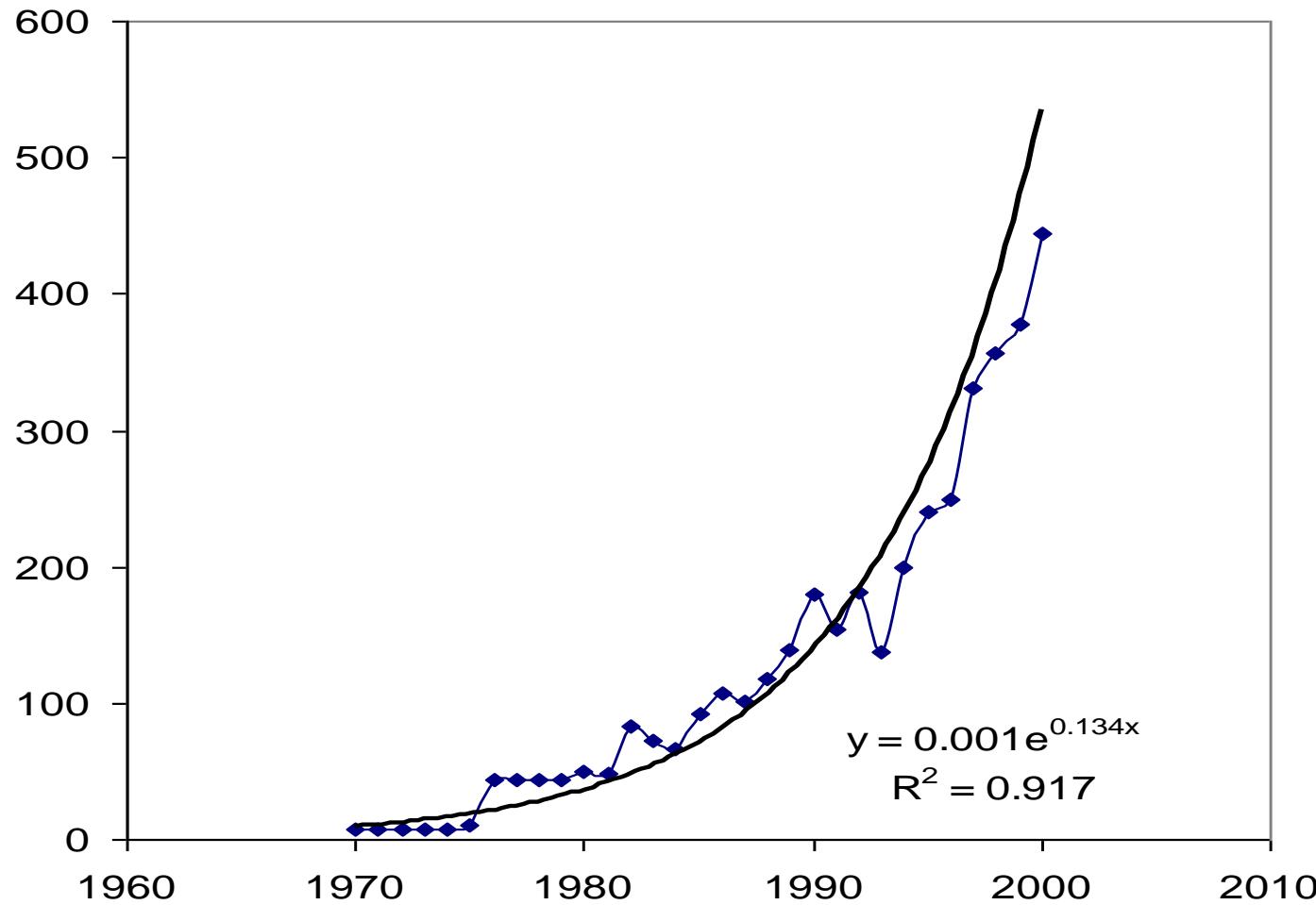


Social Networks and Innovation

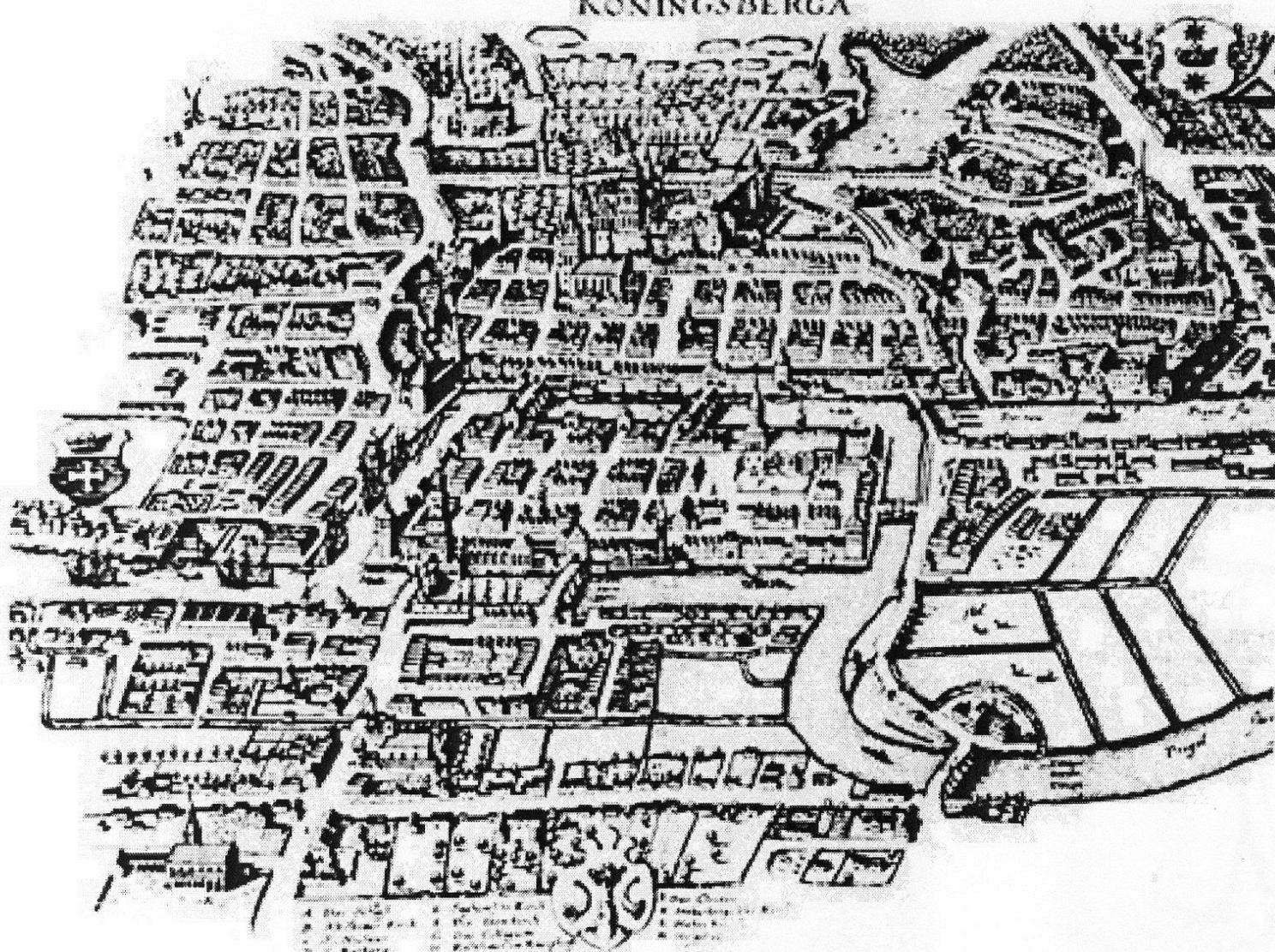
Prof. Dr. Jan Kratzer

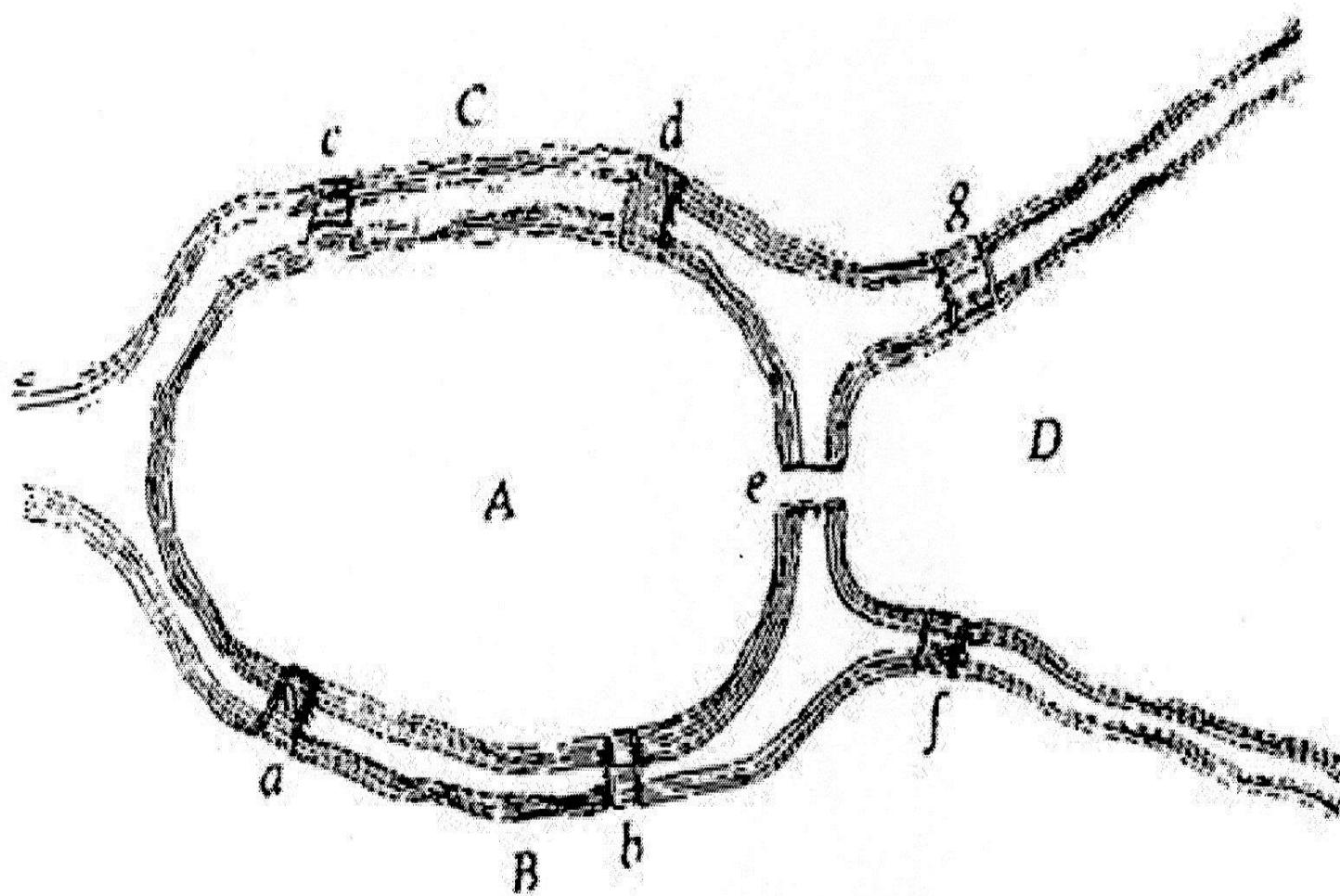
Increase of using the term „social networks“ in journal-abstracts

