion of Innovations	Book	14.1	204.3
6	Lundvall (1992)	Denmark	National Innovation Systems	Book	13.4	59.3
7	Freeman (1974)	UK	The Economics of Industrial Innovation	Book	12.6	30.4
8	Cohen & Levinthal (1990)	USA	Absorptive Capacity	Article	11.9	124.3
9	Pavitt (1984)	UK	Sectoral Patterns of Technical Change	Article	11.6	23.2
10	Arrow (1962)	USA	Economic Welfare and Allocation of Resources for Invention	Book Chapter	10.5	26.0

Innovation Studies: Core contributors



*(Brackets:
Fagerberg
and
Verspagen
2009, RP)*



Rank	Name	Country	Total J-index	Total ISI/year
1 (2)	Nelson, R	USA	37,6	175
2(3)	Freeman, C	UK	35,5	88
3(5)	Rosenberg, N	USA	33,4	95,9
4(1)	Schumpeter, JA	USA/Austria	27,4	160
5	Porter, M	USA	24,9	353
6 (9)	Griliches, Z	USA	24,2	93,7
7	Von Hippel, E	USA	20,2	54,3
8(4)	Lundvall, B-Å	Denmark	19,1	76,9
9 (6)	Pavitt, K	UK	15,5	44,5
10	Chandler, AD	USA	14,8	182

The evolution of the field

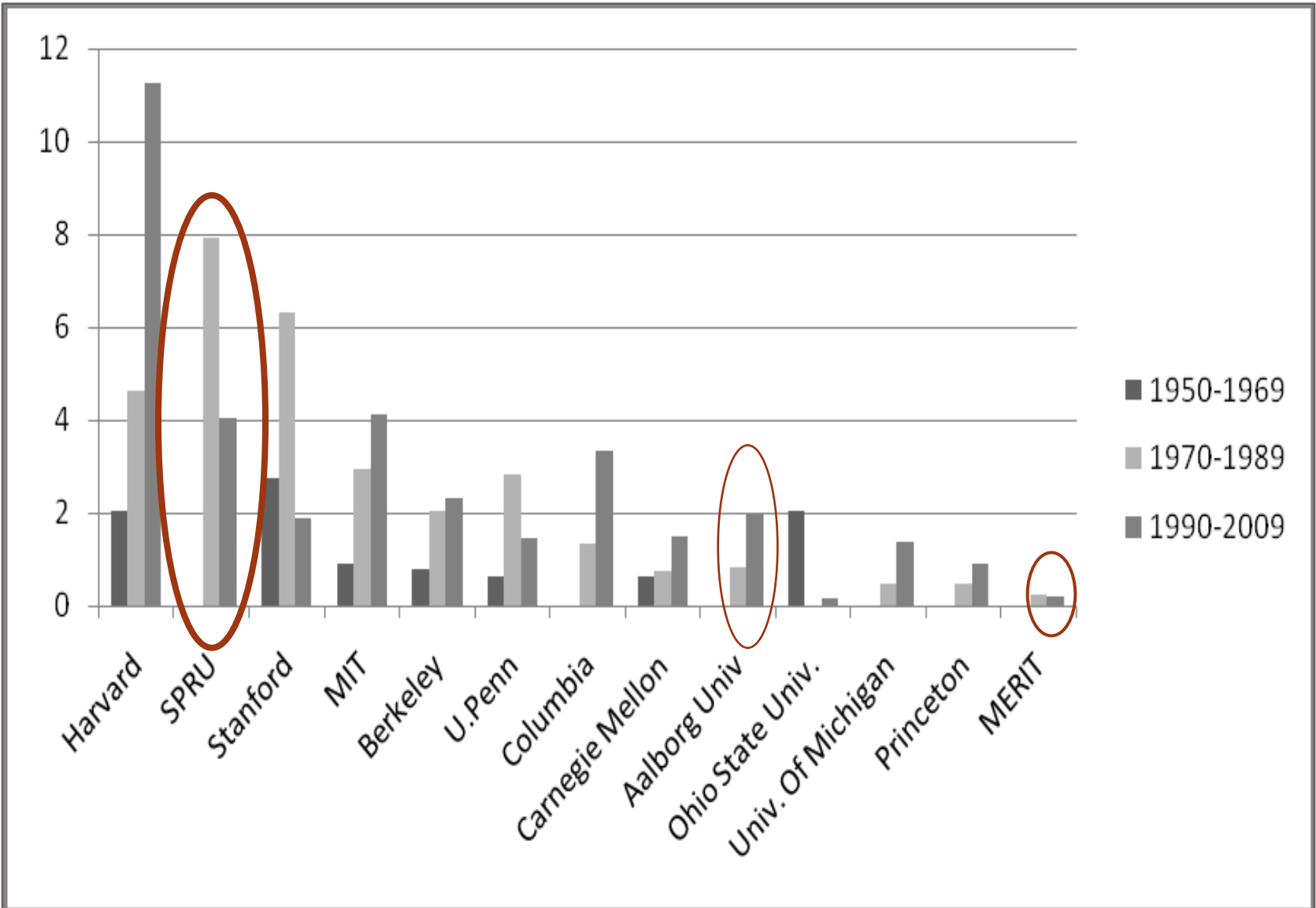
Period	Total J	J per Work	No of Scholars	No of Institutions	No of Countries
1950-1969	98.9	5.5	25	13	2
1970-1989	261.0	5.7	51	17	4
1990-2010	316.9	5.4	82	44	11

