CESA YPF Gauteng South Organisation and Innovation Webinar
14 September 2023

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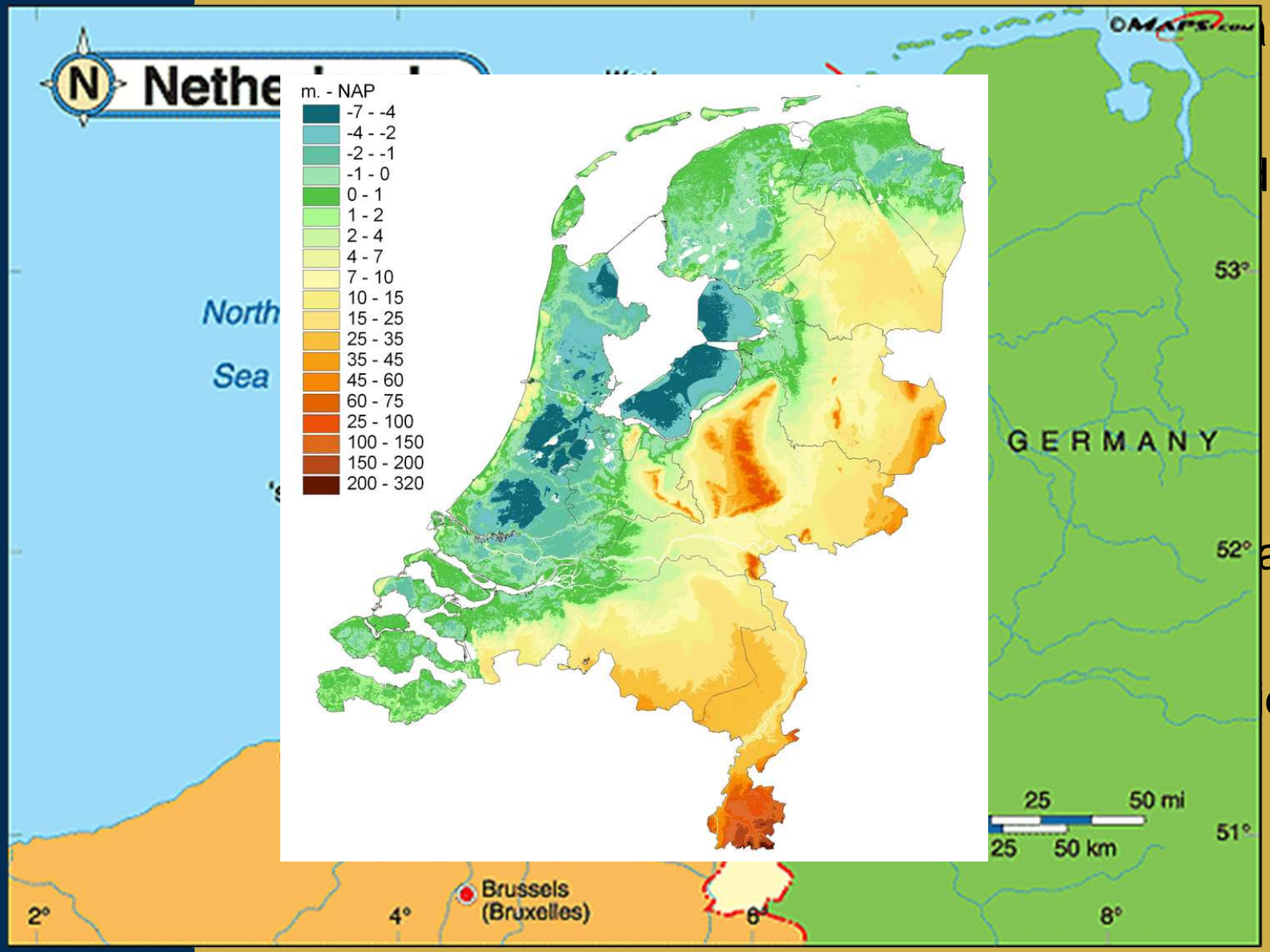
Short intro Leon

- Born (19xx) and raised in Tilburg



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Recent publications

- Oerlemans, L., Chan, K-Y, Knoben, J., Vermeulen, P. (2022): Keep it simple: External resource utilization and incremental product innovation in resource-challenged South African manufacturing firms. In: Industry & Innovation, 29(1), 102-130 (5Y-IF 2020 = 4.444; 82/376 in Economics).
- Krijkamp, A., Knoben, J., Oerlemans, L., Leenders, R. (2021). An ace in the hole: The effects of (in)accurately observed structural holes on organizational reputation in whole networks. In: Journal of Business Research, 129, 703-713 (5Y-=IF = 5.484, 29/152 in Business).
- Atakhan-Kenneweg, M., Oerlemans, L., Raab, J. (2021): New inter-organizational knowledge tie formation after firm relocation: Investigating the impact of spatial, relational, and temporal contexts. In: Journal of Business Research, 127,264-276 (5y-IF = 5.484; 29/142 in Business).

Today's agenda

- What is innovation?
- What is organization?
- What are networks?
- To what extent are networks beneficial to organizational innovation?
- Questions & Discussion

What is innovation? (definitions)

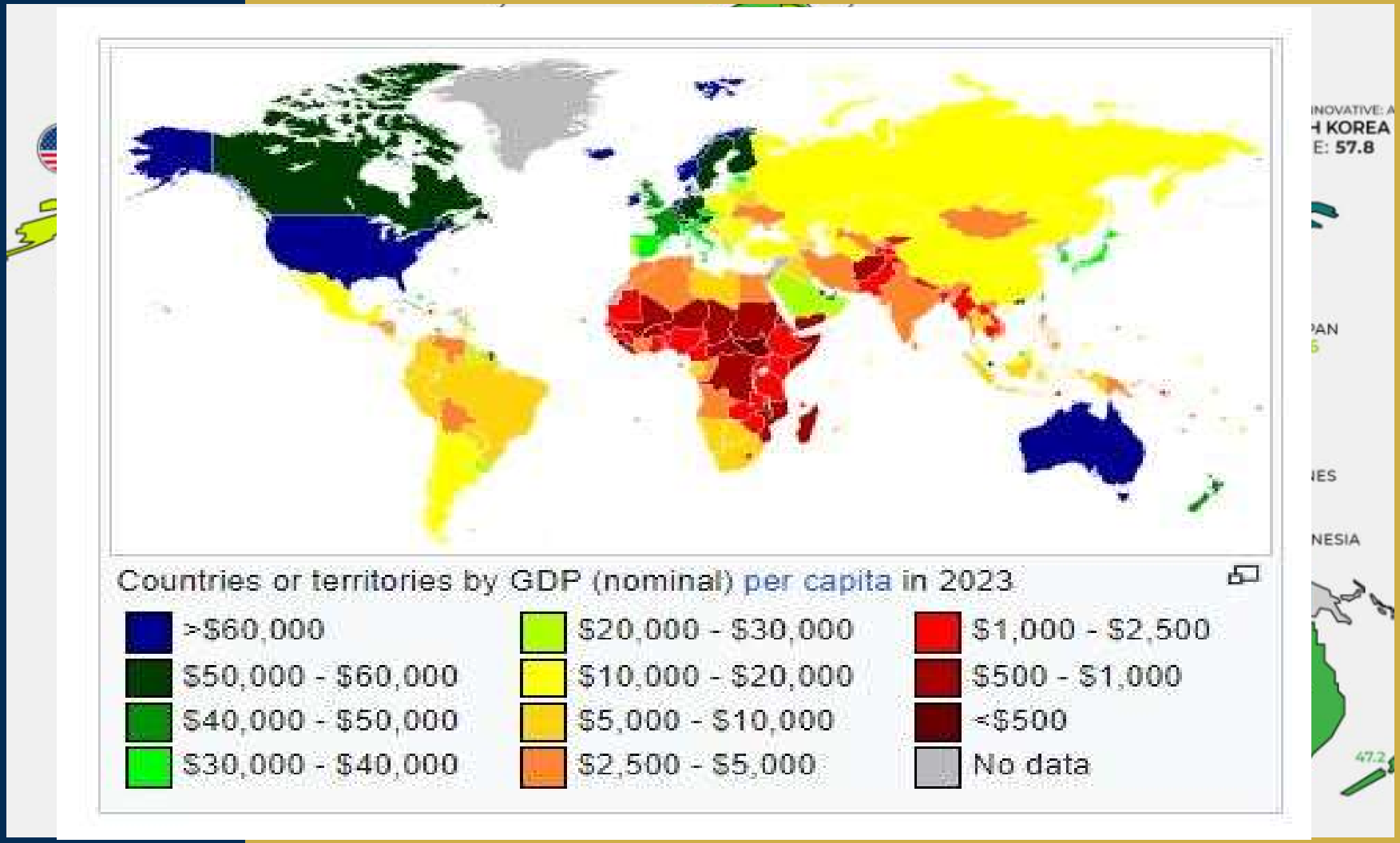
- Innovation as an outcome:
- An innovation is an implemented new or significantly improved product (good or service), process, a new marketing method, or a new organizational method in business practices, workplace organization, or external relations. At least: new (or significantly improved) to the firm.

- Innovation as a process:
- Innovation activities are all scientific, technological, organizational, financial, and commercial steps that actually, or are intended to, lead to the implementation of innovations. Innovation activities also include R&D that is not directly related to the development of a specific innovation.

Innovation comes in shapes and forms

- Product Innovation
- Process Innovation
- Business Model Innovation
- Service Innovation
- Incremental Innovation
- Radical or Disruptive Innovation
- Open Innovation
- Social Innovation
- Sustainable Innovation
- Design Innovation
- Cultural or Organizational Innovation
- Marketing or Brand Innovation

Innovation & wealth creation



Networks and innovation: Biotech

What is Biotechnology?