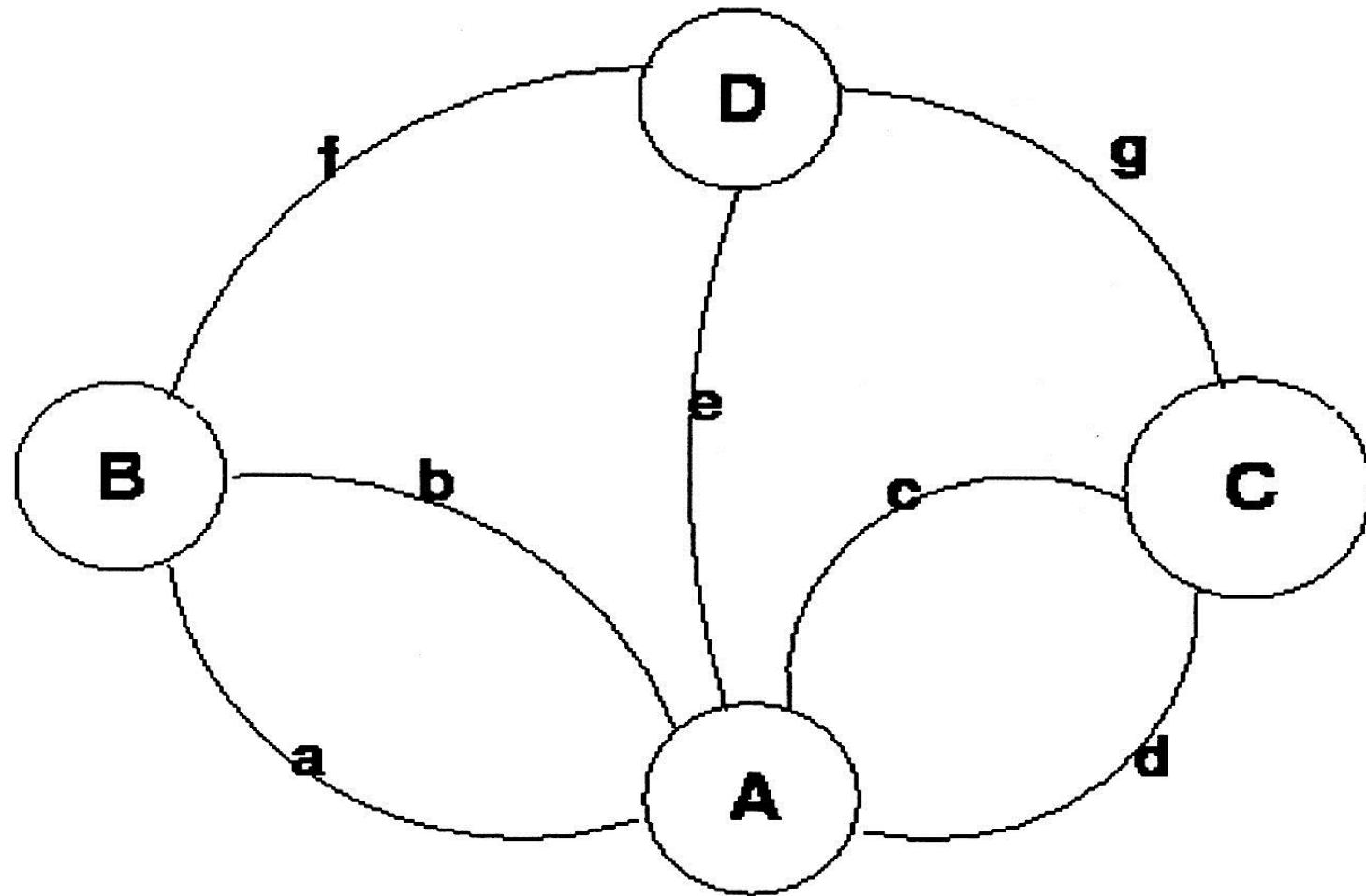


„Social networks“ – Short History

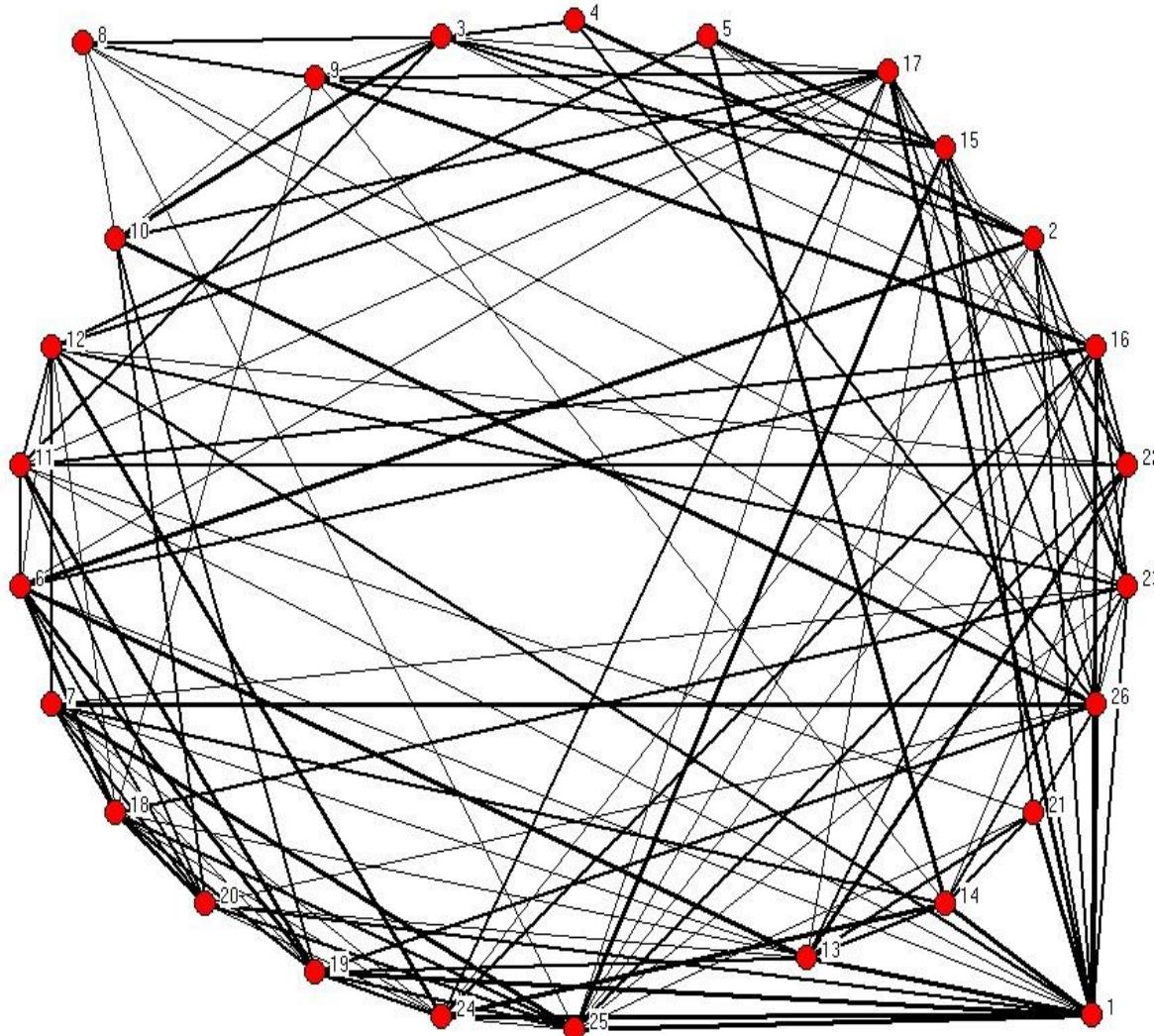
- Mathematics – goes back to Euler (1736) who translated the Konigsberg Bridge problem into a mathematical notion of points and lines
- The sociogram was introduced by Moreno (1934)
- Anthropology – milestone ‘Hawthorne Experiment’ (1927-1932) (Warner, Mayo, Roethlisberger, Dickson)
- Psychology – gestalt tradition, names as Kohler, Lewin, Moreno, Heider (founded method and journal of sociometry)
- Davis (1953) ‘Grapevine-study’
- Menzel/Katz/Coleman (1957/69) ‘Diffusion of Innovation’
- Homans (1951/73) ‘Cohesion-compliance hypothesis’
- Granovetter (1974) ‘Getting a job’ (1974)
- Allen (1977/84) ‘Communication and Performance’
- Burt (1992) ‘Structural Holes’





