NIFU
Nordic Institute for Studies in Innovation, Research and Education

MCI MANAGEMENT CENTER INNSBRUCK

CIRCLE

THE IMPACT OF CORPORATE GROUP AFFILIATION AND KNOWLEDGE BASES ON INNOVATION COLLABORATION ABROAD

SVERRE J. HERSTAD, CIRCLE Lund University & NIFU, Oslo
BERND EBERSBERGER, Management Center Innsbruck
BJØRN ASHEIM, CIRCLE Lund University
December 2012

sverre.herstad@nifu.no / bernd.ebersberger@mci.edu / bjorn.asheim@circle.lu.se

Motivation

- Innovation is becoming globally distributed
- What is the role of the MNE in this respect?
  - Beyond intra-group technology transfer
- All-encompassing or conditioned by the nature of technology and knowledge involved?

Plan for the presentation.

- Motivation
- Conceptual building blocks
- Hypotheses
- Data & measures
- Findings

BUILDING BLOCKS.

International innovation collaboration

- Allows the firm to tap distant knowledge assets
  - Disembodied and evolving
- (Cognitive) breadth
  - The number of different partner types with which a collaborative linkage is maintained
- Contingent on prior search (opportunity identification) and absorptive capacity (transfer & assimilation)

- Distance (geographical, cultural, institutional) reinforces constraints of search, knowledge transfer and absorptive capacity

- Constraints are dependent on the **knowledge base** of the focal firm
  - Analytical (science-based; know-why)
  - Synthetic (engineering-based; know-how)
  - Symbolic (designs, images and symbols; know-who)

- Constraints are specific to various **network configurations**
  - Inter-regional scope versus intra-regional breadth

Analytical knowledge base

- Knowledge development is based on 'learning-by-studying' and **inputs from the science system**
  - E.g. biotechnology, chemicals
- The process of identifying such inputs is enabled by the flow of information in global 'epistemic' communities
- Engaging with other analytical knowledge base partners at a distance is lubricated by commonly **accepted professional languages**
  - Supportive of geographical scope
- **Search spaces** and organizational routines are **rather narrow** which reflect specific form of knowledge development
  - Constraint on network breadth

Synthetic knowledge base

- Integrative knowledge development drawing on **various inputs** from scientific and non-scientific sources; innovation activities focused on **attaining** specific **functional goals**

- Knowledge is created in an **inductive process** of testing, experimentation and other forms of 'situated' practical work

- Partner identification is contingent exposure to information which may be highly localized; and **tacit knowledge** may require proximity during interaction
  - Constraint on geographical scope

- Organizational routines evolve through **broad partner interaction**
  - Supportive of further network broadening

Symbolic knowledge base

- The **creation of meaning and desire** as well as aesthetic attributes of products, such as designs, images and symbols
  - E.g. advertising, fashion, media, design
- Inputs are **aesthetic** rather than technological
- Requires specialized abilities in creativity and interpretation of signals which are **highly specific to social & cultural contexts**
  - Strong constraint on geographical scope; breadth contingent on (cultural & institutional) proximity

