Building Collaborative Networks for Innovation

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Understanding Innovation within University-Industry Knowledge Networks

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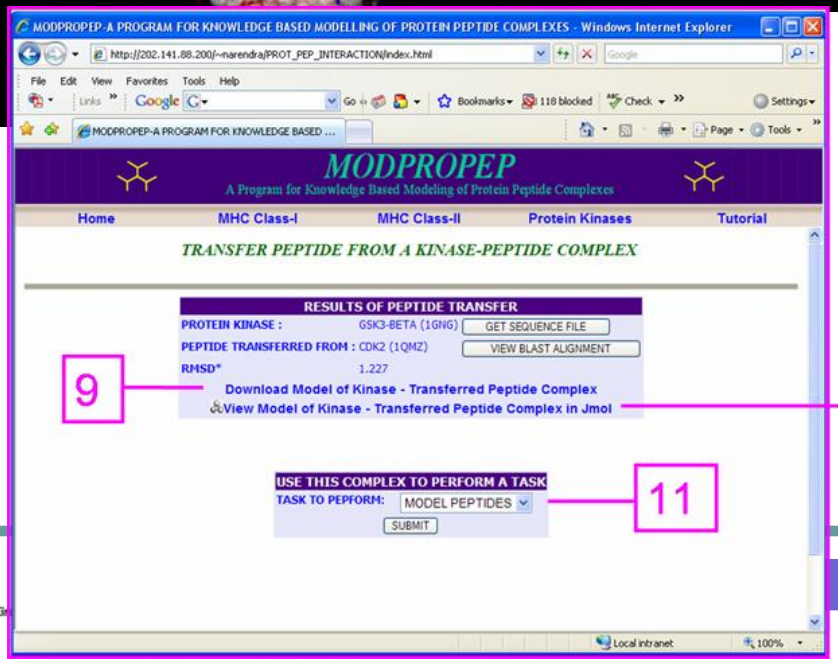
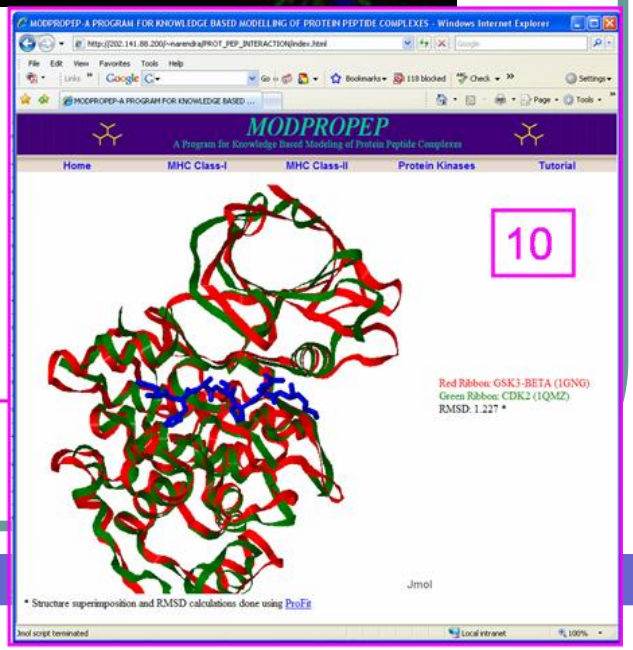
The research

- Longitudinal study of inter-organisation networks focused at the knowledge discovery phase of the life-sciences innovation process.
  - Examine how knowledge exchange occurs within these networks, with particular focus on the context, persona and structures.
  - Explore how such networks can be better managed to improve knowledge exchange and creation for mutual benefit.

Discovery science has barriers!