From a rather local affair to a global movement!

Changes in the core over time

No	Author	Country	Title	J-index	Citations (ISI/Year)
<i>Up to 1969</i>					
1	Rogers (1962)	USA	Diffusion of Innovations	14,1	204,3
2	Schumpeter (1934)	Austria/ USA	The Theory of Economic Development	14,1	56,3
3	Arrow(1962)	USA	Economic welfare and the allocation of resources for invention	10,5	26,0
4	Schumpeter (1942)	USA	Capitalism, Socialism, and Democracy	7,9	81,3
<i>1970-1989</i>					
1	Nelson & Winter (1982)	USA	An Evolutionary Theory of Economic Change	18,8	165,0
2	Freeman (1974)	UK	The Economics of Industrial Innovation	12,6	30,4
3	Pavitt (1984)	UK	Sectoral patterns of technical change	11,6	23,2
4	Freeman (1987)	UK	Technology Policy and Economic Performance	9,7	20,2
<i>1990-2009</i>					
1	Nelson (1993)	USA	National Innovation Systems	15,7	61,0
2	Porter (1990)	USA	The Competitive Advantage of Nations	14,4	166,9
3	Lundvall (1992)	Denmark	National Systems of Innovation	13,4	59,3
4	Cohen & Levinthal (1990)	USA	Absorptive capacity: A new perspective on learning and innovation	11,9	124,3

