Firm ownership and university industry linkages in Brazil and South Africa

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Outline

1. Interactions between firms and universities and GINs.
2. Exhibit A: interaction between firms and universities in the south (MCA analysis).
3. Exhibit B: case studies (Brazil and South Africa).
4. Exhibit C: research agenda.

Challenges

1. Theoretical gap:
   - GINs, university/firm linkages, and international cooperation
   - University/firm linkages+international cooperation + GINs
2. Innovation Surveys: aggregation problems
3. Absence of focused case studies and data
   - INGINEUS SURVEY
   - CASE STUDIES

NIS, interactions and hierarchies

1. NIS' maturity matter.
2. There are many possible types of interactions
3. There are many shapes for GINs.
4. Local subsidiaries have varying degrees of operational freedom (if any).

NIS Center

LOCAL

UNI

MNC (HQ)

LOCAL

UNI

MNC

Global R&D network of MNCs

MNC (SUB)

UNI

LOCAL

UNI

MNC (HQ)

MNC (SUB)

LOCAL

NIS Periphery

Type 1: Local-local

1. Interactions between local firms and local universities.
2. Does not involve cross-border transfers of knowledge.
3. Can be a first step for internationalization.

Type 2: MNCs phone home

1. MNCs HQs and subsidiaries interact with home country universities.
2. Typical relationship reported in the literature on internationalization of R&D.
3. No R&D activities or the R&D activities in host country / R&D centralized at the HQ.

Type 3: host country connections

1. More recent type of interaction.
2. MNCs HQs and subsidiaries interact with home country and local universities.
3. Broader division of innovative labor within the MNC.
4. The nature of this relationship will depend on the nature of the subsidiary's role within the MNC.

Type 3: host country connections

5. Firms (local or transnational) may establish contact with one specific university (local or foreign) to exploit advantages from other universities.

6. Scientific and education networks can shape the broader network.

Type 4: international consortia

1. This type involves firms, universities and research institutions.
2. Usually coordinated by the academic side of the interaction.
3. Triggered by intergovernmental cooperation and international institutions (WHO).
4. Can be “mission-oriented” and necessarily non-hierarchical.

NIS Center

LOCAL

UNI

MNC (HQ)

LOCAL

UNI

MNC

Global R&D network of MNCs

MNC (SUB)

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MNC (HQ)

MNC (SUB)

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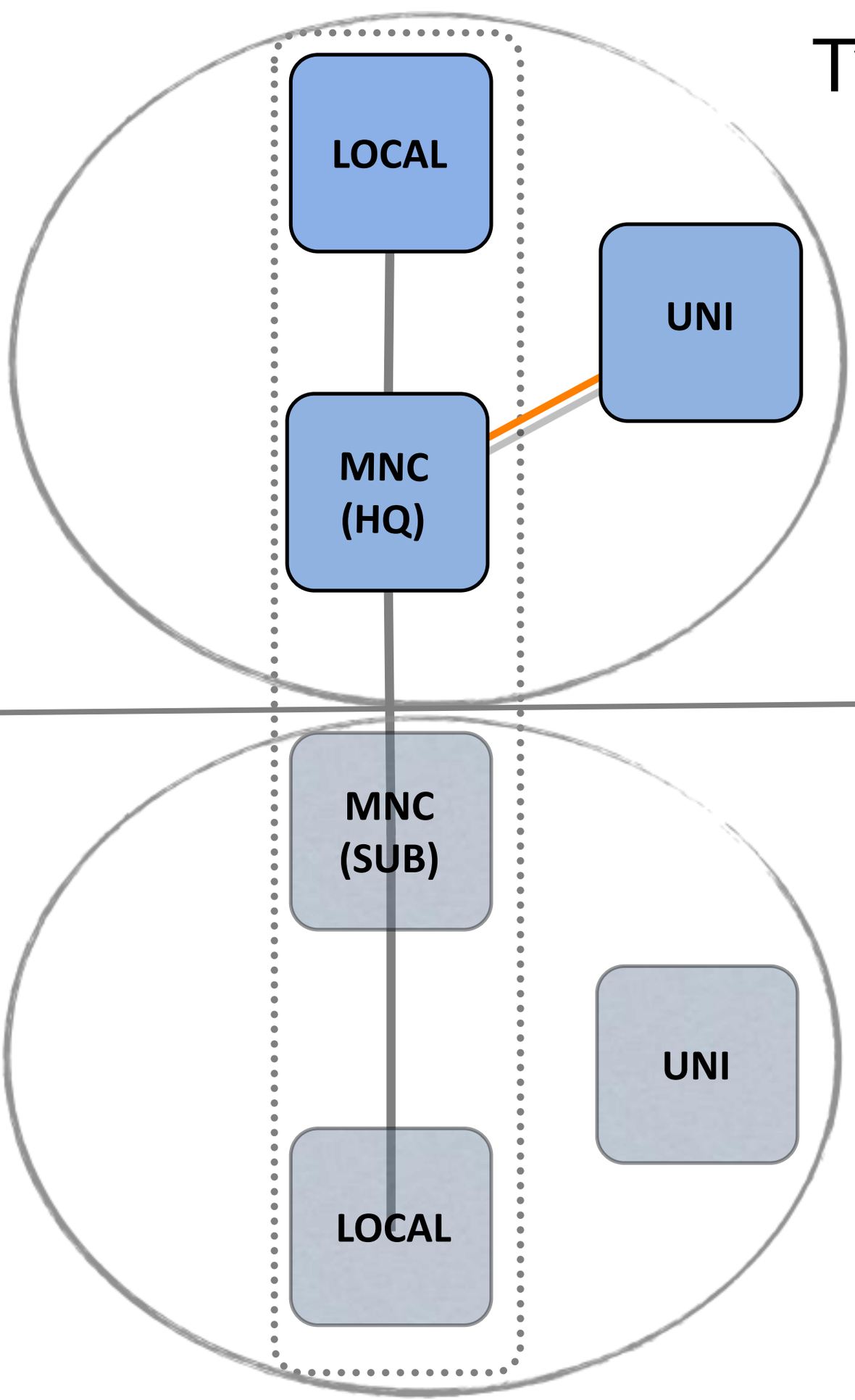
NIS Periphery