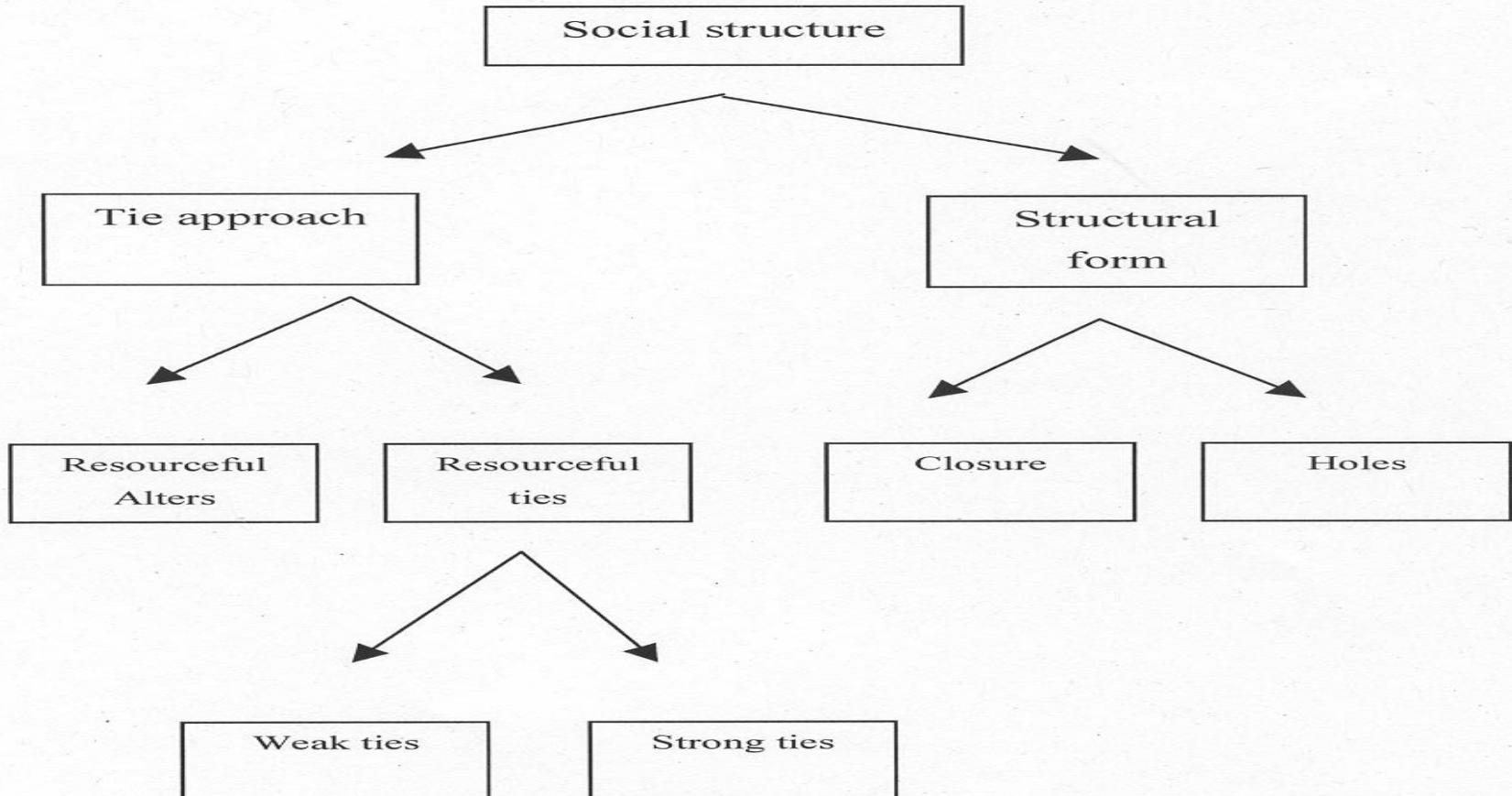


Sociogram



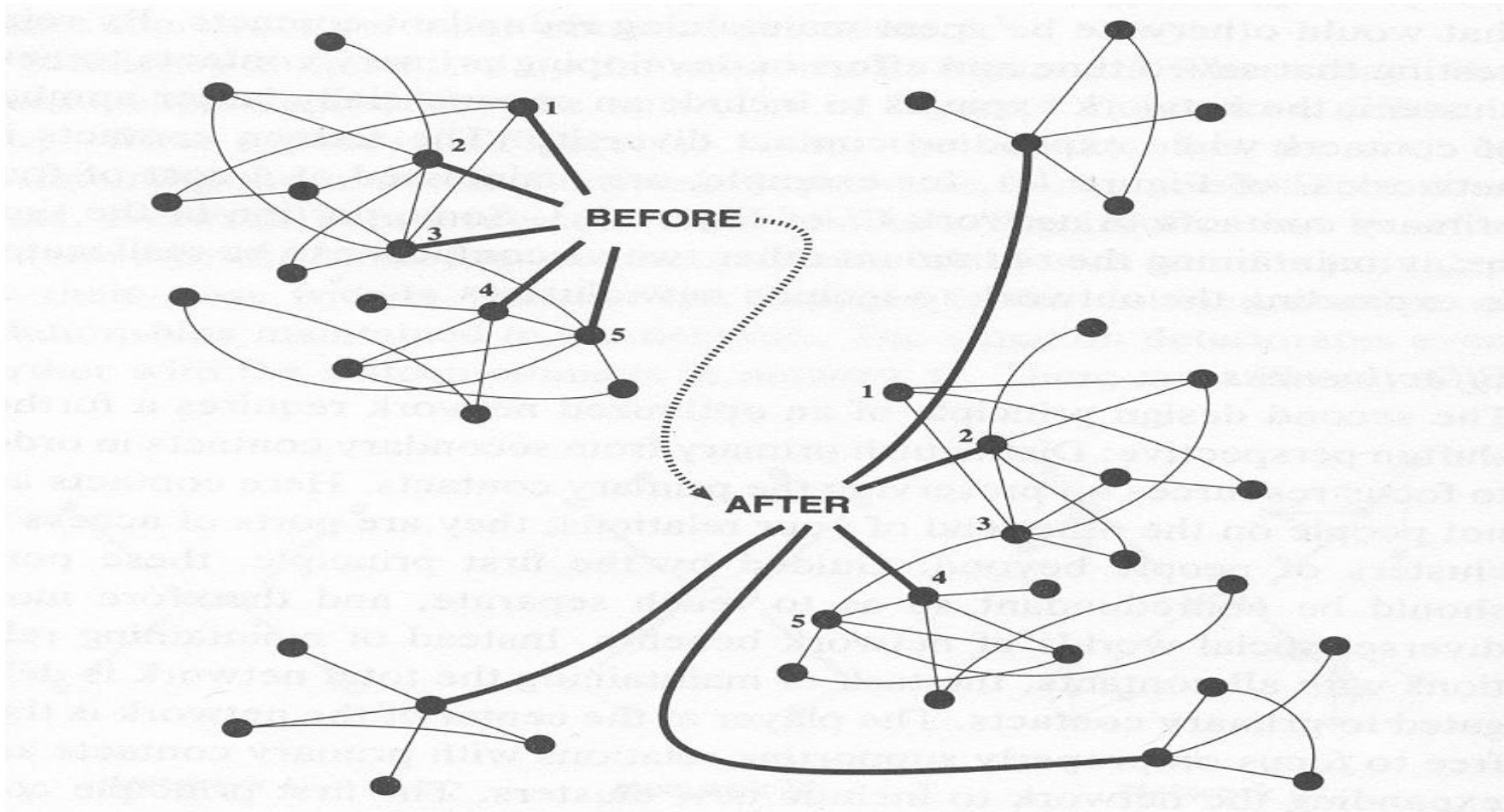
Generic Structures of Social Capital

Copyright © 1999, Leenders & Gabbay

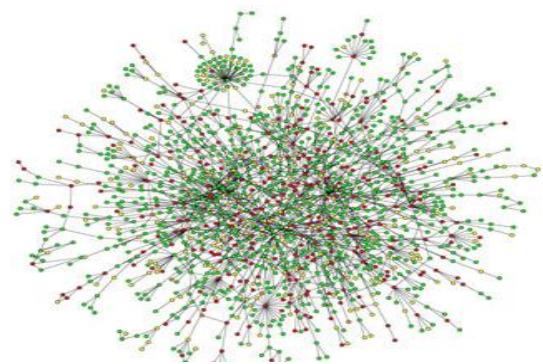


Optimizing for structural holes

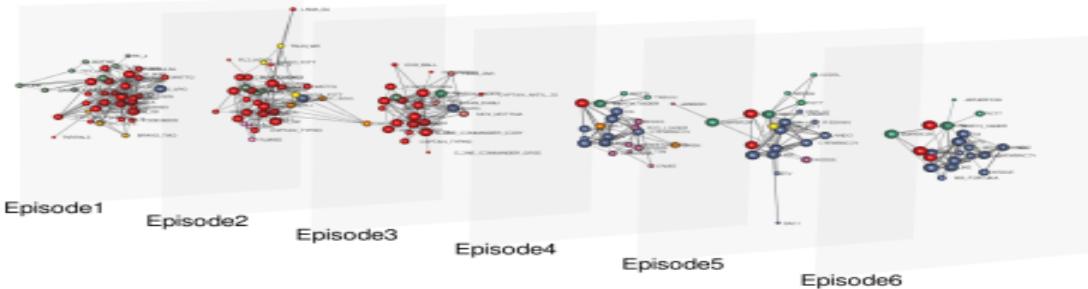
Copyright © 1992, Burt



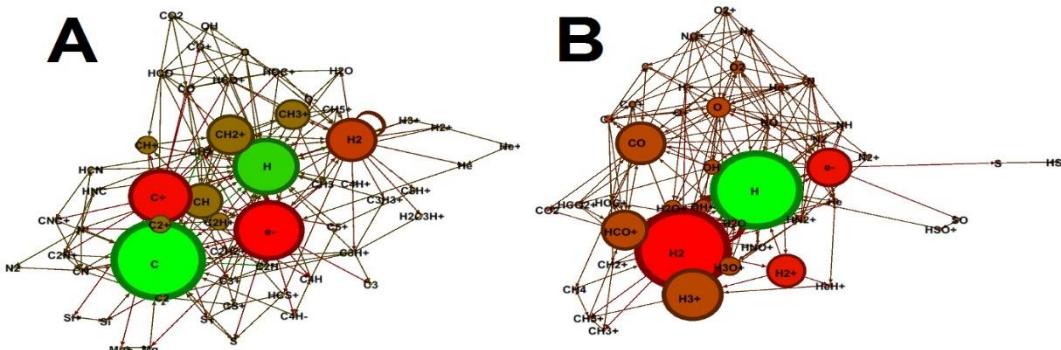
„Social networks“ in different disciplines



Biology (Image by Hawoong Jeong, KAIST, Korea)



Literature/Arts (Star Wars Saga)



Physics (Jolley, C.C. & Douglas, T. (2010). Ion Accumulation in a Protein Nanocage: Finding Noisy Temporal Sequences Using a Genetic Algorithm. *Biophysical Journal*, 99(10): 3385-3393)

Google Scholar „Social Networks and Innovation Management“

2.200.000 references (0.09s)

Journal of Product Innovation Management - JPIM:

„Social Networks and Innovation Management“ – 546 references

Research Policy:

„Social Networks and Innovation Management“ – 1367 references

R&D Management:

„Social Networks and Innovation Management“ – 568 references

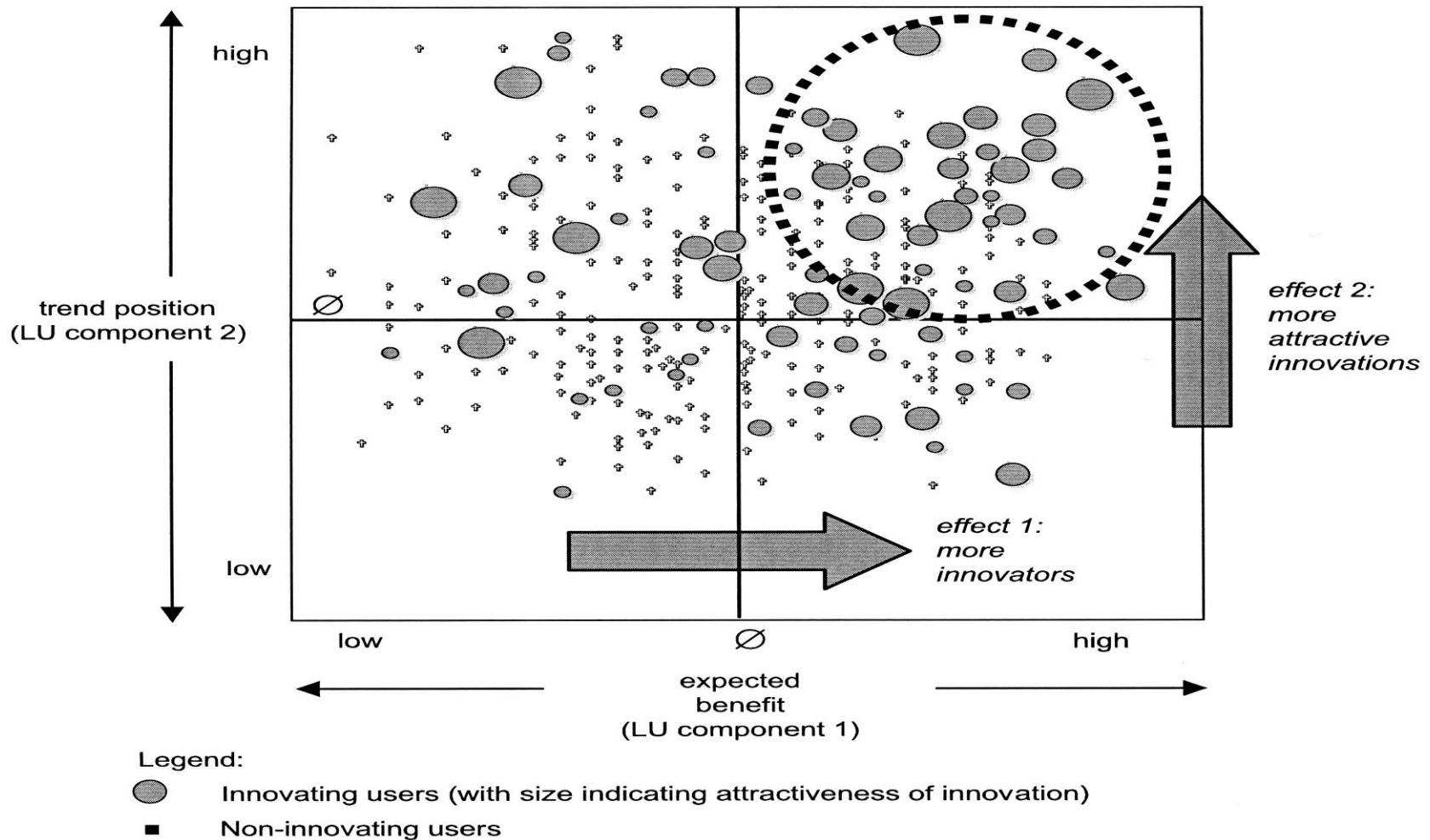
Creativity and Innovation Management:

„Social Networks and Innovation Management“ – 381 references

Innovation Management – Hot Issues

1. Users and Innovation
2. Technology Transfer
3. Alliances and Cooperations
4. Projects/Teams/Leadership

i,e,: Mapping the Topic Landscape of JPIM, 1984–2013: In Search of Hidden Structures and Development Trajectories* David Antons, Robin Kleer, and Torsten Oliver Salge (2015)



(Franke, Von Hippel, Schreier 2006)



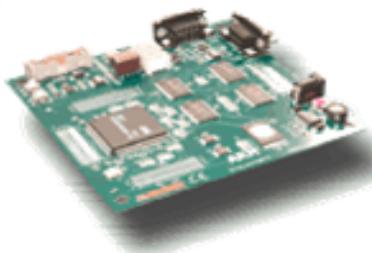
Johnson & Johnson

Kellogg's

officio



Linux



Prof. Dr. Kratzer, Lehrstuhl für Entrepreneurship und Innovationsmanagement



TECHNISCHE UNIVERSITÄT BERLIN

Users and Innovation

Table 10.1

Concepts for new products developed by lead user project teams had far more commercial promise than those developed by non-lead-user project teams.

	LU product concepts (n = 5)	Non-LU product concepts (n = 42)	Significance
Factors related to value of concept			
Novelty compared with competition ^a	9.6	6.8	0.01
Originality/newness of customer needs addressed	8.3	5.3	0.09
% market share in year 5	68%	33%	0.01
Estimated sales in year 5 (deflated for forecast error)	\$146m	\$18m	0.00
Potential for entire product family ^a	10.0	7.5	0.03
Operating profit	22%	24.0%	0.70
Probability of success	80%	66%	0.24
Strategic importance ^a	9.6	7.3	0.08
Intellectual property protection ^a	7.1	6.7	0.80
Factors related to organizational fit of concept			
Fit with existing distribution channels ^a	8.8	8.0	0.61
Fit with existing manufacturing capabilities ^a	7.8	6.7	0.92
Fit with existing strategic plan ^a	9.8	8.4	0.24

(Von Hippel, 2005)

Table 1. Fraction of users who build solution for own use within different user populations.