Central research environments over time

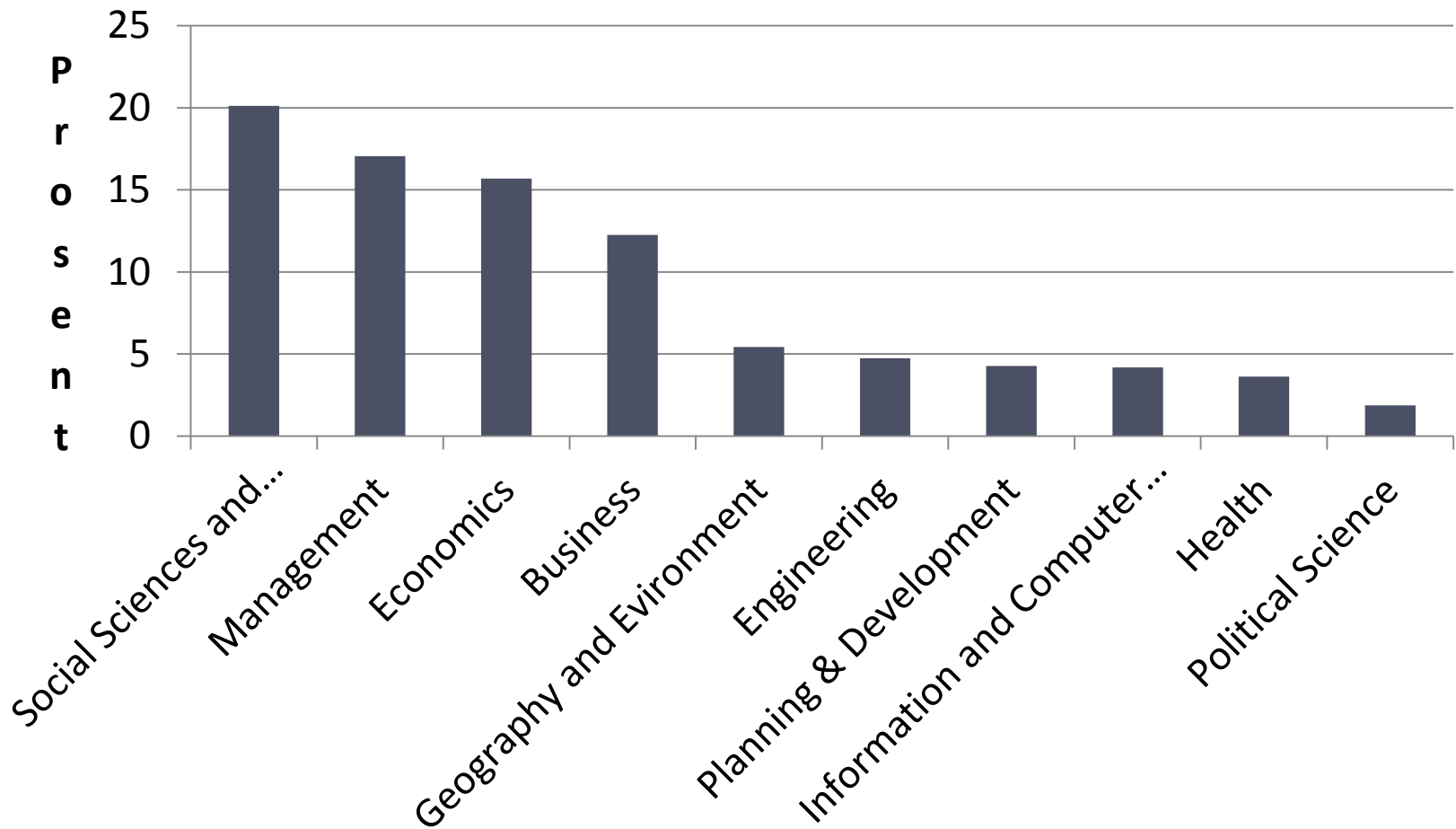


Knowledge users: Top Journals