At its simplest, biotechnology is technology based on biology – biotechnology harnesses cellular and biomolecular processes to develop technologies and products that help improve our lives and the health of our planet. We have used the biological processes of microorganisms for more than 6,000 years to make useful food products, such as bread and cheese, and to preserve dairy products.

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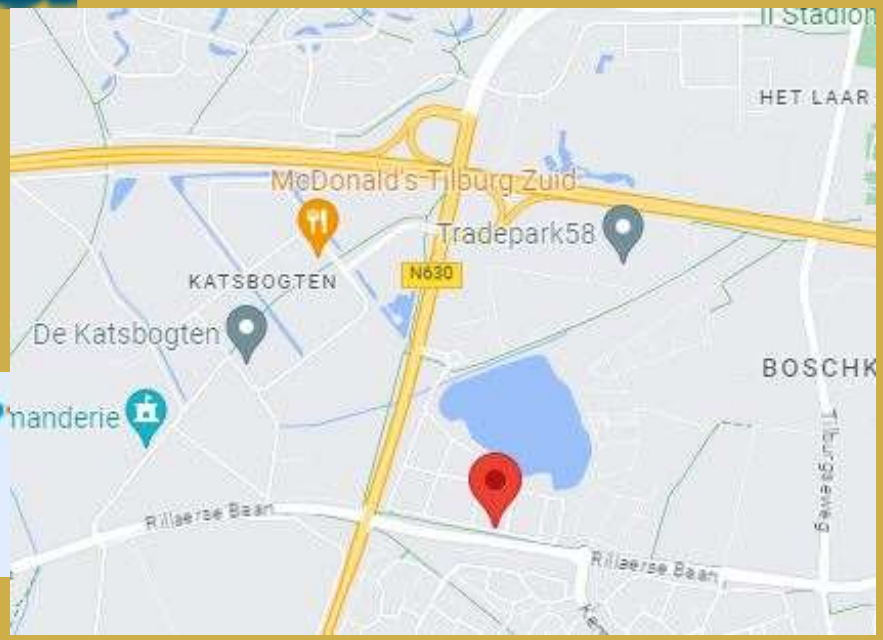
Chiesi

Welcome to Chiesi
NEDERLAND

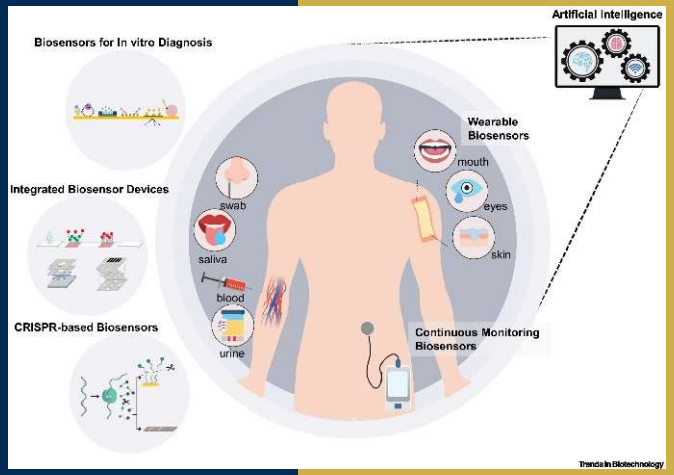
QPS
CUSTOM-BUILT RESEARCH



Biotech example: Treeway

- Treeway is a clinical-stage biotechnology company founded by two ALS patients, Bernard Muller and Robbert Jan Stuit in 2012. Our mission is to develop therapies for ALS and other neurodegenerative diseases.

Some examples of innovations in biotech



Bio-sensors

Bio-energy

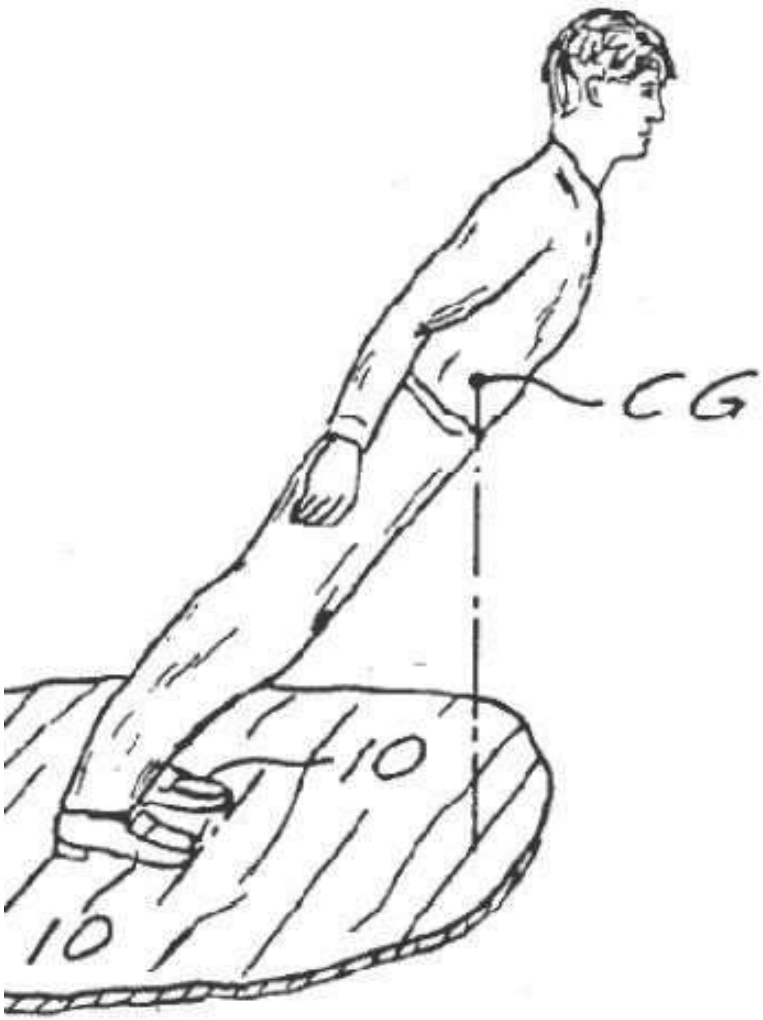
Bio-printing

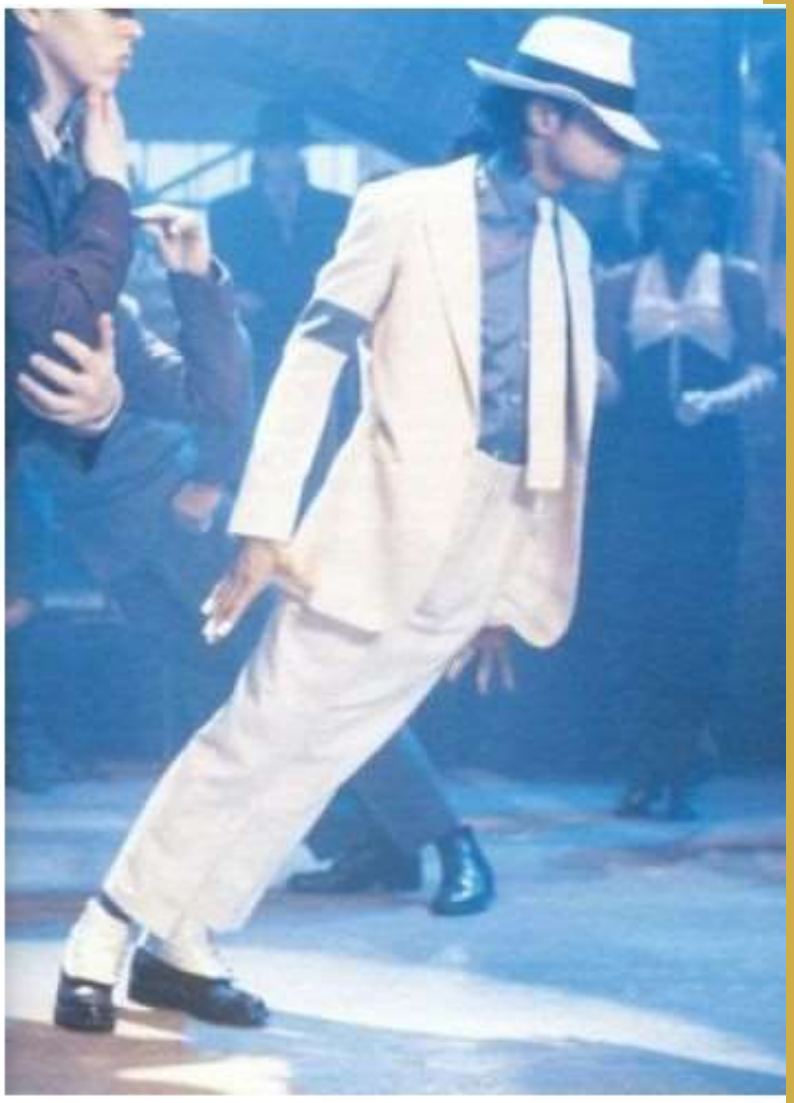
What are innovation outcomes? (measurement)

- Innovation: many shapes and forms
  - > Measurement problem: What is a valid and reliable measure?

- Multiple approaches used:
  - > R&D input (e.g., budget, workers)
  - > Creative ideas
  - > Patents
  - > Patent citations
  - > New product announcements
  - > Innovative sales

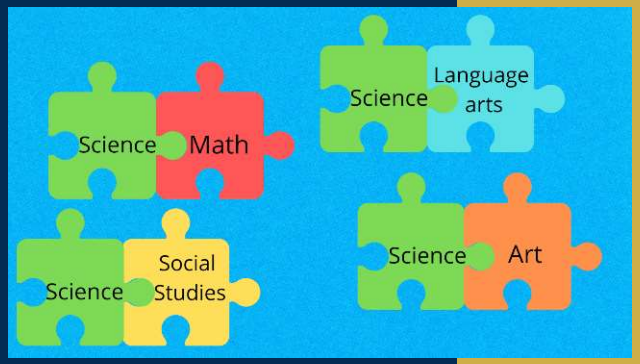
Innovation outcome: what is a patent?