Study	Field of innovation	Users sampled (n)	% of users who developed solution for own use
Lüthje (2004)	Equipment for outdoor sports (Germany)	153	10%
Lüthje (2003)	Medical surgery equipment (Germany)	261	22%
Franke and Shah, (2002)	“Extreme” sporting equipment (Germany)	197	38%
Tietz, Morrison, Lüthje and Herstatt (2002)	Kite surfing equipment (Australia)	157	26%
Lüthje, Herstatt and von Hippel, 2002	Mountainbike equipment (USA)	287	19%
Morrison Roberts and von Hippel, 2000	Library information search system OPAC (Australia)	102	18%
Herstatt and von Hippel, 1992	Pipe hangers hardware (Switzerland)	74	36%
Urban and von Hippel, 1988	PC-CAD for the design of printed circuit boards (USA)	136	24%

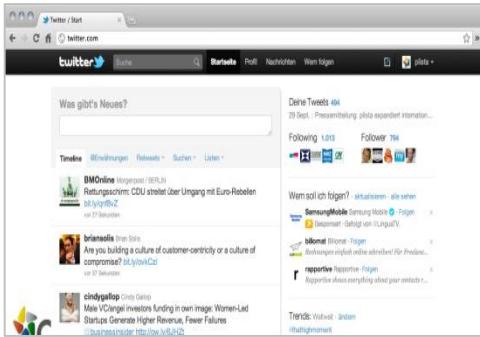
(Franke, Von Hippel, Schreier 2006)

Facebook



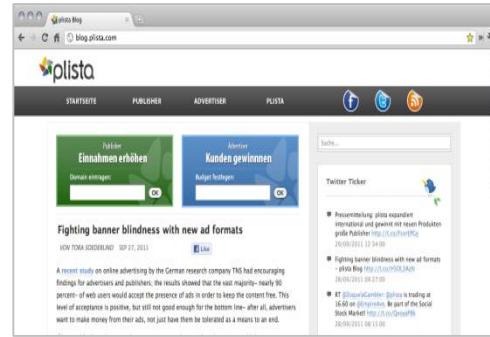
The screenshot shows the Facebook profile for 'plista'. It features a cover photo of a group of people at a conference. The page has 11 admins and 1,011 members. Posts include a status update from Dennis Matyska about plista expanding internationally, and a link to a news article from cnews.de.

Twitter



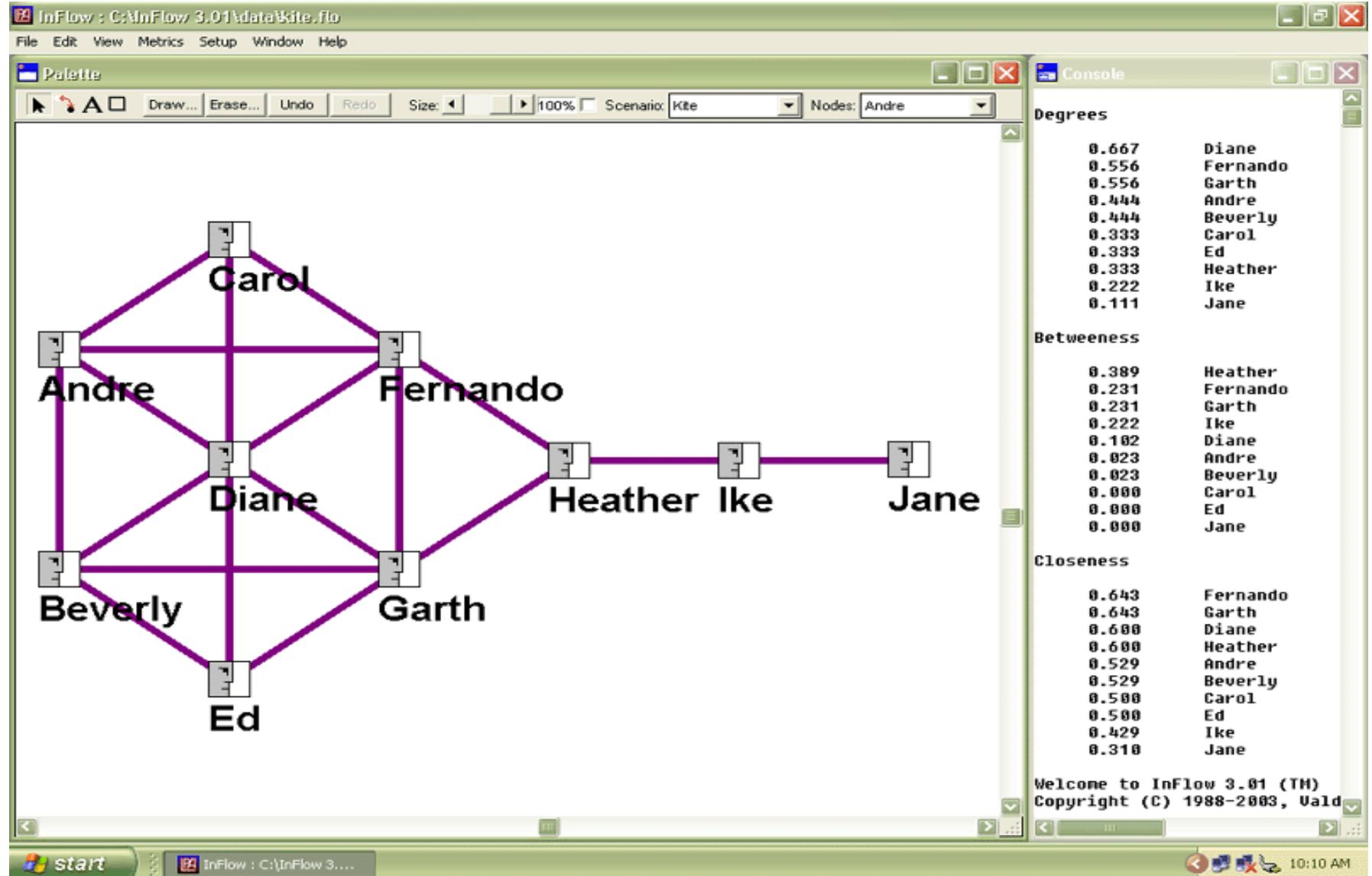
The screenshot shows the Twitter feed for 'plista'. It includes tweets from users like BIMOnline, brianmedia, cindylalop, and responsive. One tweet from BIMOnline discusses CDU's handling of Euro-rebels. Another from brianmedia questions the culture of compromise. A third from cindylalop discusses women-led startup funding.

Weblogs



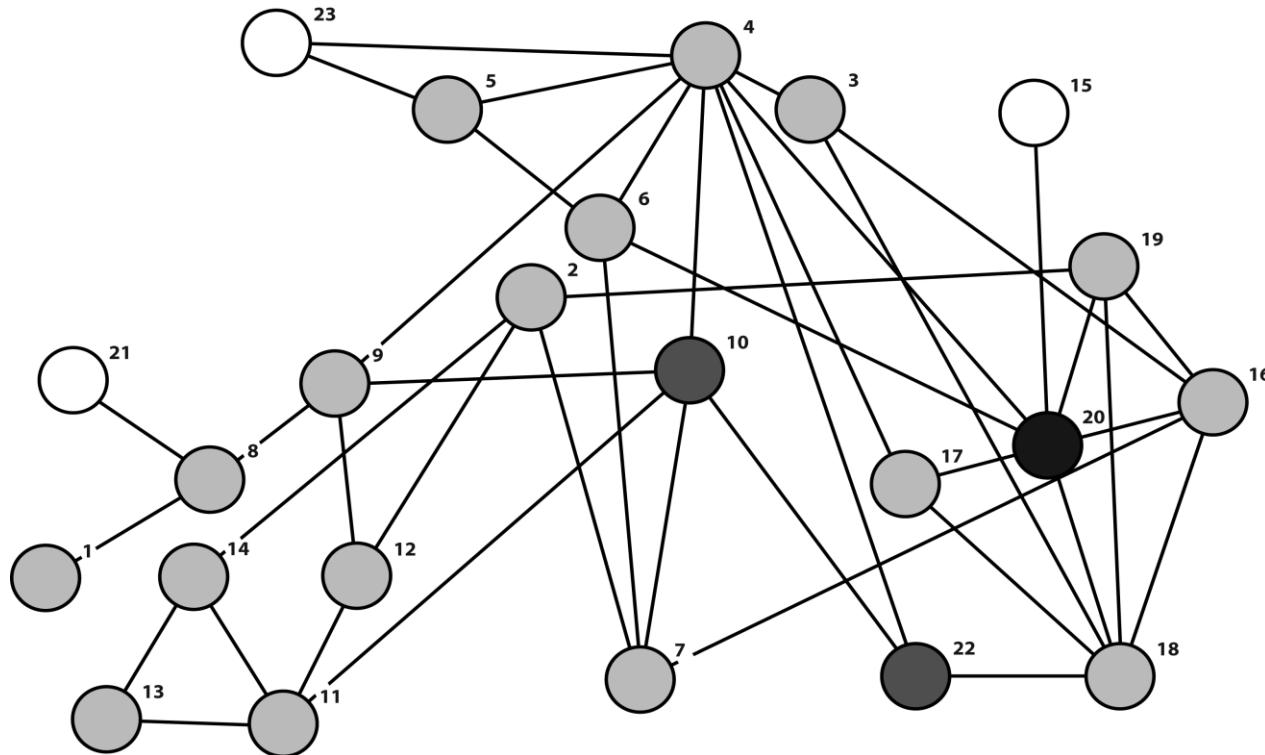
The screenshot shows the blog section of the plista website. It features a sidebar with links for 'Einnahmen erhöhen' and 'Kunden gewinnen'. The main content area displays several blog posts, such as 'Fighting banner blindness with new ad formats' and 'Assumming plista expand international and prevent mit neuen Produkten', along with their respective timestamps.

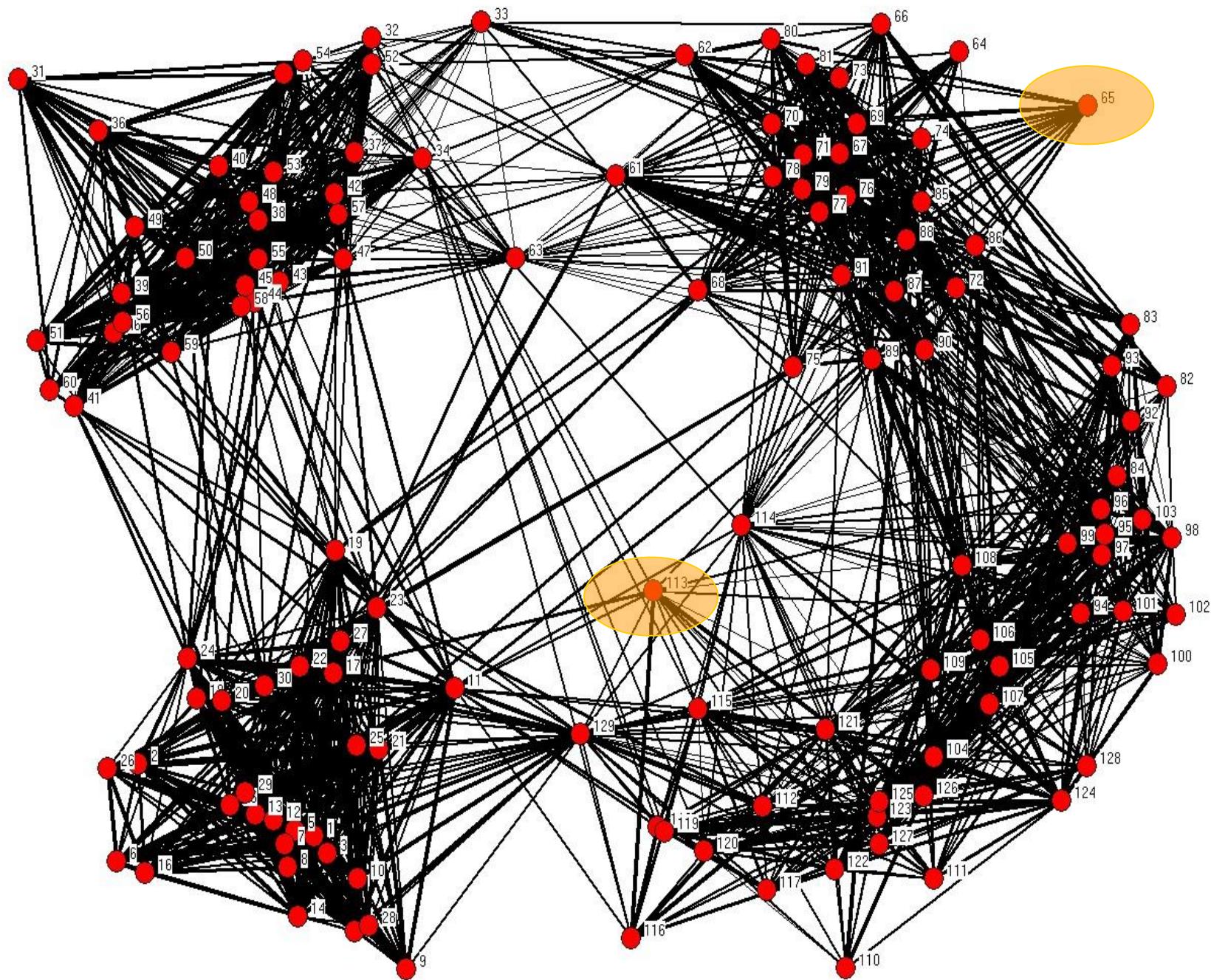
User: < 800 Millionen < 300 Millionen < 300 Millionen



Scientific study I

The first study encompasses 31 school classes with 804 pupils aged between 7 to 17.