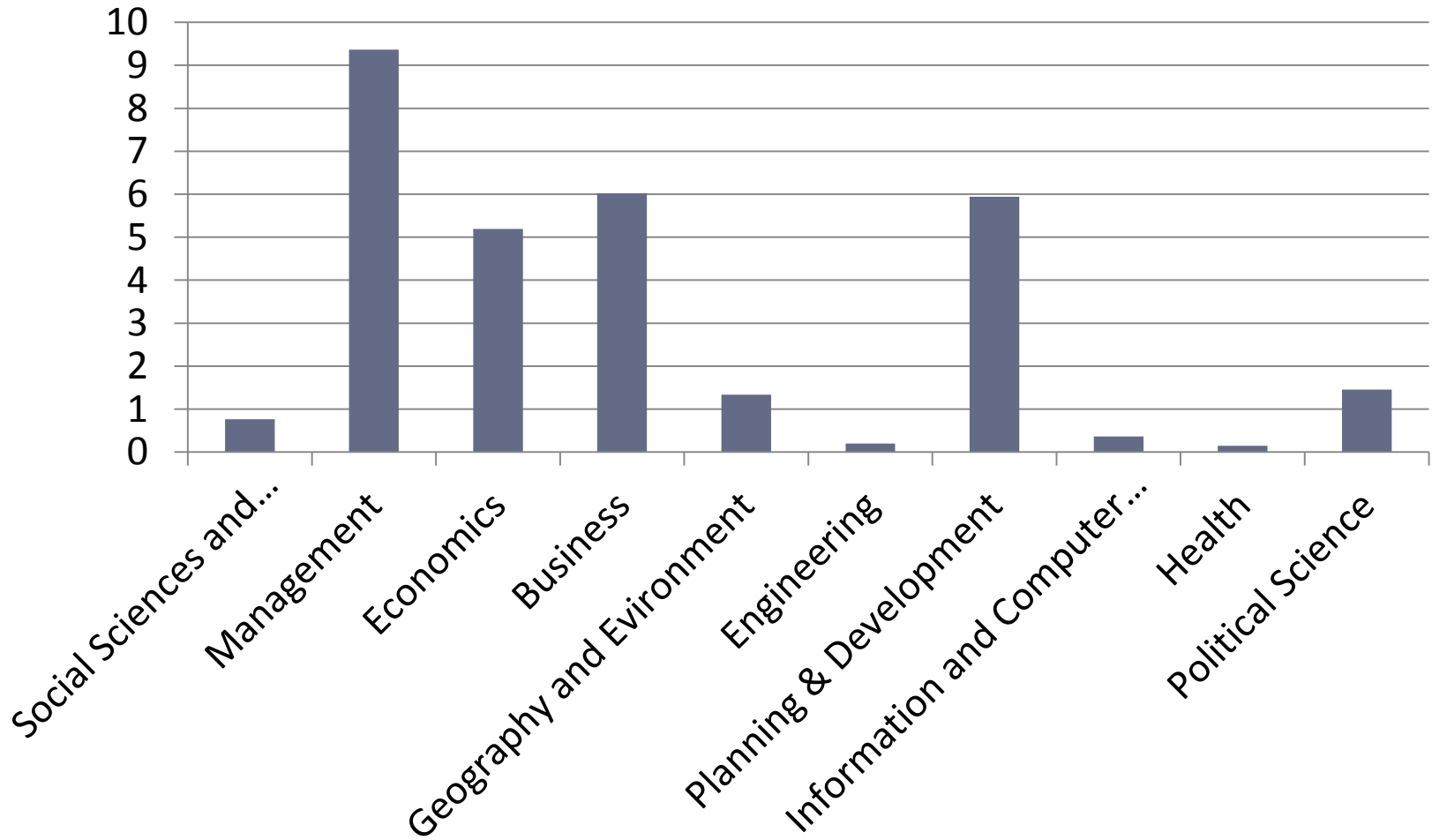
(Brackets:
Fagerberg and
Verspagen 2009,
RP)