“If you are not a scientist then what are you?” (Interviewee C: Case 3)





Three UIKE cases

- Case 1 (1998): Originally a consortium of five pharmaceutical companies collaborating with UK university research centre. Industry funded.
- Case 2 (2003): Collaborative research venture between an Irish university research division, a government research centre and an industrial partner. Joint Industry-Government funding.
- Case 3 (2004): Research network combining research capability of two academic institutions with the R&D division of a global pharmaceutical organisation. Joint Industry-Government funding.

Overview

- Collaborative Innovation
- University-Industry advantage
- Three cases of UIKE
  - Interaction drivers
  - Network life-cycle model
  - Emergent phenomena
- Conclusions

Research collaborators

- David Kirk (University of Dundee)
- Claire Gubbins (University of Limerick)
- Kevin Philpott (UCC)
- Carol Kelleher (UCC/Cranfield University)

- Positions Open!

Collaborative innovation

- 5th Generation and Network locus
- Concern of “third mission”.
- New knowledge crucial to feed life sciences innovation process
- Desire to ‘quicken’ knowledge and technology transfer across boundaries (UIKE).

University-Industry advantage

(in collaborative discovery research)

Industry benefit

- Advancing scientific frontiers
- Increased scanning capability
- Filling of structural holes of knowledge
- Increased research capacity
- Privileged access to IPR
- Enhances information flow our of university and reduces lead-time.
- Increases ability to access world-class researchers in academia
- Creates pools of potential recruits.

University benefit

- Advancing scientific frontiers
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- Access to increased library of reagents and compounds from industry
- Demonstrates their international status and contribution to national competitiveness
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Synergies

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Commonality

- Value scientific discovery
- Increased scientific capability and knowledge pool.
- Peers and common academic heritage
- Cognitive proximity and absorptive capacity
- Mutual reliance and privileged access to scarce resources
- Common value of outputs (discovery, publications, patents etc)
- Desire to influence scientific trajectory

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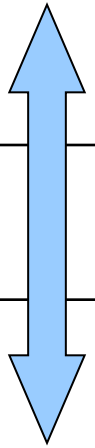
Networks are not always the Walton's

Interaction drivers

Basic Concept	Theory	Supporting Author	Spectrum
Risk Exchange and Mkt. power	Agency	Child & Faulkner (1998)	Transaction dominant
Reducing of Costs	TCE	Williamson (1985)	
Power/Conflict	Resource Dependency	Pfeffer and Salancik (1978)	
Learning & Social embeddedness	Relational Exchange	MacNeil (1980) Inkpen (1998)	
Interaction and Social Networks	Interaction	Hakansson (1982) Nohria (1992)	Trust dominant

Adapted from Donaldson & O'Toole (2007) and de Ronde (2003)

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"We wanted access to their compounds for our research and they [industry organisations] wanted access to our capability and discoveries in order to accelerate the development of these compounds into leads for drugs and new forms of income for the company" **[Case 1].**

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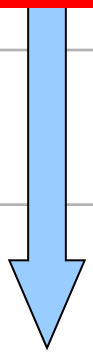
"All the original PI's [Principal Investigators] had years of co-researching prior to the funding call… for two of them it goes all the way back to sharing a lab-bench during their post-docs!" **[Case 2].**



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"As things have progressed, certain opportunities emerge… like using [the industrial partner's] chemical library as a tool for screening… Access wasn't part of the initial deal but it was still available as a resource that could be drawn on" **[Case 3].**

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LS discovery networks need to operate toward trust end of spectrum