Scientific study II

The question – can you measure social networks among children and young adults using questionnaire?

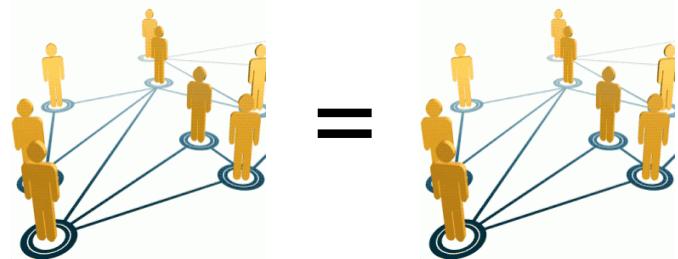
In order to answer this question we conducted an experiment in 16 school classes. The children and young adults got a task and could freely interact. We recorded all with a camera.

The task was to improve an existing online platform.

The results of the task were evaluated by two experts according to newness and useability. We used this as measure for creativity.

Results I and II

1. The findings in the questionnaire statistical significant correlate with the camera recording (QAP-correlation < .7)
2. Children and young adults with lead user characteristics are statistically significant more creative.
3. Children and young adults with a high betweenness centrality show more lead user characteristics ($R^2=41\%$)
4. Children and young adults with a high degree centrality show more opinion leader characteristics ($R^2=39\%$)



Scientific Study III

A third study was investigating a number of lead user projects by larger companies. In the context of this projects 140 lead users could be identified based on interviews, content analyses and problem broadcasting.

We have scanned these projects by using the software 'Condor' developed by MIT, Peter Gloor. The underlying question was whether we could find the same persons using the software and calculating betweenness centrality.

<http://swarmcreativity.blogspot.com/>

Resultate III

Company	Industry	Number of interviews for lead user identification	Number of forums searched	Lead users identified
Deutsche Telekom	Telecommunications	205	498	18
Deutsche Telekom	Telecommunications	240	n.a.	9
Frequentis	Airline communications and information	367	n.a.	10
I.S.A.	Automation	270	28	7
Kotányi	Food	220	162	9
MAM Babyartikel	Consumer goods	246	137	9
OMV	Energy	60	n.a.	7
Ottakringer	Food	250	40	10
Palfinger	Forklift trucks	160	200	9
Palfinger	Forklift trucks	157	184	9
Schindler	Escalators	223	10	10
Schindler	Escalators	206	99	8
Siemens	Automotive	158	n.a.	9
Siemens	Communications technology	170	n.a.	8
Stock	Food	186	n.a.	8

Result: Our study could identify more than 75% of the lead users.

Scientific Study IV

Another study, study IV, was engaged in one online forum – PlumbingForum.com in cooperation with Airbus.

This Forum has around 7000 members and contains about 460000 posts and 135000 threads.

Using 'Condor' we identified the betweenness centrality of the members and by analysing posts and threads of members using a Nethnography Method we determined the degree of lead user characteristics of the members.

Belz, F.-M., Baumbach, W. 2010. Netnography as a Method of Lead User Identification. *Creativity and Innovation Management* 19 (3) 304-313.

<http://www.plbg.com/>

Result: Members with lead user characteristics show a significant higher betweenness centrality.

J. Kratzer, Ch. Lettl, (2008) 'A social network perspective of Lead Users and Creativity: An empirical study among children', *Creativity and Innovation Management*, 17, pp. 26-36. **Tudor Rickards BEST PAPER AWARD 2008**

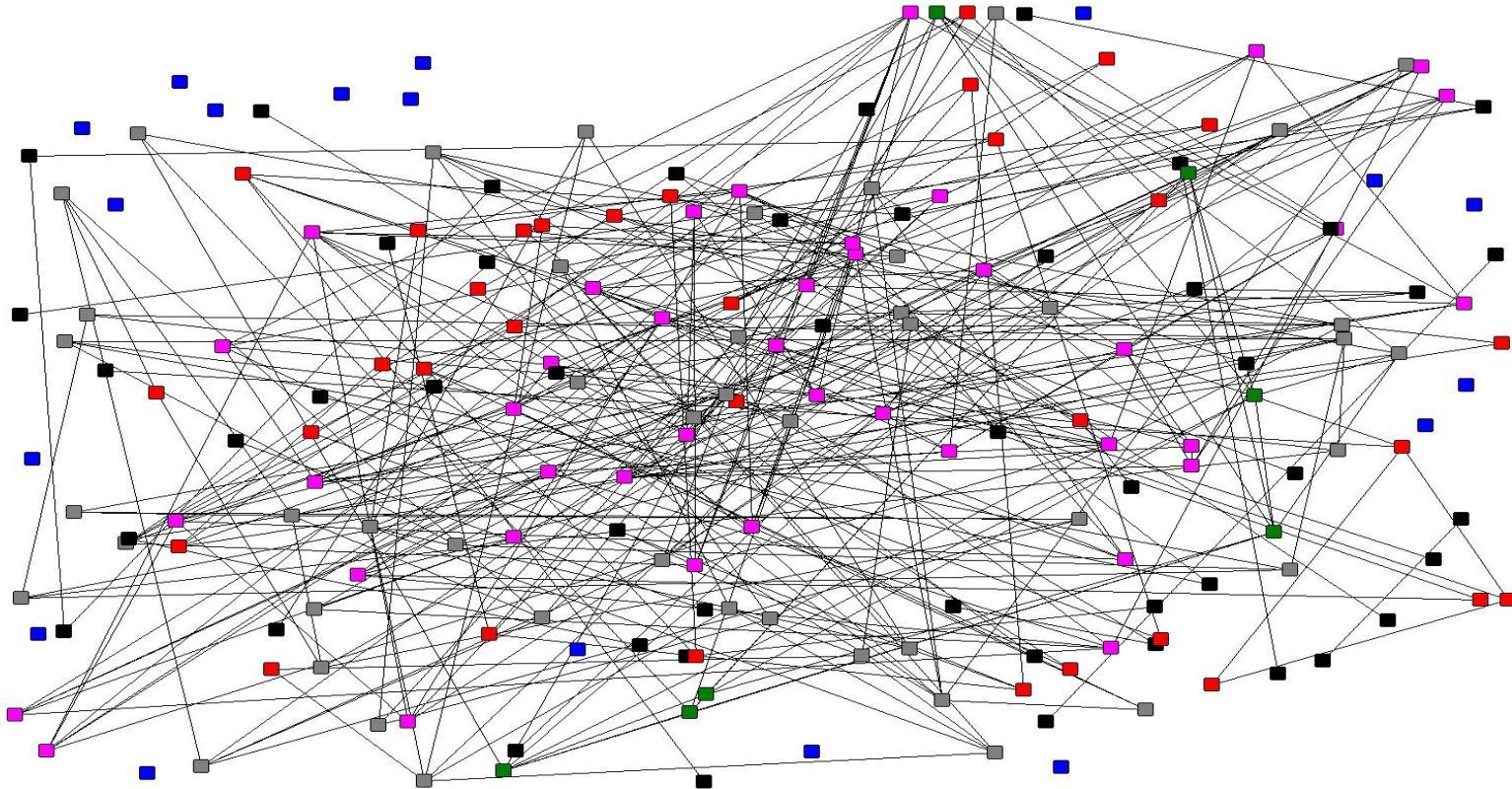
J. Kratzer, Ch. Lettl, (2009) 'The distinctive role of lead users and opinion leaders in the social networks of schoolchildren', *Journal of Consumer Research*, 36, 646-659.

N. Osterloo, J. Kratzer, M. C. Achterkamp, (2010) 'Applying lead user theory to young adults', *Young Consumers: Insight and Ideas for Responsible Marketers*, 11, pp. 5-23. **Outstanding Paper Award at LITERATI NETWORK AWARDS FOR EXCELLENCE 2011**

J. Kratzer, Ch. Lettl (2011) 'Die Identifizierung von Lead Usern über soziale Netzwerke: Eine empirische Untersuchung unter jungen Konsumenten', *Zeitschrift für Betriebswirtschaft*, 5, pp. 83-110.

J. Kratzer, Ch. Lettl, N. Franke, P. Gloor (2015) 'Identifying Lead Users in Social Networks', *Journal of Product Innovation Management*, 33, pp. 201-216.

Technology Transfer



The German network of transfer offices

J. Kratzer, H. Haase, A. Lautenschläger (2010) 'Benchmarking deutscher Transferstellen: Transferpotential, Transferkapazität, Transferaktivitäten im deutschlandweiten Vergleich, Berlin u.a..

Alliances and Cooperations

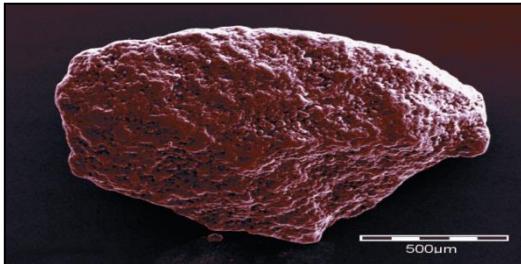
Interorganizational Innovation Networks

Creating a National Lead Market in Nanotechnologies

- Research setting: National R&D network “Inno.CNT” (nanotechnologies)
- Description: 90 companies, 250 individuals, 25 project groups, 50€Million BMBF funding, duration 2008-2014
- Research project: Case study analysing network structure and processes with focus on network value creation

1

Carbon Nanotubes (close-up)