For this presentation:

- Innovation is a process of recombination of bits of knowledge
  - > Innovation needs new or newly combined knowledge (novelty)
  - > Recombination can be costly
- Innovation from a knowledge perspective involves the transformation of existing knowledge, information, or ideas into new or improved products, services, processes, or solutions. It encompasses the application of knowledge to create value, address challenges, and drive progress in various fields.



Some key aspects

- Combining and Reconfiguring Knowledge: bringing together different pieces of knowledge from various domains and reconfiguring them in novel ways.
- Problem Solving: Innovation is often driven by the need to solve specific problems or challenges.
- Learning and Adaptation: Continuous learning and the accumulation of knowledge are crucial for innovation.
- Experimentation and Risk-Taking: Innovation often requires experimentation and a willingness to take risks.

Where to find knowledge?

- For example:
  - Books/ Libraries
  - Educational Institutions
  - Online Resources
  - Experts and Mentors
  - Workplace
  - Conferences and Seminars
  - Research and Scientific Journals
  - News Media
  - Social and knowledge Interactions
  - Experiments and Hands-On Activities
  - Etc.

What is “Organization”?

- “The accomplishment of an objective requires collective effort, men set up an organization designed to coordinate the activities of many persons and to furnish incentives for others to join them for this purpose.”

- *Blau, P. M., & Scott, W. R. (1962). Formal organizations: A comparative approach. San Francisco: Chandler, pg. 5.*

- *From Greek “organon” = tool, instrument.*

Modern organizations: Europe

Staffelter Hof Winery in Germany, which dates back to 862
NL: Brand Brewery, 1340

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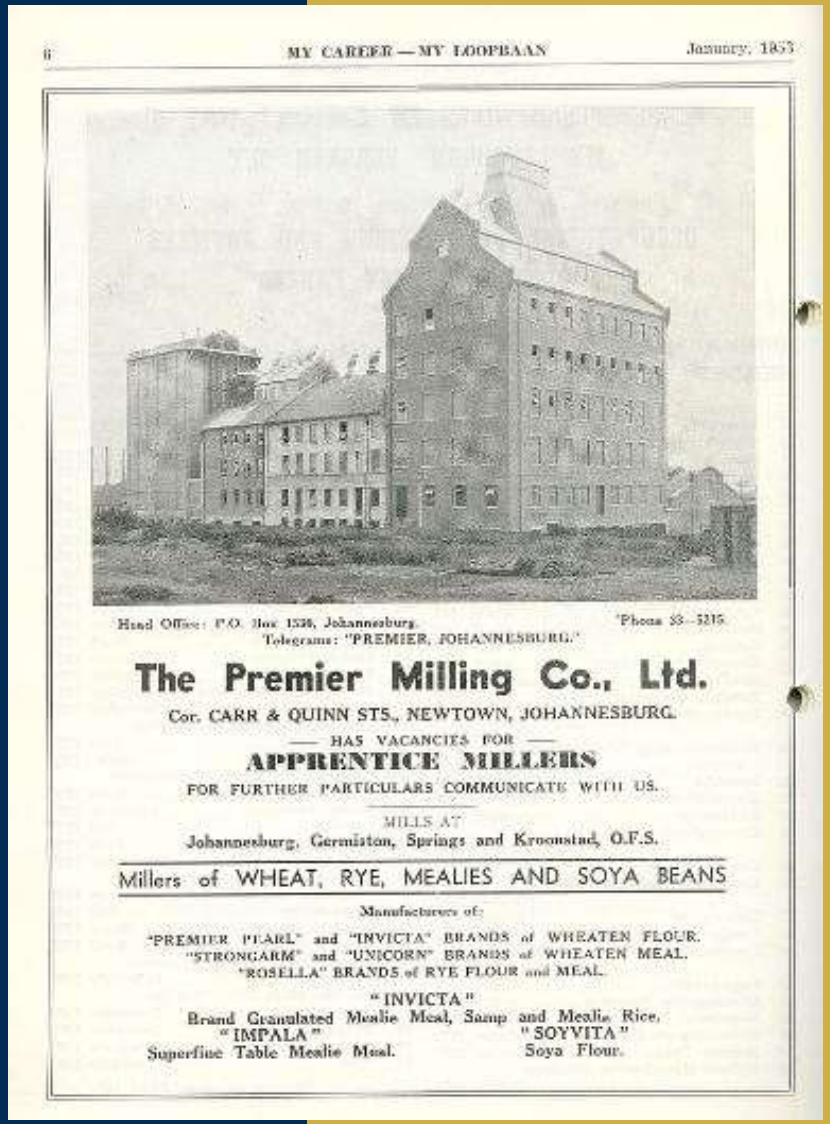
Beer!!!

Modern organizations: Africa

Oldest organization: South Africa



Founded: 1820 and still functioning

Sector: Food Manufacturing

HQ: Waterfall City, Jo'burg

Revenue (2022): R14.5bn (+16.1%)

Total assets (2021): £m 2,274.9

Number of employees: 8,650

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Premier: Brands

What is an Organization?

There are many types of organizations

Non-Governmental Organizations

International Organizations

Not-for-Profit Organizations

Secret Societies

Schools

Corporations

Armed Forces

Voluntary Associations

Governments

Resistance Movements

Political Organizations

Charities

Criminal Organizations

An organized group of people who have a common goal and work together

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But also:

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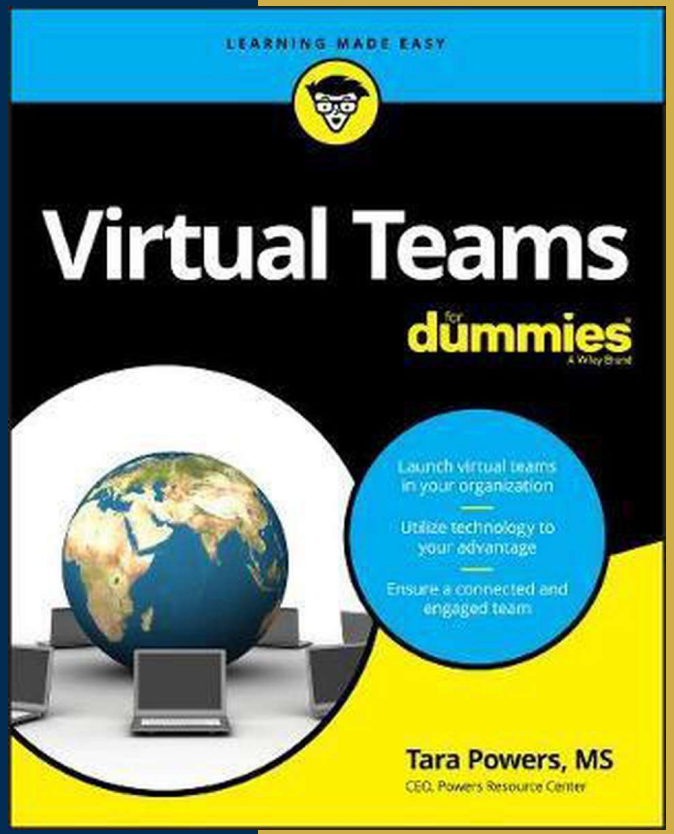
GGZ Friesland

Chris



THE HUMAN VARIOME PROJECT

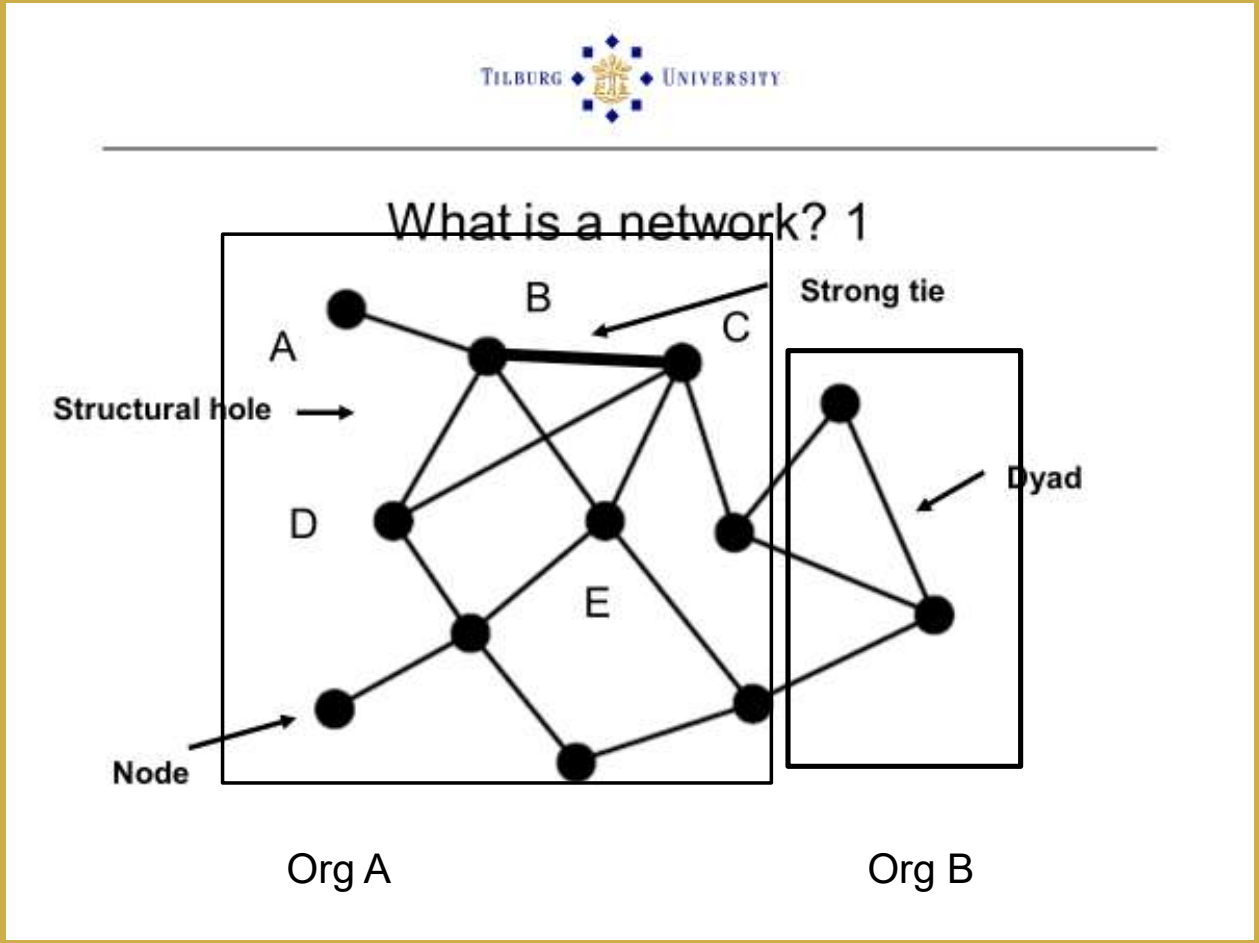
an NGO official partner of UNESCO

sharing data · reducing disease

THE PURPOSE PROJECT.