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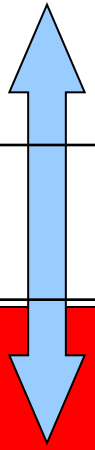
Reducing of Costs	TCE	Williamson (1985)	
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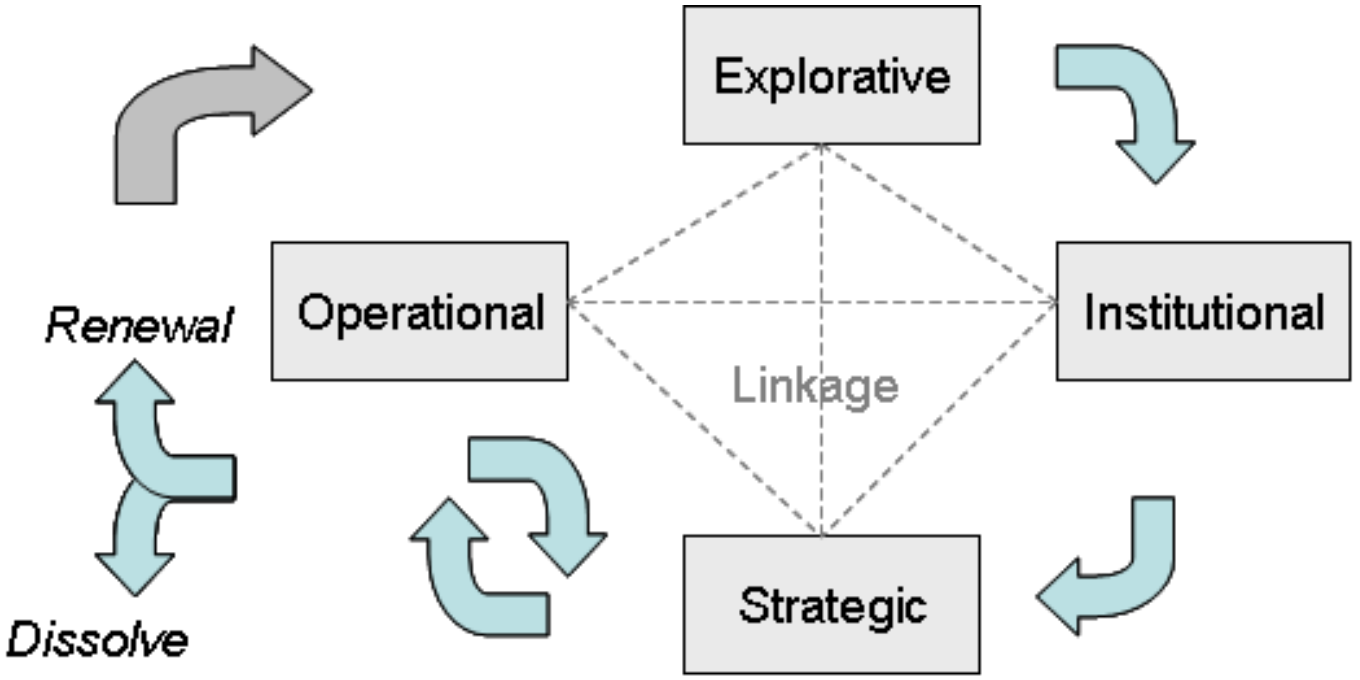
Network life-cycle model



Explorative phase

Sample Emergent Phenomena

- Key individuals behaving as knowledge brokers.
- History of interaction between key individuals.
- Trust and mutual respect between key individuals.
- University partner possessing renowned expertise and capability in area of strategic importance to industry.
- Strong synergistic opportunity offering mutual benefit
- Weak ties between industry and academia.
- Cognitive proximity between key individuals.
- Key individuals occupying positions of influence in their organisations.

"*I was fairly naive but then again if I hadn't been naive I would never have attempted this in the first place… We went around to lots of different organisations hawking ourselves, trying to persuade people to join our consortium and become involved in it"* [Case 1].

Institutional phase

Sample Emergent Phenomena

- Key individuals actively championing the collaboration proposal within their organisations to develop inter-organisational ties.
- Recognition at organisational level of the attractiveness of the opportunity.
- Acceptance by all parties of need to compromise in agreeing objectives, deliverables and contractual conditions.
- Presence of organisational representatives who have experience of inter-organisational collaborations.
- Development of structured contract that is flexible enough to allow network evolve.
- Defined long-term focus with respect to interaction allowing time to achieve goals.