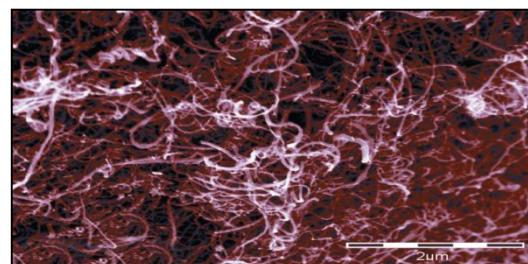
2

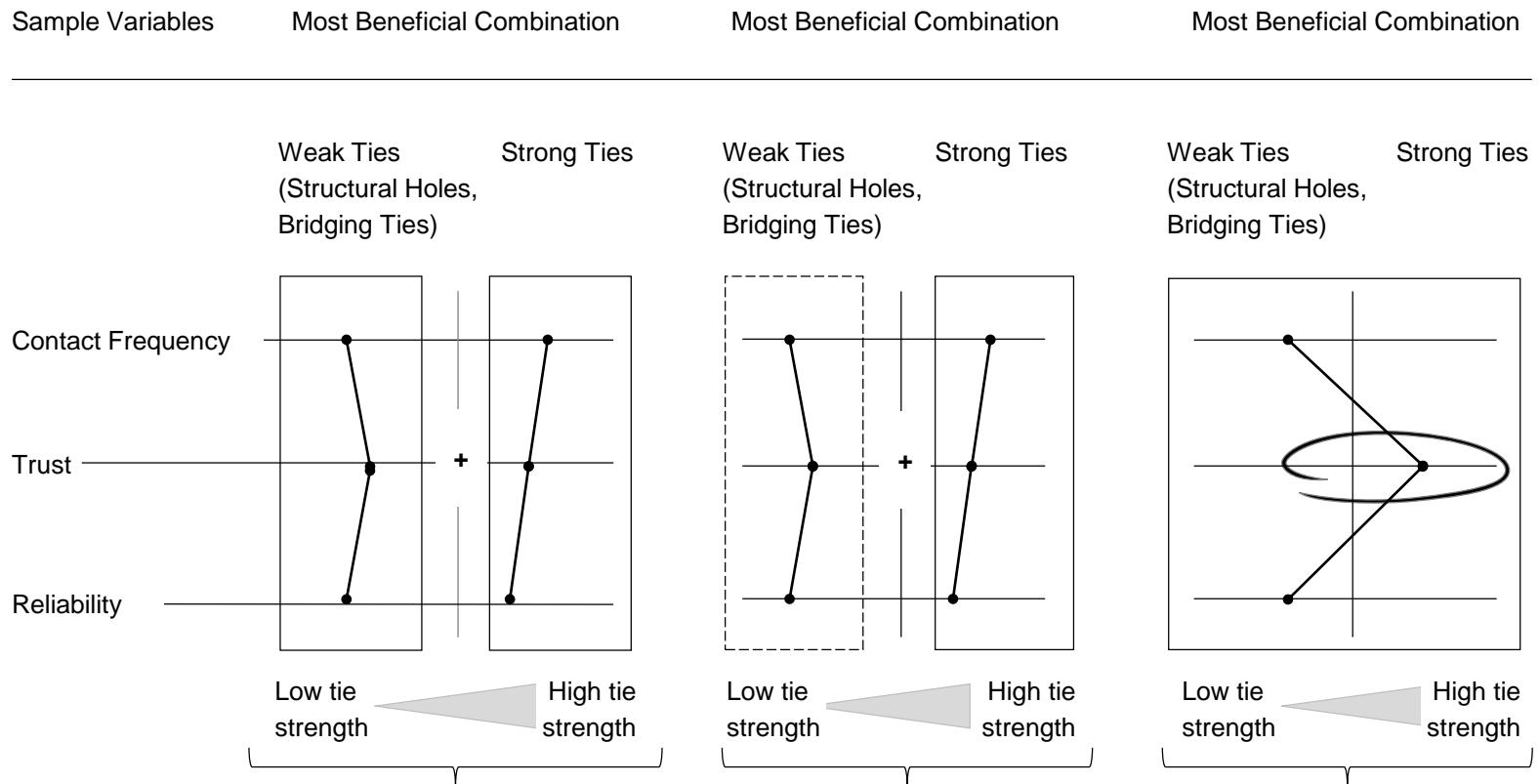
Nanotubes ready for use



3

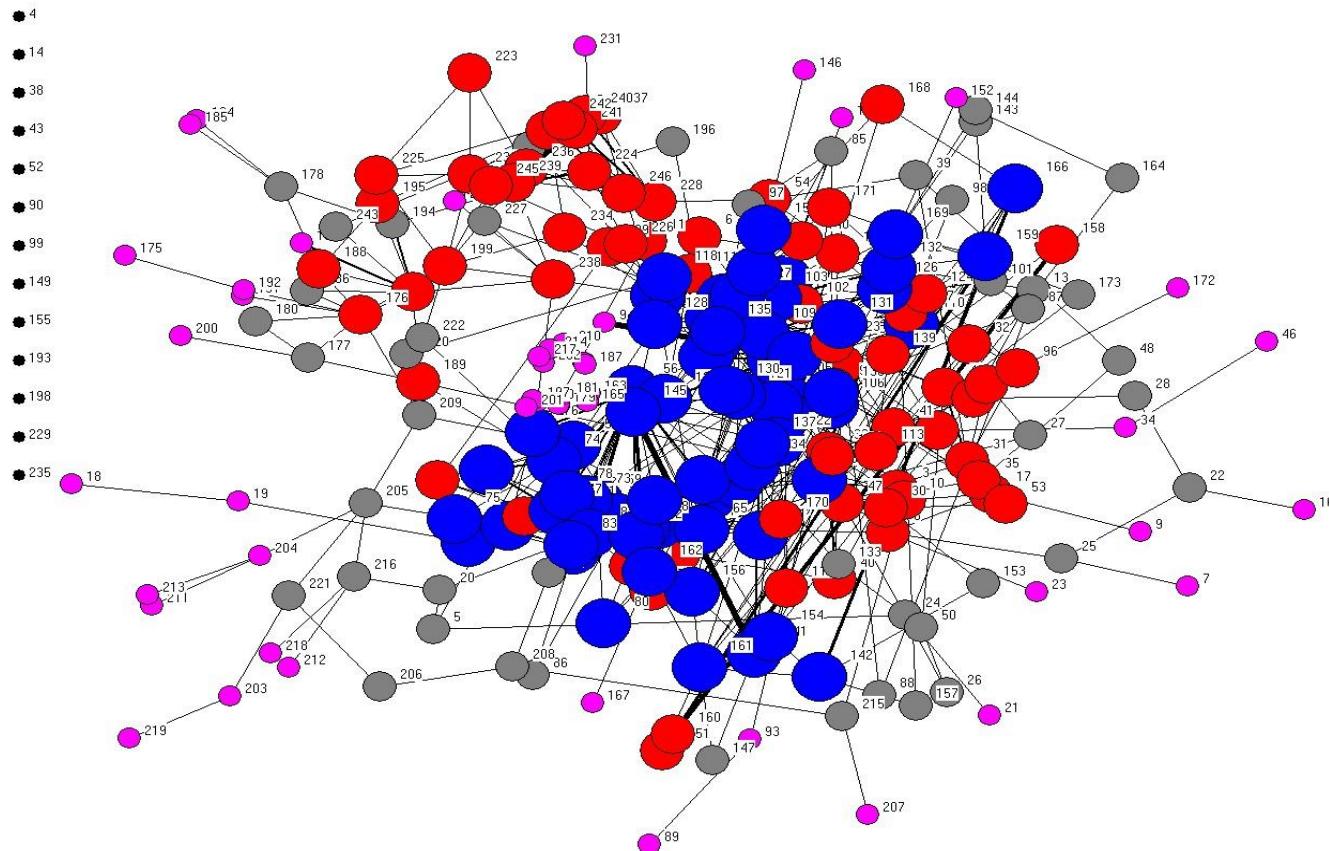
Sample product applications





I. Michelfelder, J. Kratzer (2013) 'Why and How Combining Strong and Weak Ties within a Single Interorganizational R&D Collaboration Outperforms Other Collaboration Structures', *Journal of Product Innovation Management*, 30, pp. 1159-1177.

Interlocking directorates



K. van Veen, J. Kratzer, (2011) 'National and international interlocking directorates within Europe: Corporate networks within and between 15 European countries', *Economy and Society*, 40, pp. 1-25.

Projects/Teams/Leadership

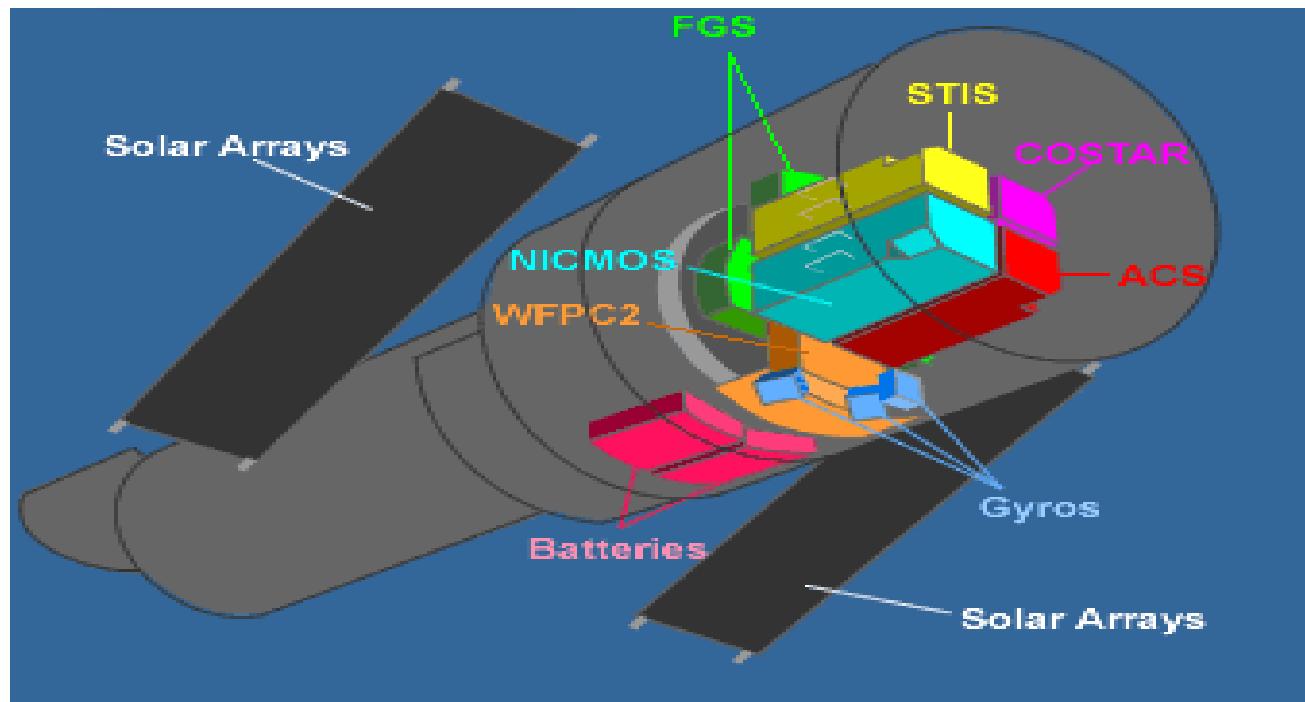
LOFAR (Low Frequency Array)



Herschel Space Observatory



Hubble Space Telescope



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26								
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2	S	-	W		S			W						W				W	W	S	S	W	W	W										
3		W	-	W	W	W	W	W	S		S	W	S	S	S																			
4		W	-	W			W	W	S	S	W	S		S		S		S																
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9		S	S				S	-					W																					
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15		S					S			W		W		-	W					W	W													
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S - Strong interface **W** - Weak interface