No	Journal	Per cent	Subject-area(s)
1 (1)	RESEARCH POLICY	3.4	Management; Planning & Development
2(14)	STRATEGIC MANAGEMENT JOURNAL	2.4	Business; Management
3	INTERNATIONAL JOURNAL OF TECHNOLOGY MANAGEMENT	1.3	Engineering, Multidisciplinary; Management; Operations Research & Management Science
4	ACADEMY OF MANAGEMENT REVIEW	1.3	Business; Management
5	JOURNAL OF MANAGEMENT STUDIES	1.2	Business; Management
6	ORGANIZATION SCIENCE	1.2	Management
7	ACADEMY OF MANAGEMENT JOURNAL	1.1	Business; Management
8(10)	TECHNOVATION	1.1	Engineering, Industrial; Management; Operations Research & Management Science
9	ADMINISTRATIVE SCIENCE QUARTERLY	1.1	Business; Management
10	ORGANIZATION STUDIES	1.0	Management
11(9)	REGIONAL STUDIES	0.9	Environmental Studies; Geography
12	TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	0.9	Business; Planning & Development
13(13)	MANAGEMENT SCIENCE	0.9	Management; Operations Research & Management Science
14(8)	R & D MANAGEMENT	0.8	Business; Management
15(2)	INDUSTRIAL AND CORPORATE CHANGE	0.7	Business; Economics; Management

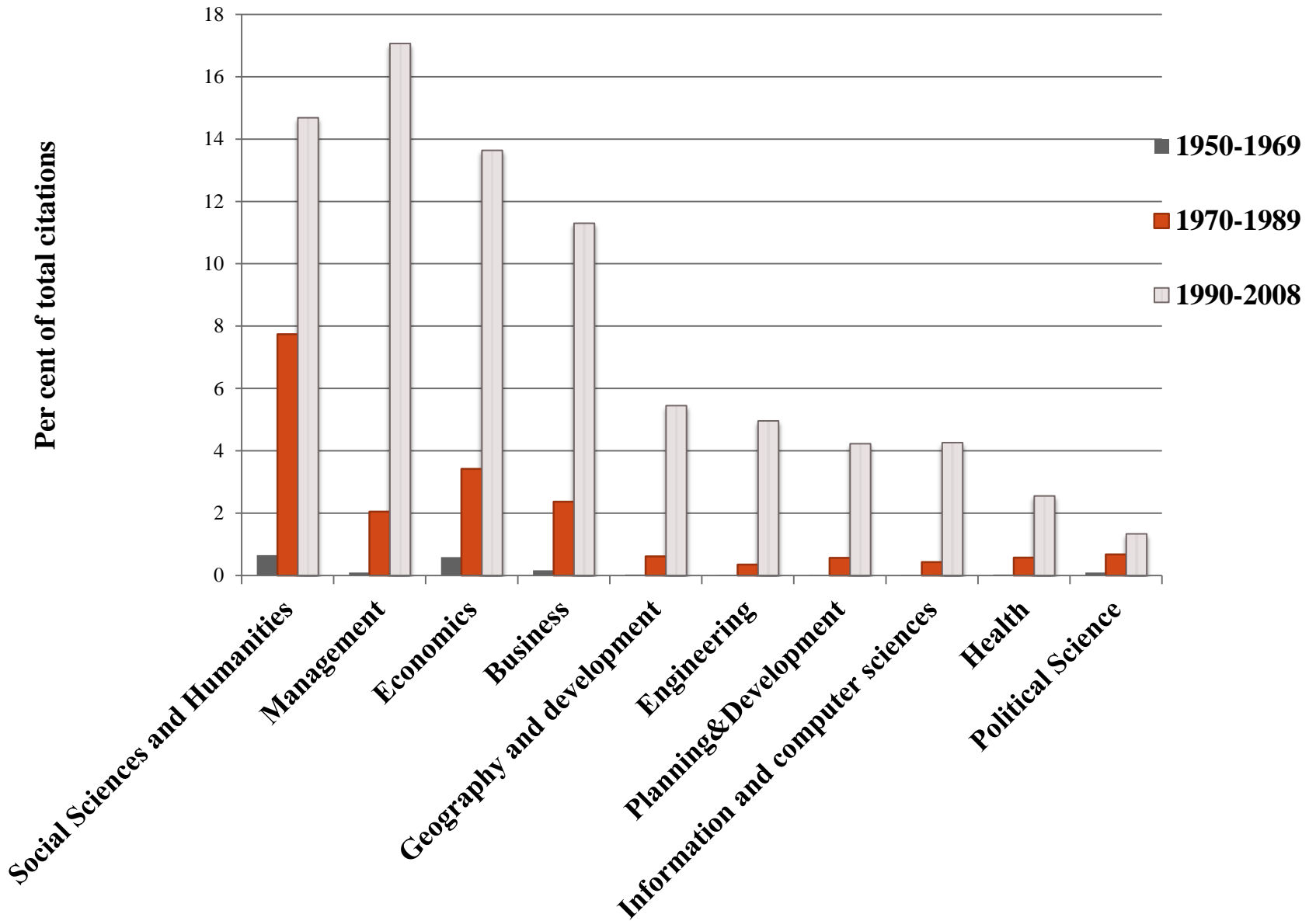
Knowledge users: “Disciplinary” orientation (percent)