"It took twelve months to agree the consortium agreement.. It wasn't due to lack of trust between the partners… just a direct result of the scale and complexity of the proposed collaboration relative to the experience of the partner organizations and a need to address the necessary background issues" [Case 2].

Strategic phase

Sample Emergent Phenomena

- Cohesive management team to oversee network direction.
- Development of routines to enhance network interaction, operations & capabilities.
- Boundary spanners that traverse structural holes and engage new members.
- Organisational representatives who are committed to collaboration.
- Frequent meetings (especially at early stages) to manage interaction & evolution.
- Evidence of both professional and social interaction facilitating trust and cognitive proximity between individuals.
- Periodic realignment of network activities with both emerging partner requirements and the scientific state of the art.

"Each company has assigned an individual to get value from the consortium and to get the information out to the relevant people within their organization. However … the relationship between the consortium and the individual companies is very much based on the relationship with that individual" [Case 1].

Operational phase

Sample Emergent Phenomena

- Agreed operating standards for undertaking and protecting research.
- Structured research portfolio aligned with networks objectives.
- Frequent interaction of staff (all levels) to strengthen ties across network.
- Operational process that nurture exchange of both explicit and tacit knowledge.
- Willingness on part of collaborating partners to surpass contractual requirements in support of network objectives.
- Production of new knowledge valuable to network members.

"things gradually built up to a point where everyone trusted what the other is doing… experimentally and after that point deliverables became much easier" [Case 3]

"*… things have evolved into fairly sincere friendships [between researchers] which ultimately eases the potential for conflict"* [Case 3].

Network evolution

"It is only after you have interacted and had the consortium going for a number of years, that people stand back and turn around and realise that, hang on, things are going well…People began to open up a bit more… there is more trust and then some more interesting compounds begin to come through to you [the network research entity]" [Case 1].

"The initial contact between the parties occurred serendipitously as C was on the review board [for the Government funding agency] and [they] recognised the synergistic research potential between the organisations; eight months later contacts were signed!" [Case 2].

"If government funds are not available to continue supporting the collaboration then possible outcomes are that the collaboration may dissolve or that an alternative network may emerge [Case 3]

Conclusions

- University-Industry collaboration at knowledge discovery phase of innovation process is less contentious.
- Importance of entrepreneurial knowledge broker as ‘network architect’.
- Research quality key factor in initially enticement of potential industrial partners.
- Management of the social as well as the technical dimensions of knowledge networks.
- Longevity builds stability but can undermine mutual reliance.
- Networks are fragile: all phases of life-cycle must be managed (including the inter-linkages).

Questions & comments

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Thank You

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Understanding discovery science

- Emergent learning arises within these communities through the sharing similar socially agreed ideas and technical skills with other peers (Brown and Duguid, 1991).
- When such interactions confront uncertainties and unknowns, new understandings are realised through the building of conceptual structures through reflection and abstraction (Von Glasersfeld, 1995).
- 'Encultured' expertise informs research practice that is embedded in specific routines and encoded in distinctive scientific language (Blackler, 1995).

University-Industry challenges

- Collaboration complicated and not the norm.
- Differing cultures, values and time-scales.
- Mutual fear of being exploited and of unknown.
- Discovery research = ‘blue-sky’ and long-term.
- Distrust of the third academic mission.
- Emerging issues: IPR and freedom to publish.

Discovery research

- ‘strategic’, ‘fundamental’, ‘curiosity-driven’, ‘researcher-controlled’, ‘autonomous’.
- “no practical application in mind”
- “the experimental and theoretical work undertaken to acquire new knowledge without looking for long-term benefit other than the advancement of knowledge” (ANZSRC definition)

Uke (Judo)

Managing collaboration within knowledge discovery networks

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University College Cork, Ireland

University-Industry advantage (in collaborative basic research)

Industry benefit

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