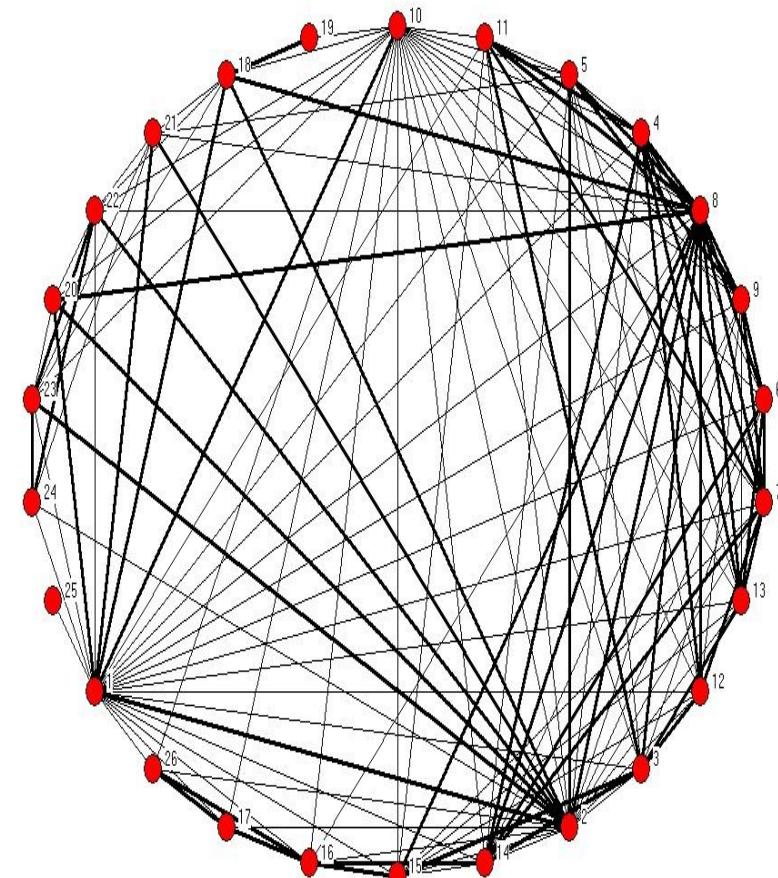
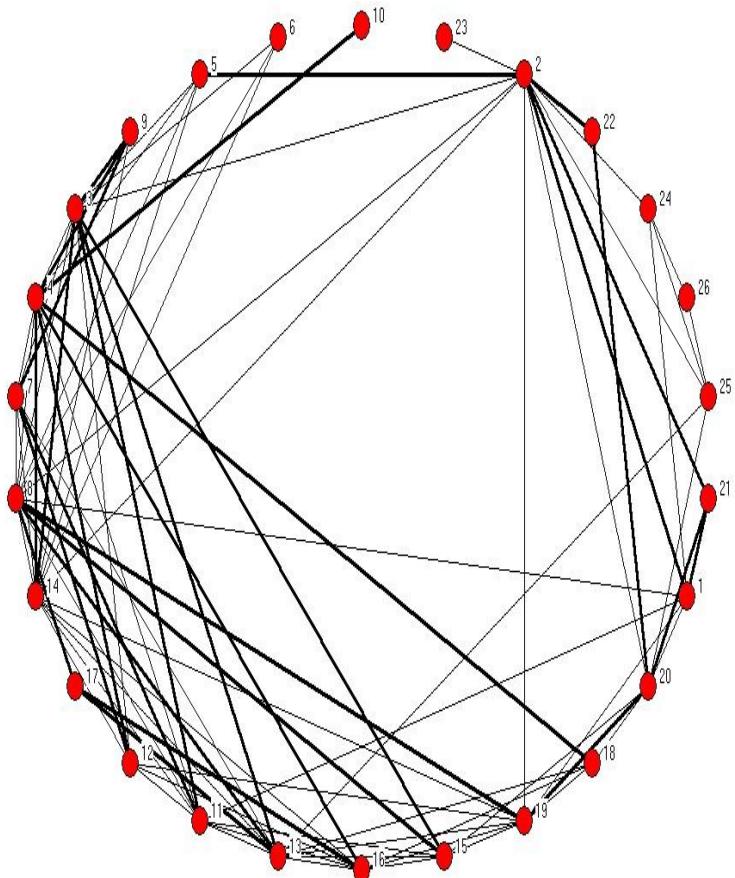
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1	-	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	
2	S	-	S	S	S	S	S	S	S	S	S	S	S	S	W	W	S	W	S	S	W	S	S	S	S	
3	S	S	-	S	S	S	S	S	S	S	W	W	S	W	S	W	W	W	W	W	W	W	W	S	S	
4	S	S	S	-	S	S	S	S	S	W	S	W	W	S	W	S	S	W	W					S	S	
5	S	S	S	S	-	S	S	S	S	S				S		W									W	W
6	S	S	S	S	S	-	S	S	S	W	S	W	W	S	W	S	S	W	W					W	W	
7	S	S	S	S	S	S	-	S	S	S	W	S	S	W	S	S	S	S	S					S	S	
8	S	S	S	S	S	S	S	-	S	S	S	S	S	W	S	S	S	S	S					S	S	
9	S	S	S	S	S	S	S	S	-	S	W	W	S	W	W	W	S	W	W	W	W	W	W	W	W	
10	S	S	W		W	S	S	W	-				W		W									S	S	
11	S	S	S	S	S	S	S	S	S	-	S	S	S	S	S	W	W	S	W	W	W	W	S	S		
12	S	S	W	W		W	W	S	W	S	-		W				S	W						S	W	
13	S	S	W	W		W	S	S	W	S		-	W		W			W	S	S	S			S	S	
14	S	S	S	S	S	S	S	S	W	S	W	W	-	W	S	S		S						S	S	
15	S	W	W	W		W	W	W	W	S			W	-				S						S	W	
16	S	W	S	S	W	S	S	S	W	S		W	S		-	W	S							S	S	
17	S		W	S		S	S	S	W	W	S			S		W	-	W						S	S	
18	S	S	W	W		W	S	S	S	W			W	S			-	S	W					S	S	
19	S	W	W	W		W	S	S	W	W	W	W	S	S				-						W	W	
20	S	S	W			S	S	W	S	S		S								-	S	S	W	S	S	
21	S	S	W					W		W		S								S	-			S	W	
22	S	W	W					W		W		S							S		-	S	S		W	
23	W	S	W					W		W									W		S	-	S	W	S	
24	S	S	S	S	W	W	S	S	W	S	S	S	S	S	S	S	W	S	S	S	S	-	S	S		
25	S	S	S	S	W	W	S	S	W	S	S	W	S	S	S	S	W	S	S	W	W	-	S	S		
26	S	S	S	S			W	W			W			W			W	W	S	W	W	S	W	S	-	

S - Strong communicational contact W - Weak communicational contact

Design phase

Integration phase

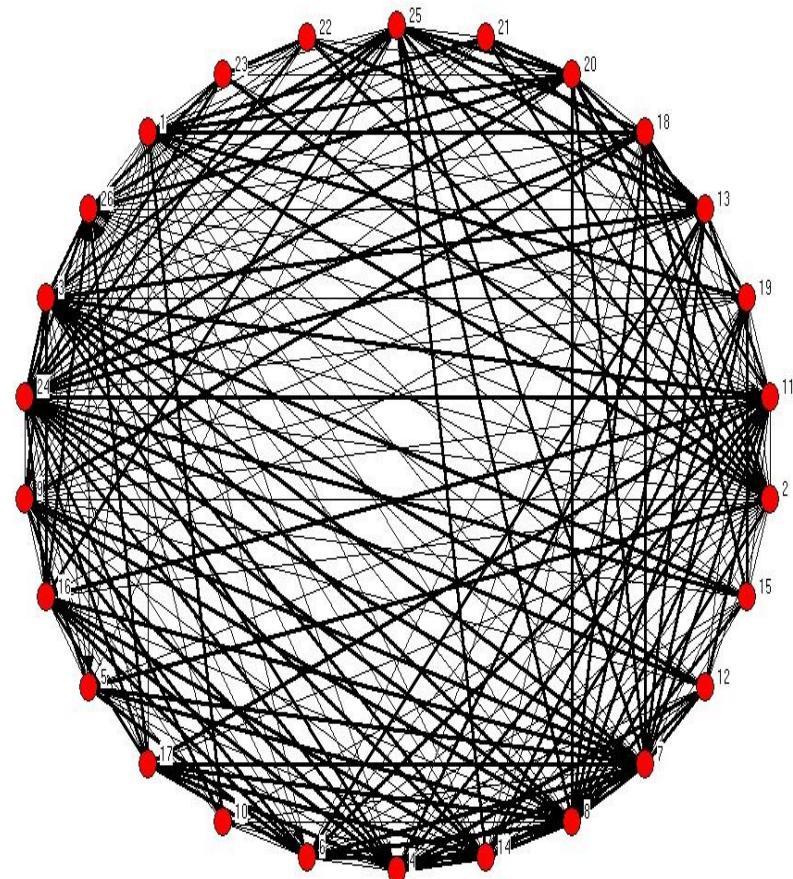
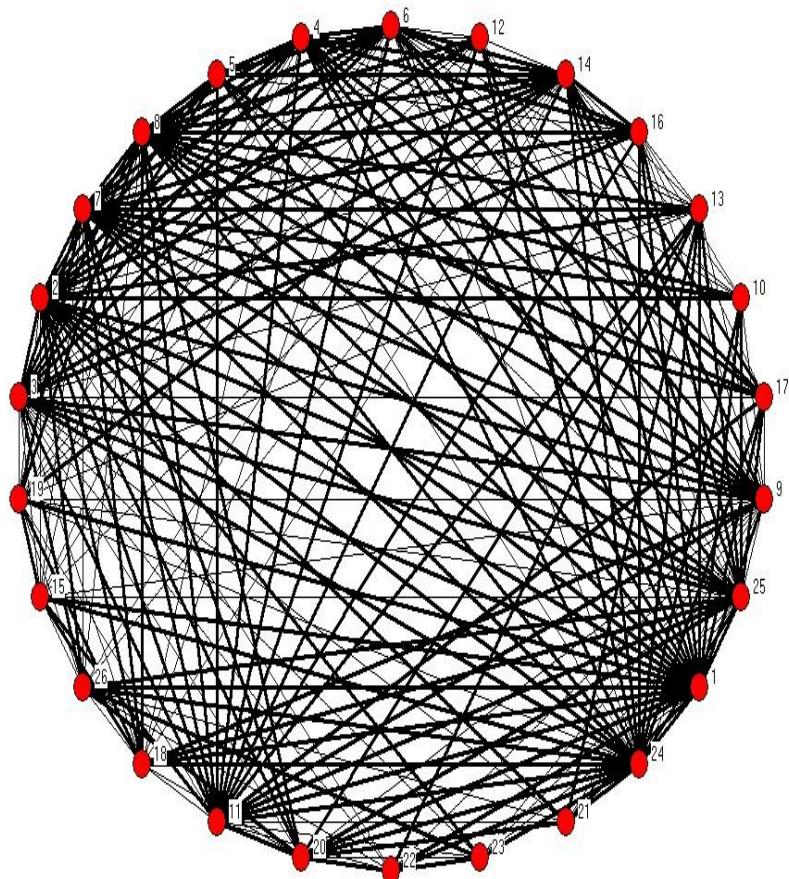
Design Structure Matrix