Capacity Building for Social Change

What is a network?



Intra- and Inter-Organizational Networks

Innovation/ creativity in intra-organizational networks

Archimedes: Eureka, Eureka
("I have found it")

Social structure of leadership and creativity in engineering design teams

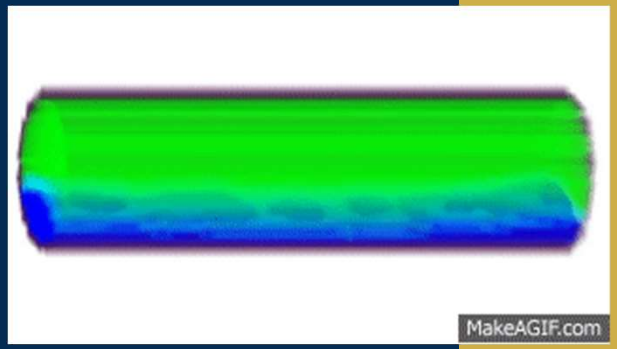
- Creativity of teams depends on:
  - Firm strategy (innovation?)
  - Resources available
  - Features of individual team members
  - Social network / processes in team
- Not much research of role of team leader
  - Is important as (s)he coordinates access to knowledge and information
  - Is important due to growth of project-based and matrix-like organizations

What is team creativity?

- “Creation of a valuable, useful new product, service, idea, procedure or process by individuals working together in a complex social system” (Woodman et al., 1993: 293)
- Measurement is extremely difficult
  - > External rating by experts
  - > Internal rating: team leader and members:
    - Novelty and originality of solutions
    - Number of possible solutions generated

Different networks @work

- In engineering teams different networks are at work (which can be influenced by project team leaders):
  - *Workflow network*: exchange of goods, data or services like blueprints, drawings, models, test data;
  - *Problem-solving network*: discussion, innovation or evaluation of new idea or approaches to technical problems; technical help; ‘sound-boarding’;
  - *Boundary-spanning network*: the extent to which the team leader maintains work-related external ties



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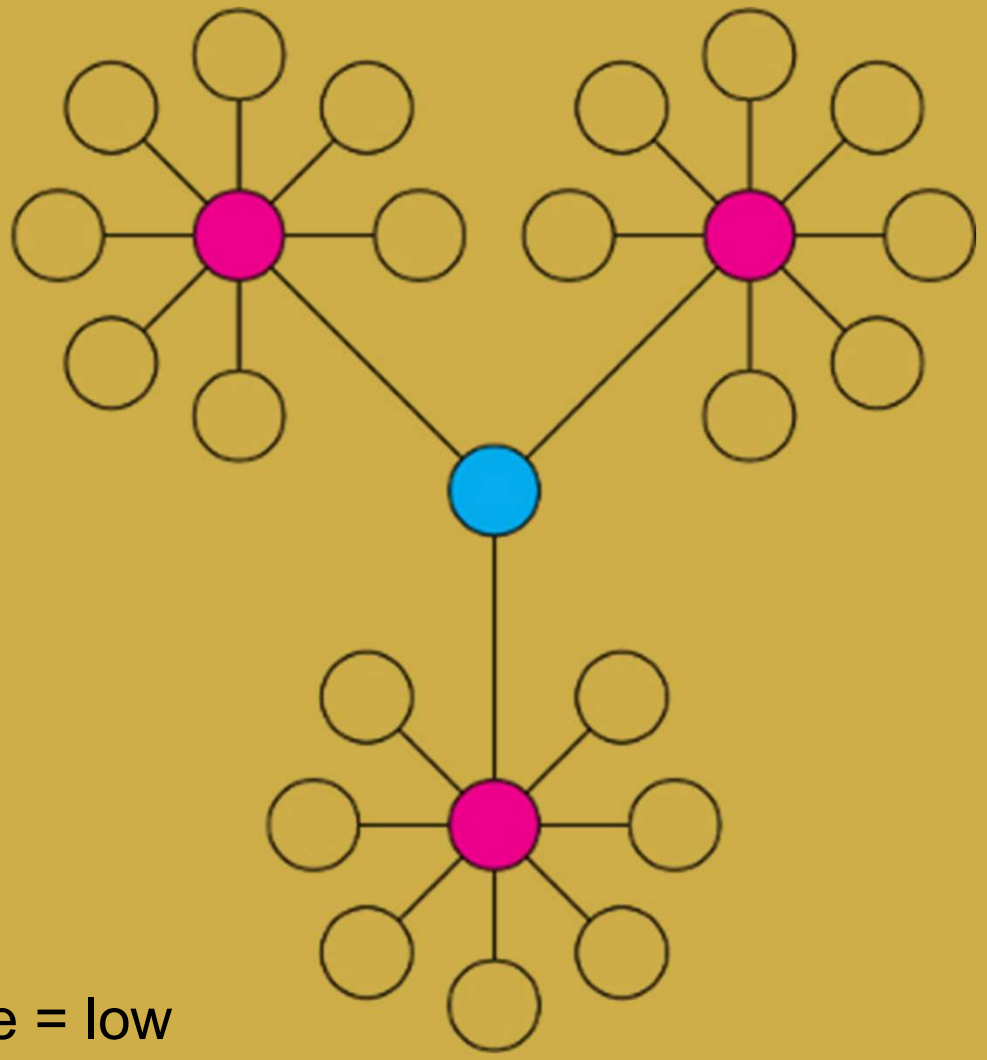
What is degree centrality?



Blue = low
Pink = high

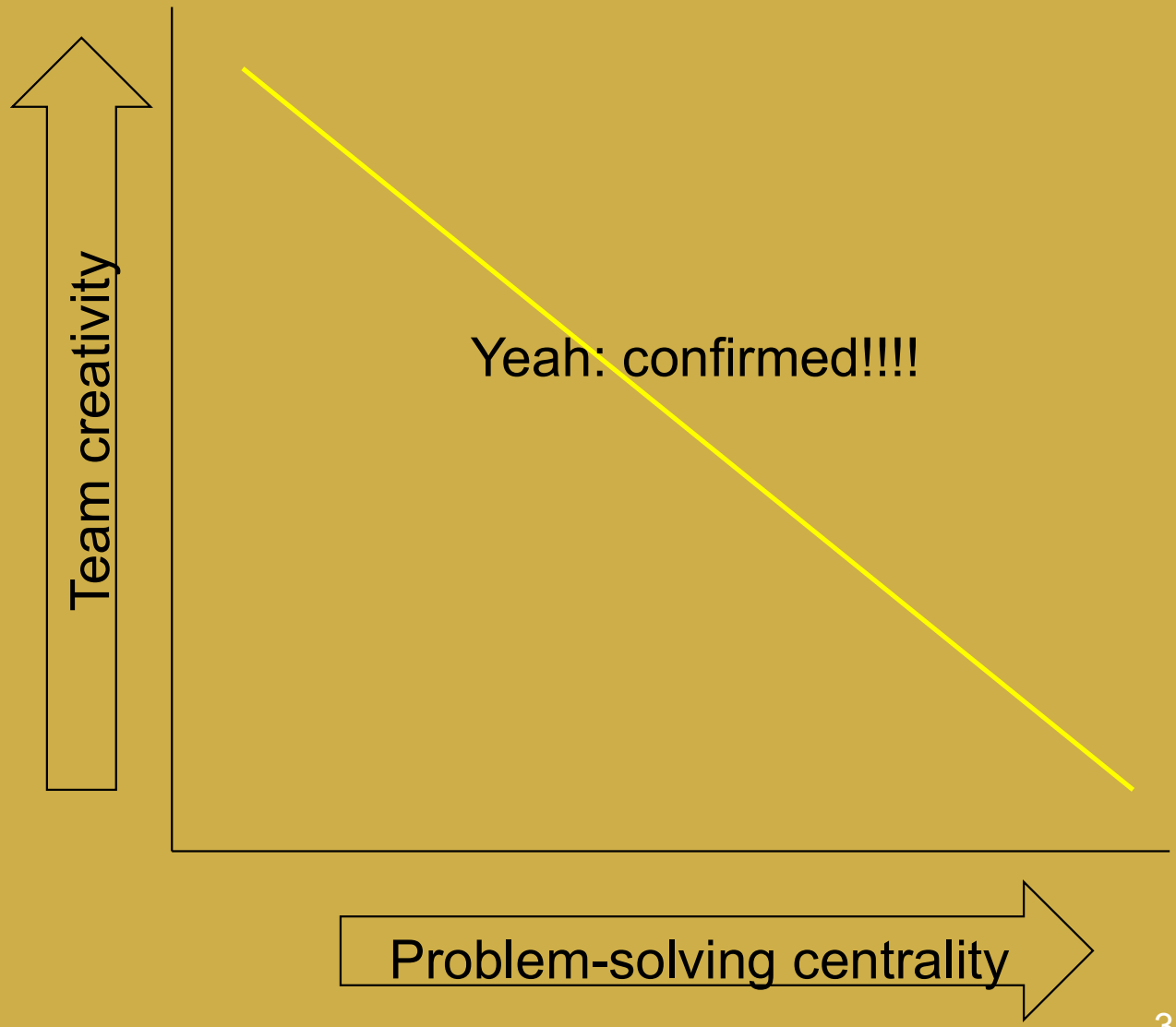
Workflow network: team leader position and creativity