Knowledge Users : “Disciplinary” Specialization (index)



The evolution of the user community over time



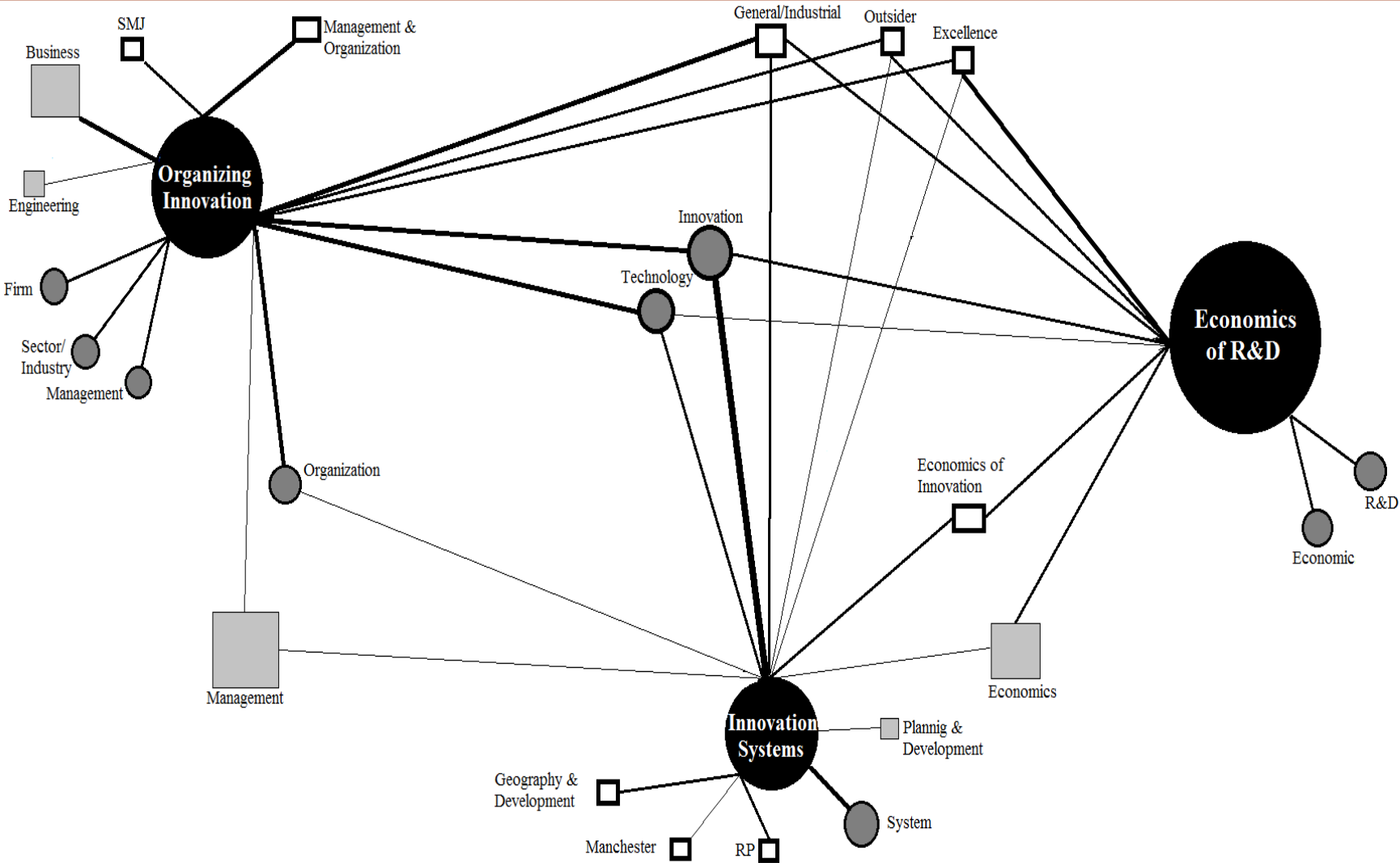
Cluster analysis

- **Explorative** method: Sort similar objects in categories (based on their characteristics)
- **“Producer”** characteristics : Orientation of handbooks selecting the literature, the excellence of research environment from where it comes, the thematic priorities (“keywords”),
- **“User”** characteristics/assessments: Their disciplinary orientation (“subject areas”), their assessment of the general orientation of contribution (“outsider/insider”), the excellence of the publication channel in which a citation occurs
- Result, two clusters or more?
- **Two main poles; management (“Organizing innovation”) and “economics”/social science (“Economics of R&D)**
- With **“Innovation systems”** in between