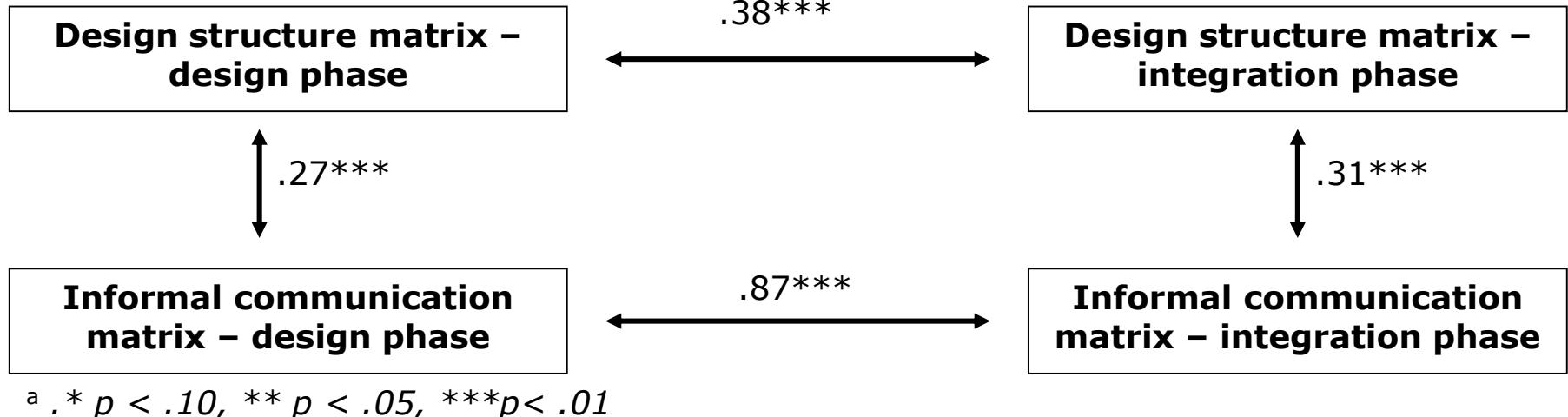
Design phase

Integration phase

Informal Communication Matrix

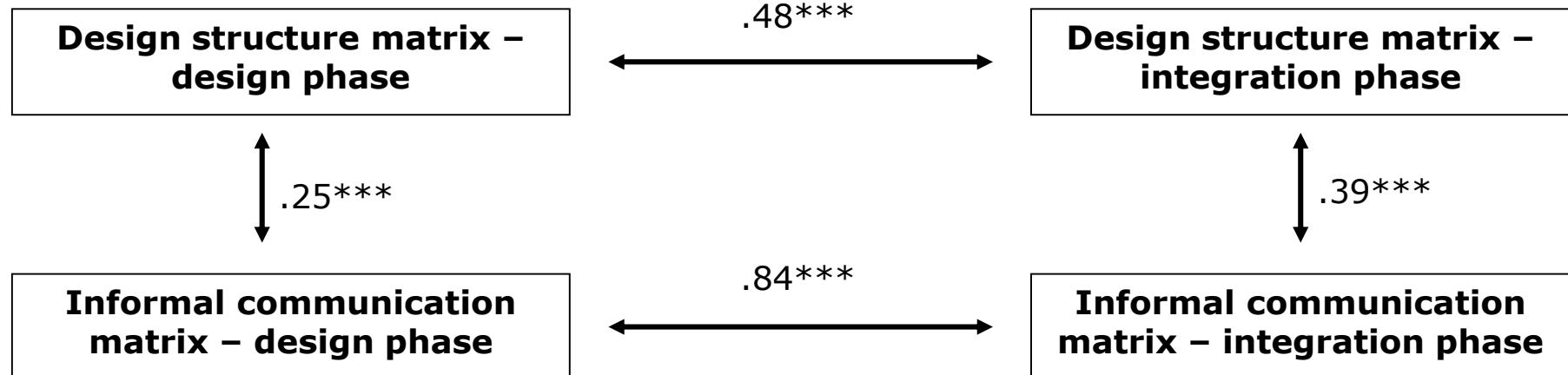


Collaboration A



^a.* $p < .10$, ** $p < .05$, *** $p < .01$

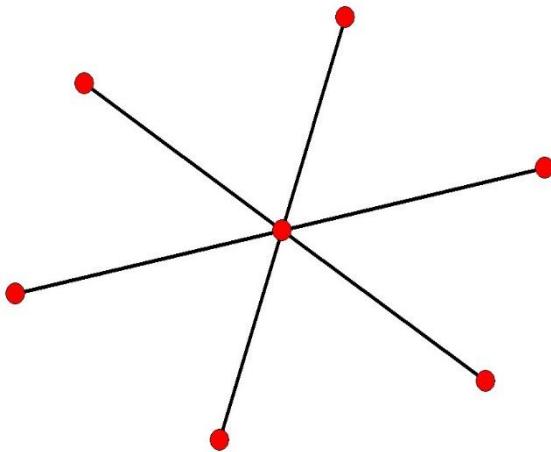
Collaboration B



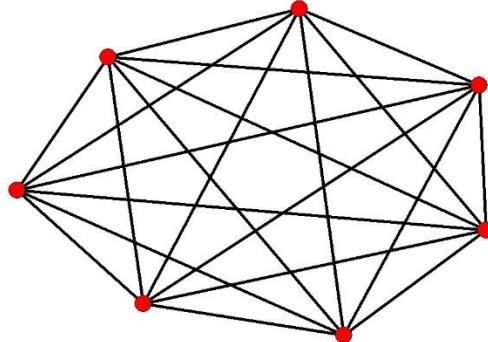
^a.* $p < .10$, ** $p < .05$, *** $p < .01$

‘The creativity that is required of design teams is couched in the communication structure of the team.’

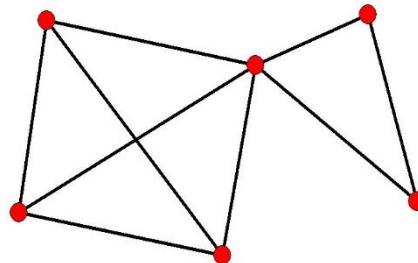
Csikszentmihalyi, P., Sawyer, K., 1995, Shifting the focus from individual to organizational creativity, In: Ford, C.M. and Goia, D.A. (eds.) *Creative Action in Organizations*, Thousand Oaks: Sage, 167-173



Centralization



Frequency

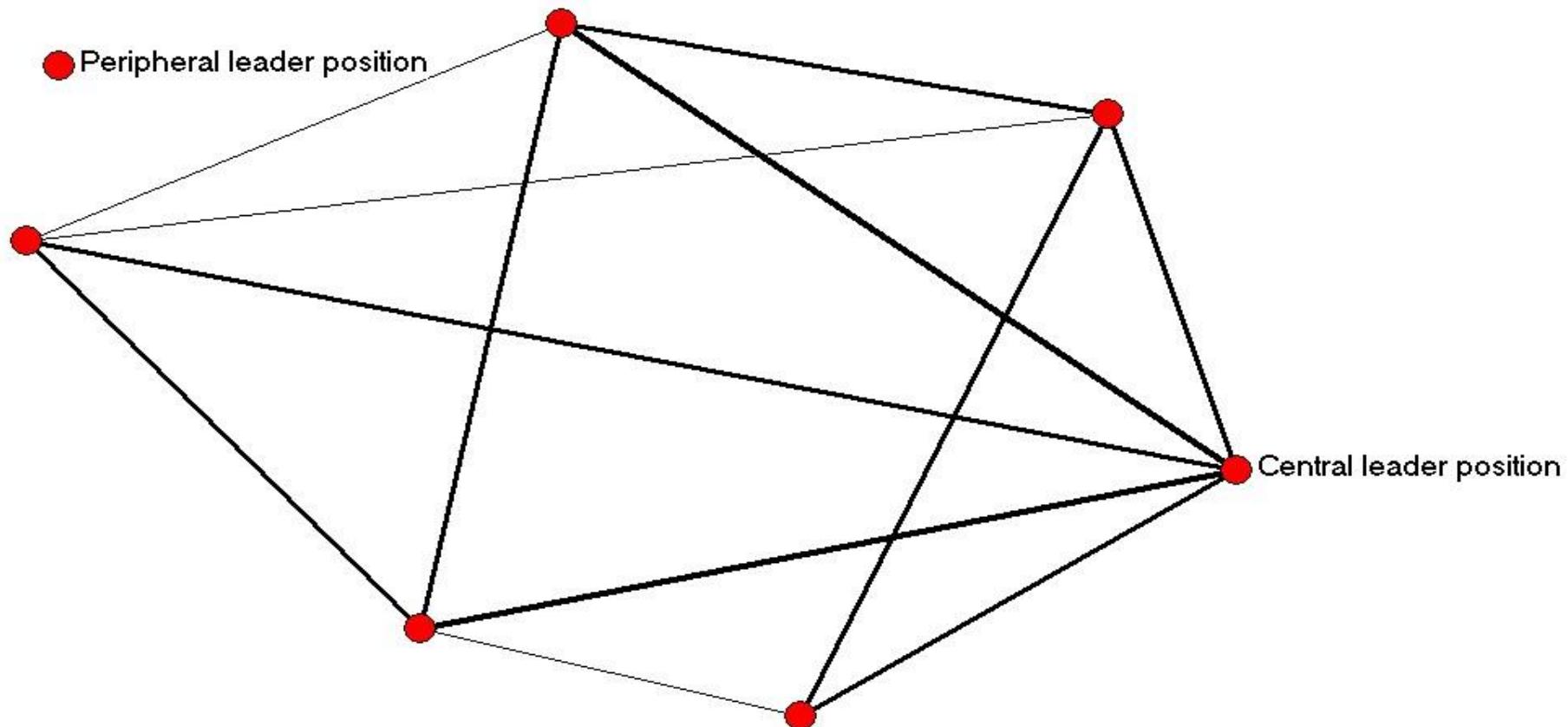


Segmentation

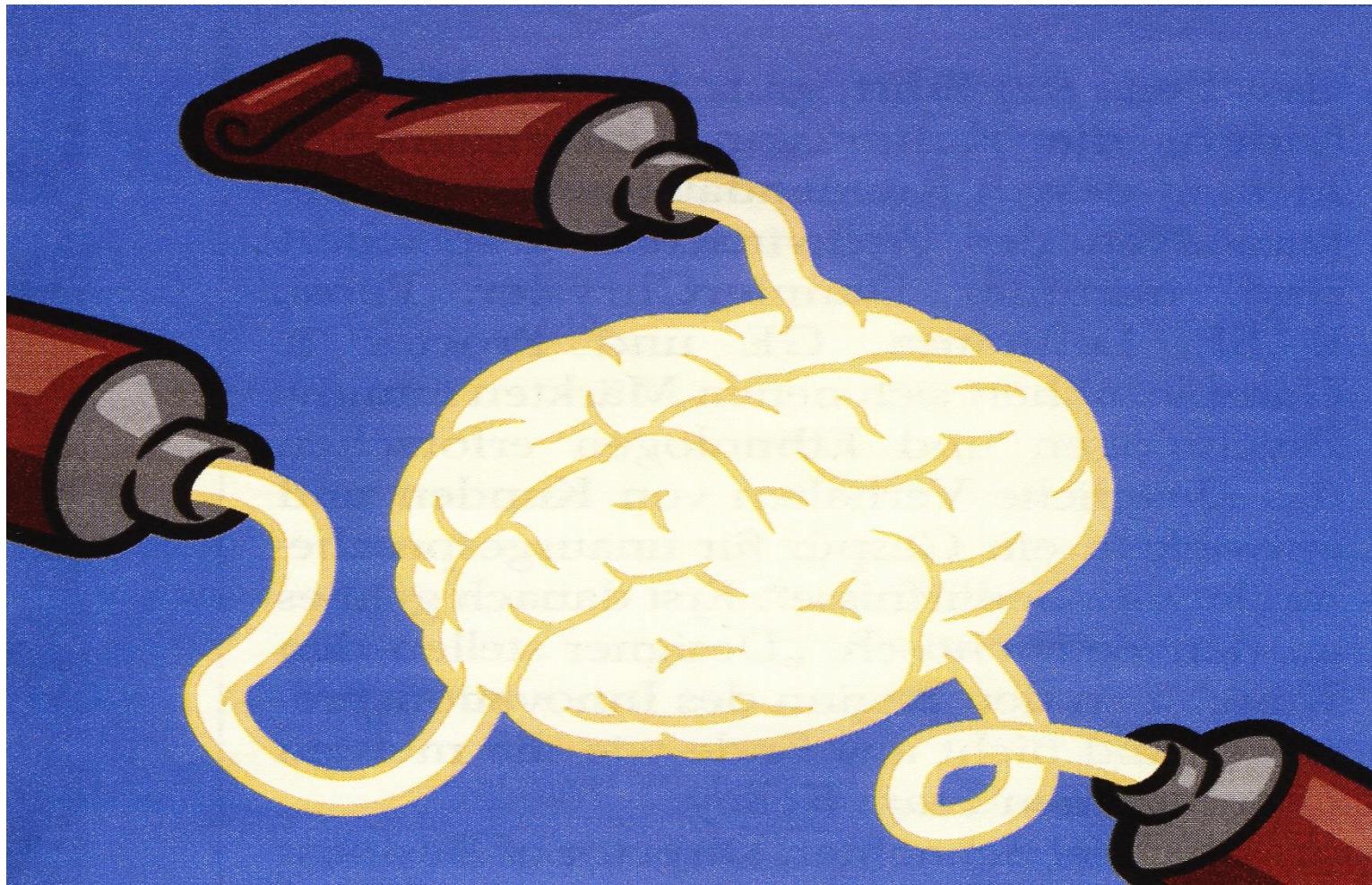
	Model 3			Model 4		
Intercept	5.43	***	(.18)	5.28	***	(.19)
Frequency of interaction	-1.13	***	(.32)	-1.08	***	(.33)
Frequency of interaction²	-5.10	***	(1.51)	-4.44	***	(1.53)
Subgroups	-.04		(.05)	-.04		(.05)
Centralization	-.16	*	(.09)	-.15	*	(.08)
Level of disagreement				-.24	**	(.12)
Level of disagreement²				.22		(.14)
Team tenure	-.31	**	(.13)	-.29	**	(.13)
Adjusted R²	.51			.54		

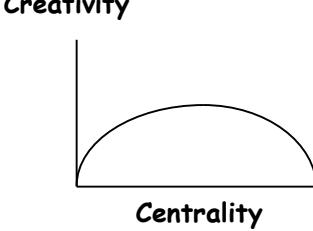
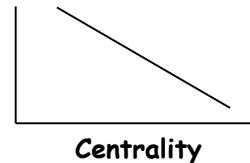
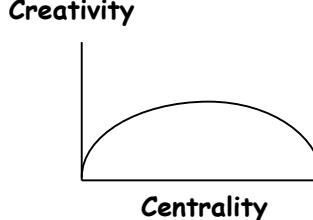
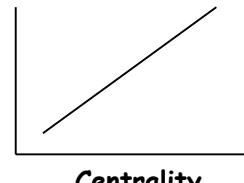
* $p < .10$, ** $p < .05$, *** $p < .01$, 44 Design Teams/243 Team Members

The balance between central and peripheral leader positions



Different network flows



Network property	Relationship between centrality and creativity	Managerial implications
Work-flow	<p>Creativity</p>  <p>Centrality</p>	<p>The involvement in work-related exchanges should be moderate to a level where leaders can assess the processes, evaluate outcomes, and intervene when necessary.</p>
Problem-solving	<p>Creativity</p>  <p>Centrality</p>	<p>The involvement in the problem-solving process of the team members should strictly be kept to a minimum.</p>
Awareness	<p>Creativity</p>  <p>Centrality</p>	<p>The involvement in the awareness network should be moderate to a level where leaders can monitor information flows and navigate them when required.</p>
Information: Boundary spanning capacity	<p>Creativity</p>  <p>Centrality</p>	<p>Leaders should invest in external networks to provide their own team with all access to knowledge and information possible to fulfill the tasks.</p>

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