High involvement TL:
- Overloaded with knowledge and decision need; giving delayed input to team members
- Discouragement of team members of behaving creative

Low involvement TL:
- Lack of monitoring and navigating shift of focus away from task
- Free-riding; lowering performance standards

Problem-solving network: team leader position and creativity

Negative:
- TL very central dominate discussion, inhibiting team member contributions
- Less central, team members feel more involved and committed to solve problems



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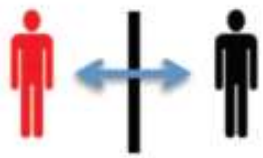
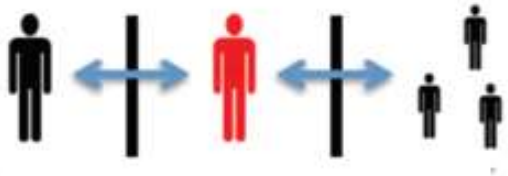
What is boundary spanning?

An Introduction to *Boundary Spanners* and *Boundary Spanning*

Most generally, *boundary spanners* are people who link or connect with others across various kinds of boundaries. Three kinds of boundary spanners are shown below (with boundary spanners shown in red).



Boundary spanner linking to one other person across a boundary

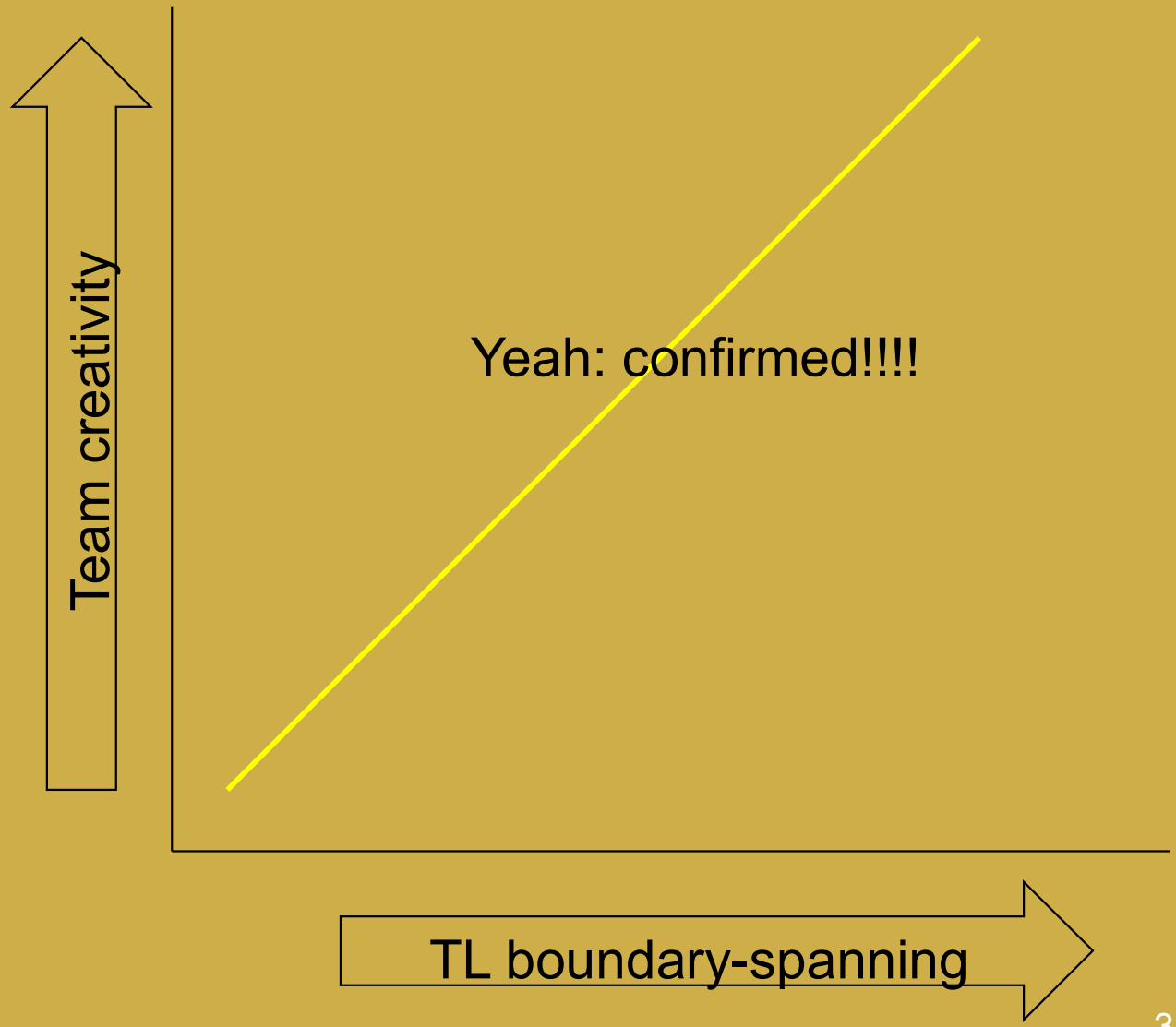


Boundary spanner connecting other people across multiple boundaries

Boundary spanner linking with external environment

Boundary-spanning capacity and creativity

Positive:
• TL as gatekeeper linking internal and external communication flows
• External links bring in new information; bring openness; innovation



Conclusions

- Team leaders can stimulate or impede team creativity
- Good lesson for future team leaders and managers!

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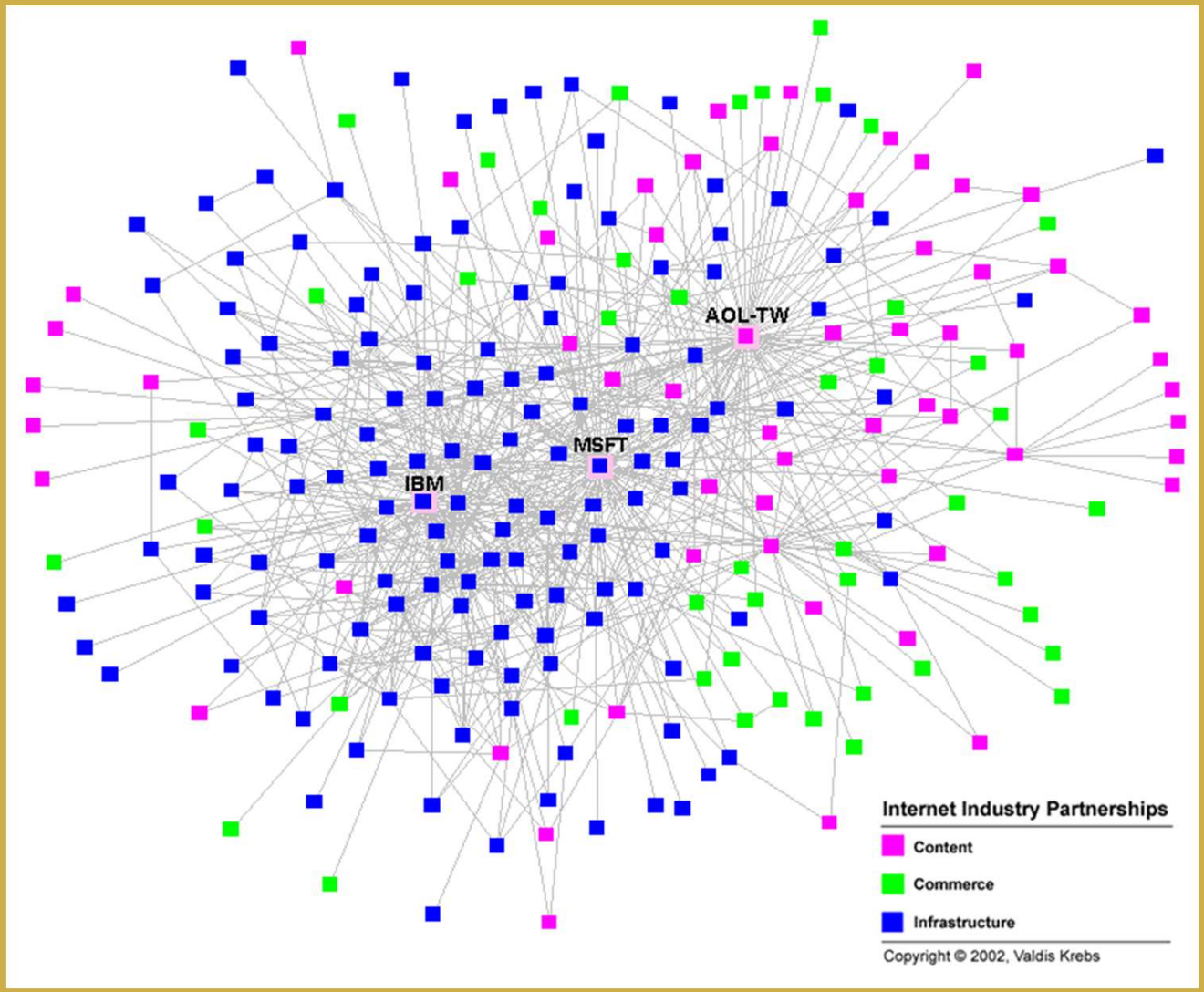
Innovation in inter-organizational networks