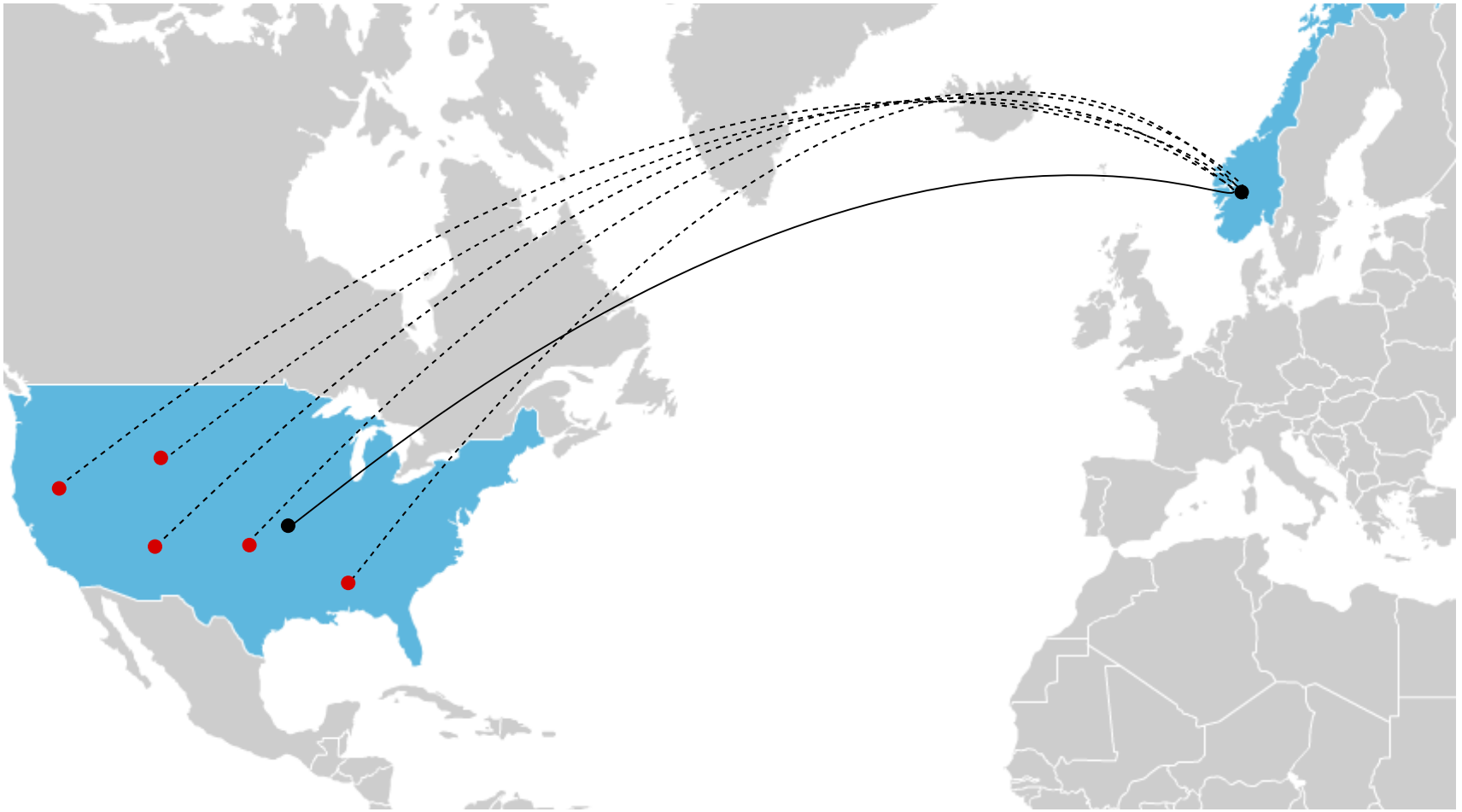
Multinational companies.

- MNCs are networks of companies with a complex set of relational ties
  - through international presence
  - spanning different cultural and business contexts

- From the perspective of a domestic affiliate two modes of presence in a world region
  - strong presence / strong linkages – collaborative linkages with another subsidiary in that region
  - weak presence / weak linkage – HQ is located in that region

Research question.

- Does the presence of a Norwegian company abroad affect the breadth of its collaboration network in the respective world region?
- Does the effect depend on:
  - knowledge base (analytical / synthetic / symbolic)
  - mode of presence in the region (subsidiary / HQ)?



DATA & MEASURES.

Data.

- Norwegian Innovation Survey 2010
  - national wave of the CIS 2010
  - pretested, collected and cleaned by Statistics Norway
    - 3,419 firms in manufacturing and KIBS
    - 1,501 innovation active
- Firm level data about
  - innovation input
  - innovation output
  - innovation activities / behavior
    - collaboration
    - information search
    - ...
  - based on OECD‘s Oslo Manual

Measures.