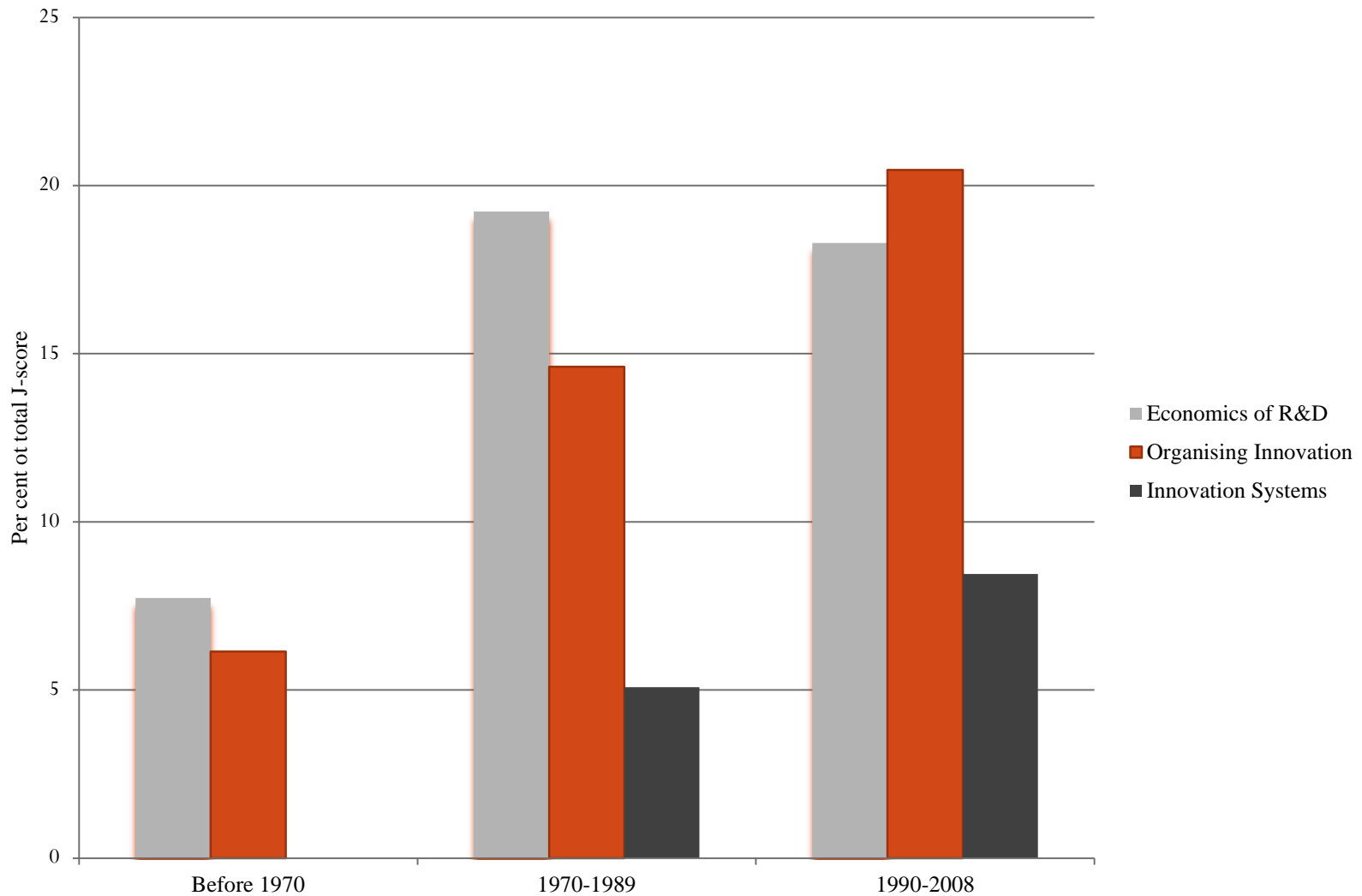
Cluster characteristics

Cluster	Organizing Innovation	Economics of R&D	Innovation Systems
Works (authors)	50 (83)	66 (102)	14 (18)
Thematic focus	Innovation (62%) Organization (50%) Sector/Industry (48%) Firm (42%)	Economics (63%) R&D (36%) Innovation (32%) Technology (32%)	Innovation (100%) System (56%) Technology (38%) Macro (31%)
Most central works (J-index)	Nelson and Winter 1982 (18,8) Rogers 1962 (14,1) Cohen & Levinthal 1990 (11,9)	Porter 1990 (14,4) Schumpeter 1934 (14,1) Freeman 1974 (12,6)	Nelson 1993 (15,7) Lundvall 1992 (13,4) Freeman 1987 (9,7)
Most important affiliation	Harvard (16%) MIT (12%)	Harvard (16%) Stanford (11%)	SPRU (28%) Stanford (17%)
Location of authors	North America (75%) Europe (20%)	North America (77%) Europe (20%)	Europe (67%) North America (33%)
Most important citing journal	Strategic Management Journal	Research Policy	Research Policy
Largest citing field	Business (30%) Management (21%)	Economics (34%) Social Sciences & Humanities (28%)	Management (22%) Economics (22%)
Specialisation	Management (1.5) Business (1.5) Information & Computer Science (1.4)	Economics (1.5) Geography & Environment (1.4) Political Science (1.3)	Planning & Development (5.1) Geography & Environment (2.9) Engineering (2.3)
Location of citers	North America (49%) Europe (38%)	Europe (44%) North America (42%)	Europe (67%) North America (17%)

The structure of the knowledge-base



Literature clusters, three periods



Achievements and Challenges

- A growing field characterized by strong element of multi-and interdisciplinarity
- Economics traditionally the most important background but several other disciplinary backgrounds present as well (some leading scholars also have an engineering background)
- Although initially a social science/economics oriented field, users of the literature are increasingly to be found in management
- Will the public policy orientation (which was the basis for the field) continue to be equally central? A challenge?
- Relatively weak institutions and coordination mechanisms. This increases the probability that the main groups will drift apart, with possible negative consequences for scholarly interaction and scientific progress. Action needed?