IBM
Microsoft
America Online



Inter-organizational Networks & Innovation

- The importance of studying the impact of relations and networks on (outcomes of) organisations
  - > Dense/closed or disconnected/open networks
  - > Building effective network structures (direct vs. indirect ties)

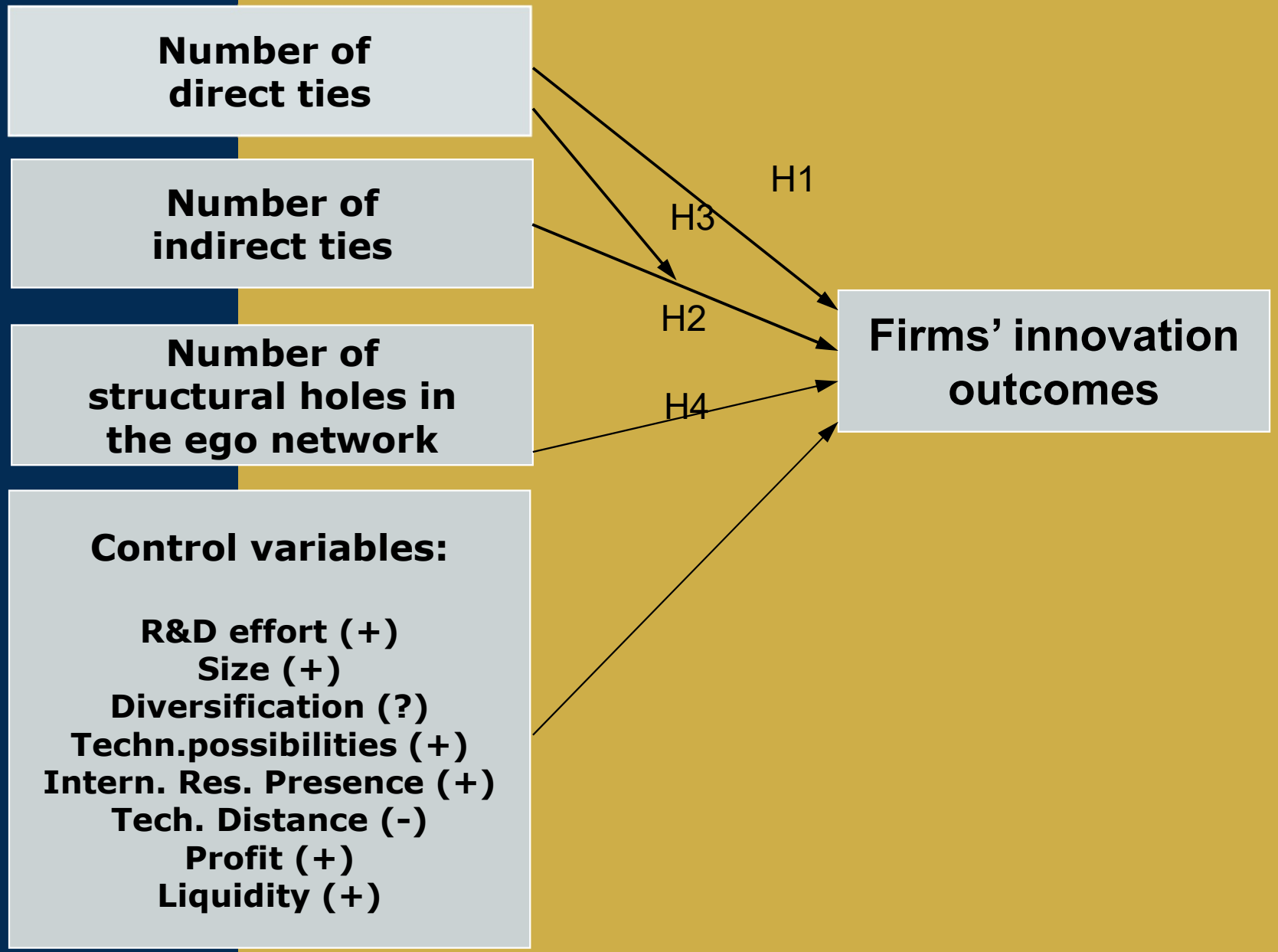
Aim

- To determine the optimal structure of firm's network relations for it to maximize innovation output.

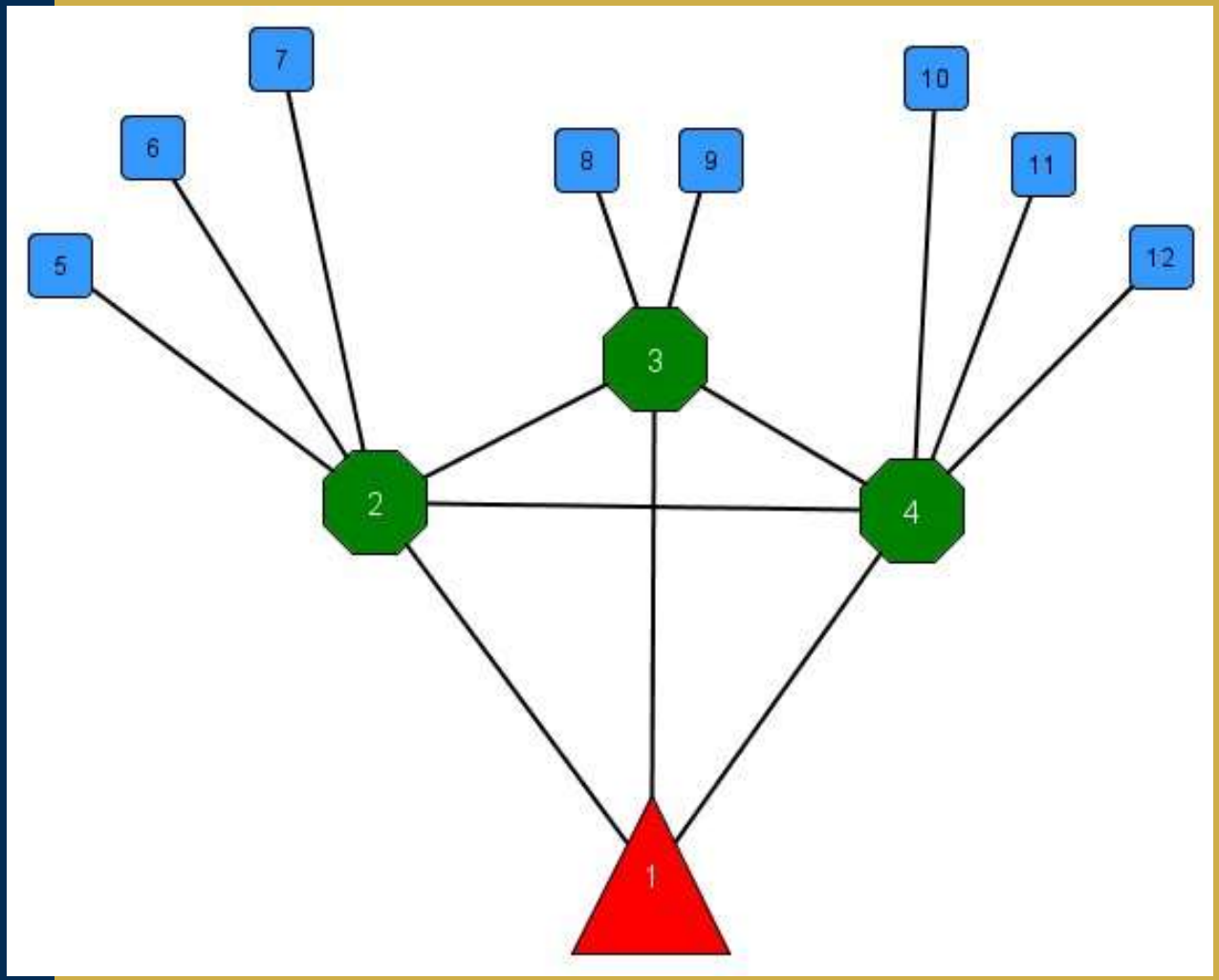
Research question

- What is the relation between a firm's network structure and its innovation output?