- International collaboration (continuous variable)
  - Differentiating four world regions
    - Norway / Nordic countries / Europe (w/o Nordic countries) / US
  - For each region and for each partner type (customers / suppliers / consultants / competitors / universities / research inst. / R&D labs) binary variable indicates innovation collaboration in the data

  - Involvement index (Bozeman & Gaughan, 2011; Gaugan & Corley, 2010; Ebersberger & Herstad, 2013)
    - Additive index of collaboration
    - Weights for each collaboration = inverse of relative frequency of collaboration in the NACE 2-digit industry

  - Involvement index
    - weights up rare collaboration
    - weights down common collaboration in the industry

Measures.

- Knowledge bases (binary variables)
  - Analytical knowledge base
    - Information from science sector more valuable than from any other source
  - Synthetic knowlege base
    - Not analytical
    - Engineering competence available **in** the firm
  - Symbolic knowledge base
    - Not analytical & no engineering competence available in the firm
    - Competences in design, web and multimedia available in the firm
- Presence in the world region (binary variables)
  - HQ (Norwegian firm is part of an MNE headquartered e.g. in US)
  - Subsidiary (Norweg. firm is part of an MNE with coll. subs. e.g. in US)
- Interaction of knowledge base and presence

Measures.

- Controls
  - Size
  - Innovation intensity
  - External innovation exp. domestic / international
  - Part of a Norwegian MNE
  - Public funding domestic / international
  - Market presence local / domestic / EU / internatioal
  - Protection strategies formal / strategic
  - Factors hampering innovation market / financial
  - Sector controls (~NACE 2 digit)
- Method
  - Probit to identify innovators
  - SUR for the international collaboration (NO, ND, EU, US)

FINDINGS.

Table 4: Effect of weak presence (headquarter location) in the world region on the breadth of the firm's network linkages in the region

Knowledge base	Norway	Nordic	EU	United States
I – Symbolic	0.072	-0.01	-0.04	-0.859
II - Synthetic	-0.395***	-0.021	0.005	-0.222*
III - Analytical	-0.251	0.41	-0.645**	0.402
Significance of difference in impact between knowledge bases				
I vs II	7.51***	0.01	0.07	0.95
I vs III	1.26	1.74	5.34**	2.56
II vs III	0.28	1.92	7.61***	1.77

Note: ***, **, * indicate significance on the 1%, 5%, 10% level.

Table 5: The effect of strong presence (direct coll. with another subsidiary) in the world region on the breadth of the firm's network linkages within it

Knowledge base	Norway	Nordic	EU	United States
I - Symbolic	1.835***	0.616***	0.319	0.565
II - Synthetic	1.240***	1.043***	0.591***	0.936***
III - Analytical	1.110***	0.540*	0.197	-
Significance of differences between knowledge bases				
I vs II	8.15***	5.00**	1.57	0.64
I vs III	4.90**	0.06	0.18	-
II vs III	0.18	2.92*	2.78*	-

Note: ***, **, * indicate significance on the 1%, 5%, 10% level.

Findings.

- Impact of presence is contingent of the mode of presence
  - HQ do by and large not affect the breadth of the collaboration network
- Impact of strong presence is contingent on the knowledge base.
- Symbolic knowledge base
  - symbolic knowledge base is context specific / impact is more sensitive of cultural and social proximity
  - MNE does not really overcome this in EU and US

Findings.

- Synthetic knowledge base
  - synthetic knowledge is contextual to a certain degree but not as culture specific (as symbolic)
  - it has some tacitness to it
  - it is multi-disciplinary
  - it is sensitive to proximity (search constraints and face-to-face interaction)
  - subsidiary presence seems to be conducive to maintain a broader network and transfer this knowledge.
  - subsidiary presence works as a platform for search and collaboration

Findings.

- Analytical knowledge base
  - Codified, not contextual in itself
  - Yet breadth of collaboration requires proximity (cf impact on subs in Norway)
    - this is because breadth of collaboration extends beyond the science system
  - No impact of presence on breadth.
    - either no need for subsidiary presence or
    - subsidiary can channel knowledge from its broad network without loss and no need for a broad network

THANK YOU.