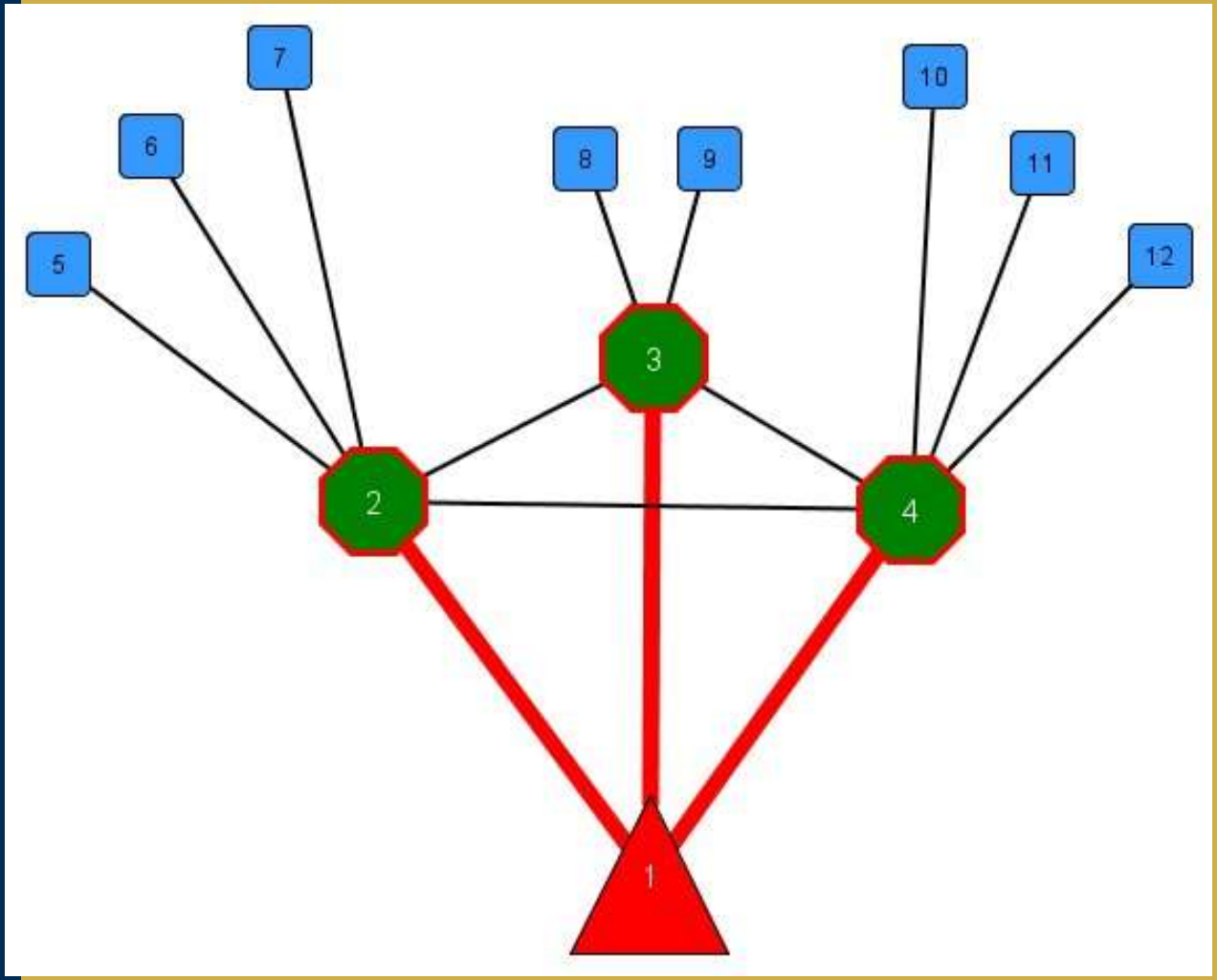
Model


Number of direct ties
Number of indirect ties
Number of structural holes in the ego network
Control variables:
R&D effort (+)
Size (+)
Diversification (?)
Techn.possibilities (+)
Intern. Res. Presence (+)
Tech. Distance (-)
Profit (+)
Liquidity (+)
H1
H3
H2
H4
Firms' innovation outcomes

Ego-network concepts

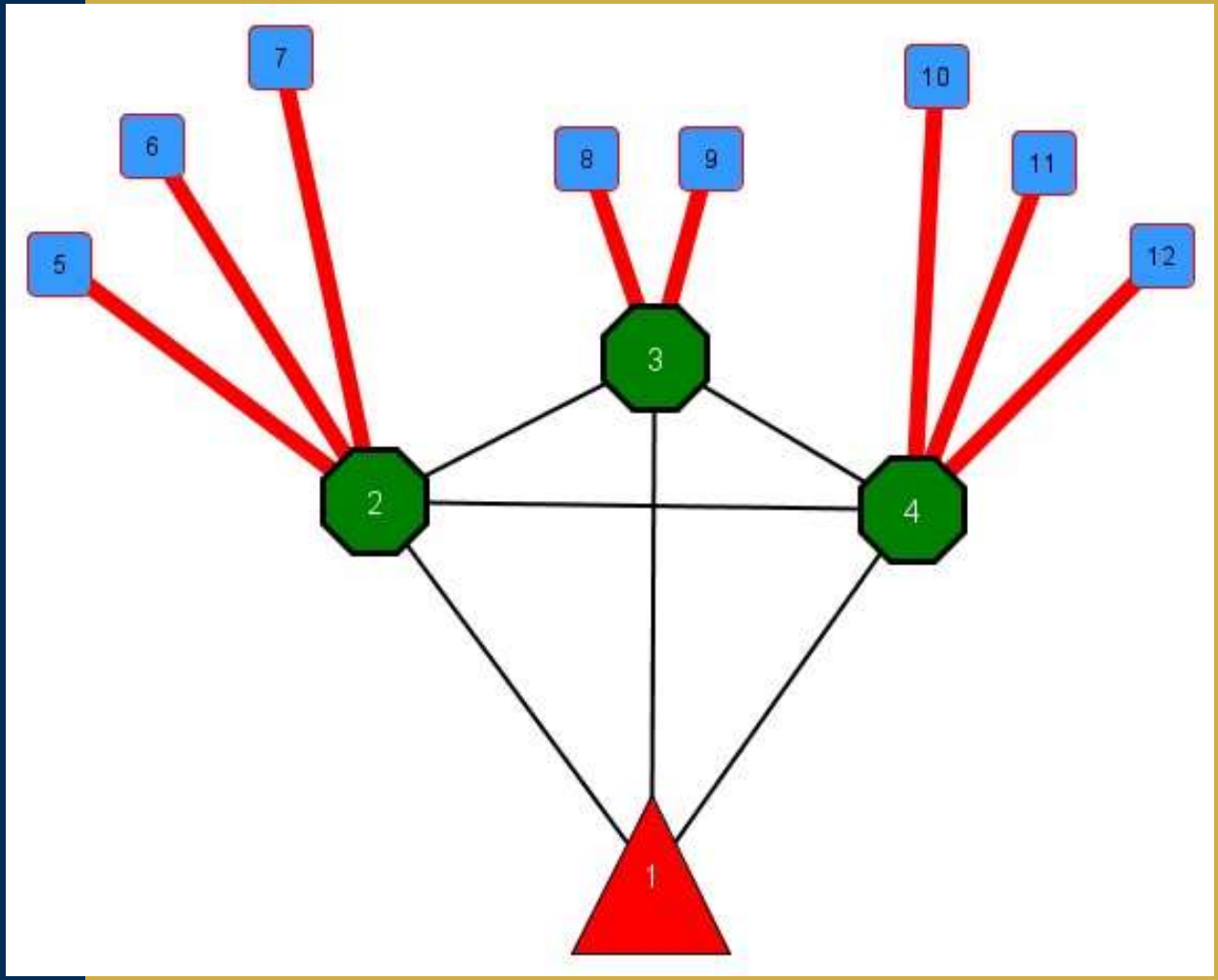


Ego-network concepts



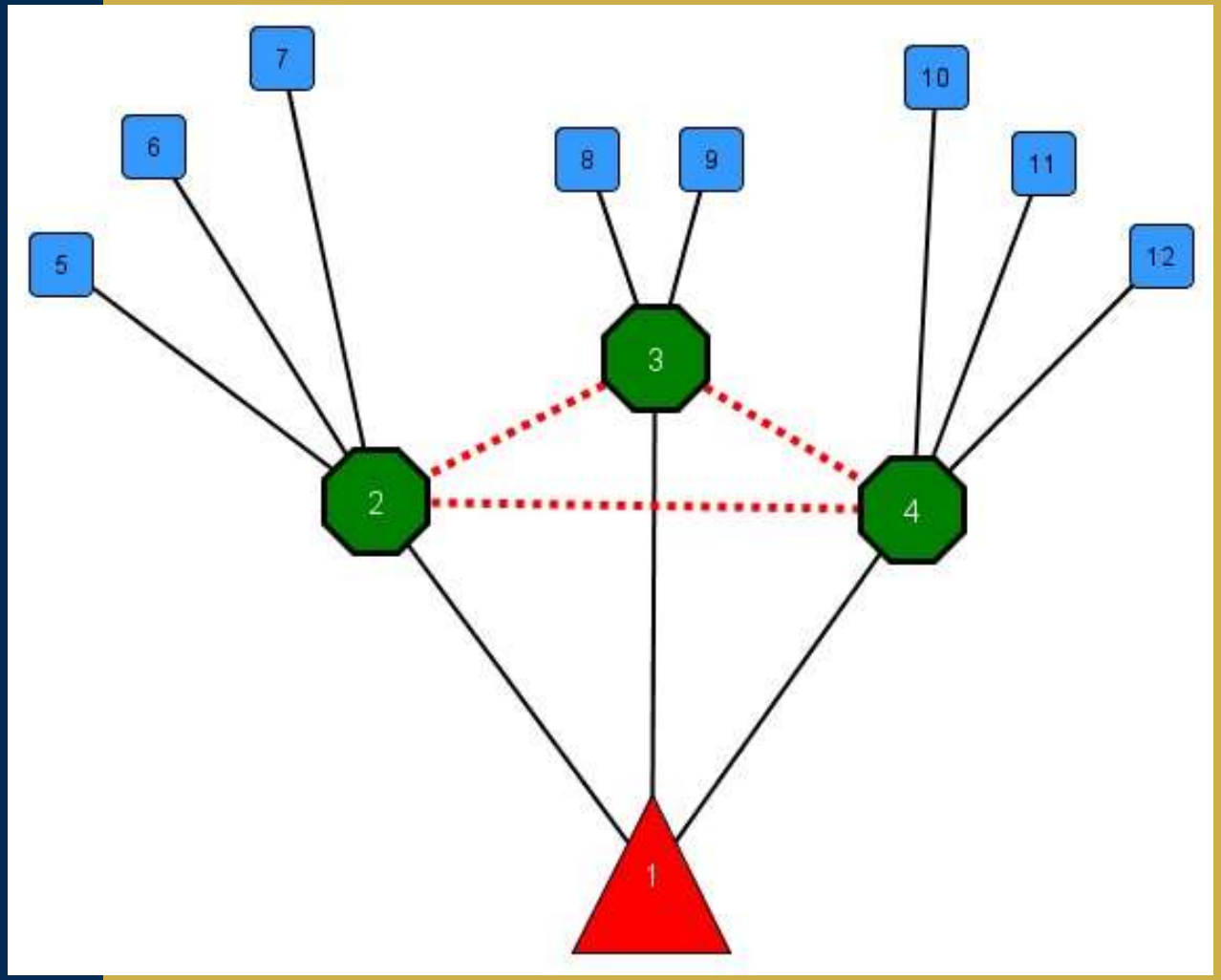
Direct ties

Ego(network) concepts



Indirect ties

Ego(network) concepts



Structural holes

Direct ties and innovation

- Benefits of direct (technology-based) ties:

1. 'knowledge sharing' = non-rival nature of knowledge
2. 'scale' = larger projects generate relatively more knowledge than smaller ones.
3. 'complementarity' = access to multiple kinds of knowledge and skills

- **H1:** The more direct ties that a firm maintains, the greater the firm's subsequent innovation output.

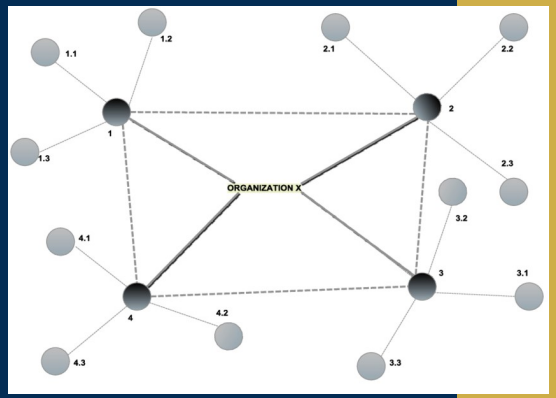
Indirect ties and innovation

- Benefits of indirect (technology-based) ties:

  1) information-gathering device

  2) information-processing mechanism

- **H2:** The greater a firm's number of indirect ties, the greater the subsequent innovation output of the firm.



Direct & Indirect Ties

- The benefits of indirect ties is smaller when a firm has more direct ties, because:

  1. For a firm that has many direct ties, information provided by a indirect tie will add only marginally - they already have access to a significant proportion of the knowledge in the network

  2. When there are many direct and indirect ties, knowledge circulates highly in the network and becomes less beneficial to the focal firm

  3. Firms with many direct ties are more constrained in their ability to absorb new information or respond to it flexibly

- **H3:** The impact of indirect ties on a firm's innovation output will be moderated by the level of the firm's direct ties: the greater the number of direct ties, the smaller the benefit of indirect ties.

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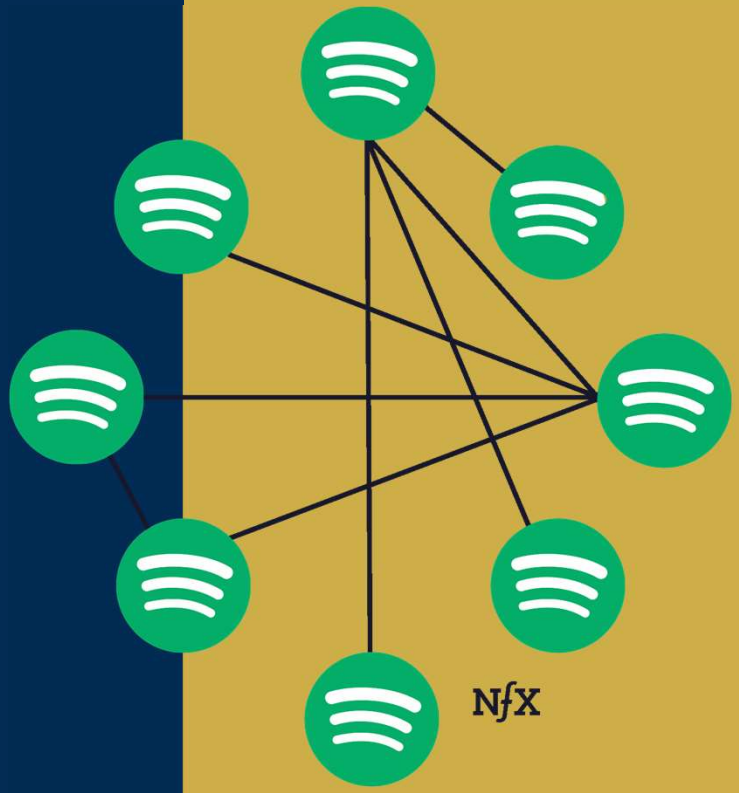
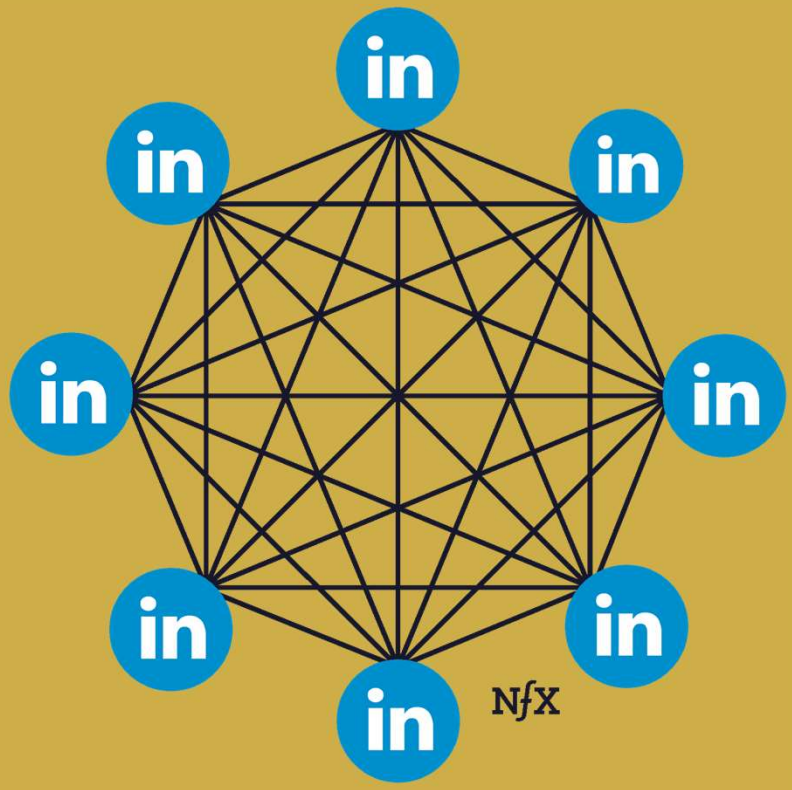
What is network density?



Low Density



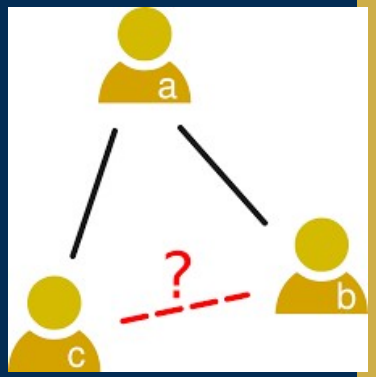
High Density

Structural holes and innovation (1)

- What is a 'structural hole' and what effect does it have on innovation?

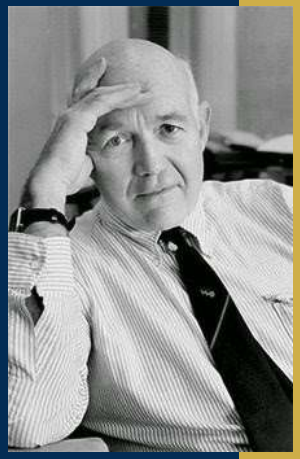
Ronald Burt (1992): Structural holes are gaps in information flows between actors linked to the focal firm but not to each other.

Networks with many 'structural holes' (low density) give access to diverse knowledge => innovation ↑



H4a: The greater the number of structural holes spanned by a firm, the greater the firm's subsequent innovation output.

Structural Holes and innovation (2)



James Coleman (1988): 'structural holes' lead to: (1) absence of trust; (2) no shared norms of behaviour; (3) bigger chance of opportunism.

Thus: Negative effect on innovation

H4b: The greater the number of structural holes spanned by a firm, the less the firm's subsequent innovation output.

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Findings

Maximum Likelihood, Random Effects Pois

Variable	5a	5b	5c
Constant	2.734*** (.173)	2.669*** (.183)	2.691*** (.170)
Direct ties$_{it-1}$	.057*** (.008)	.046*** (.003)	.040*** (.002)
Indirect ties/10, count$_{it-1}$	.051*** (.004)		
Indirect ties, dist. wtd. $_{it-1}$		.019*** (.001)	
Indirect ties, dist. & info wtd. $_{it-1}$			.023*** (.002)
Direct ties X Indirect ties/10, count$_{it-1}$	−.007*** (.001)		
Direct ties X Indirect ties, dist. wtd.$_{it-1}$		−.002*** (.000)	
Direct ties X Indirect ties, dist. & info. wtd$_{it-1}$			−.002*** (.000)
Structural holes$_{it-1}$	−.310*** (.029)	−.373*** (.029)	−.284*** (.025)
Diversification, entropy$_{it-1}$	−.072*** (.013)	−.049*** (.014)	−.054*** (.014)
International research presence$_{it-1}$	−.048 (.041)	−.059 (.043)	−.058 (.042)
Technological opportunity$_{it-1}$	−.002 (.001)	−.001 (.001)	−.001 (.001)
Return on assets$_{it-1}$	−.218* (.105)	−.077 (.118)	−.199 (.106)
Current ratio$_{it-1}$	.028*** (.007)	.043*** (.007)	.031*** (.006)
Japan	−.272 (.330)	−.223 (.346)	−.263 (.328)
USA	.357 (.384)	.355 (.409)	.353 (.382)
R&D$_{it-1}$	.205*** (.010)	.202*** (.010)	.211*** (.010)
Firm size$_{it-1}$	.073*** (.013)	.086*** (.014)	.069*** (.015)
Tech. distance between partners$_{it-1}$	−.256***	−.201***	−.261***

H1

H2

H3

H4b

Some conclusions

- Do networks matter for innovation?
  - > Yes, they do, but structural network characteristics matter:
    - Number of direct relationships.
    - Number of indirect relationships.
    - Structure of the overall network.
- To what extent can the network be 'managed'?
  - > Intra
  - > Inter
- Many of these findings are reproduced in the South African context.

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Questions & Discussion

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Dank jullie wel (Dutch)