Type 1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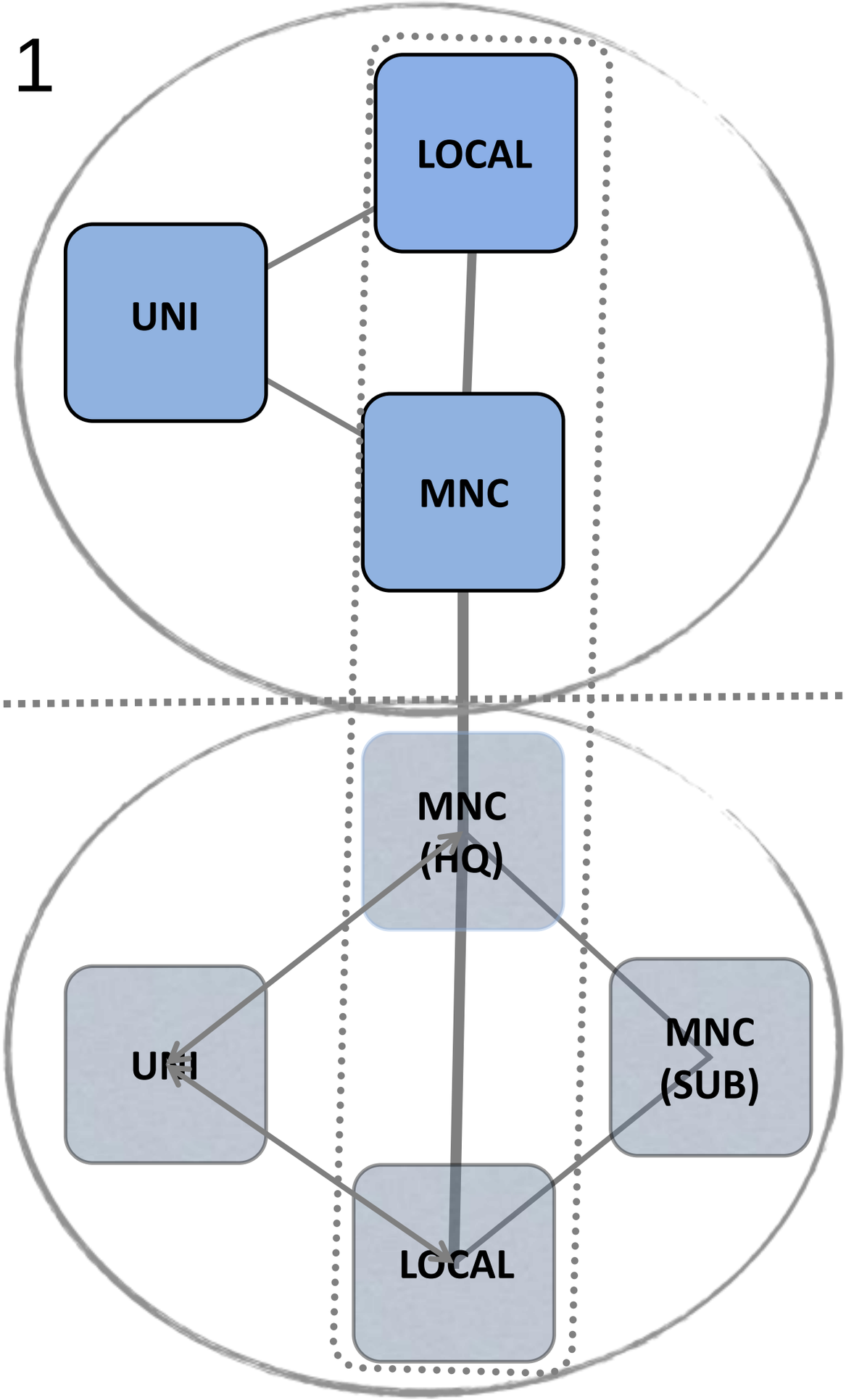
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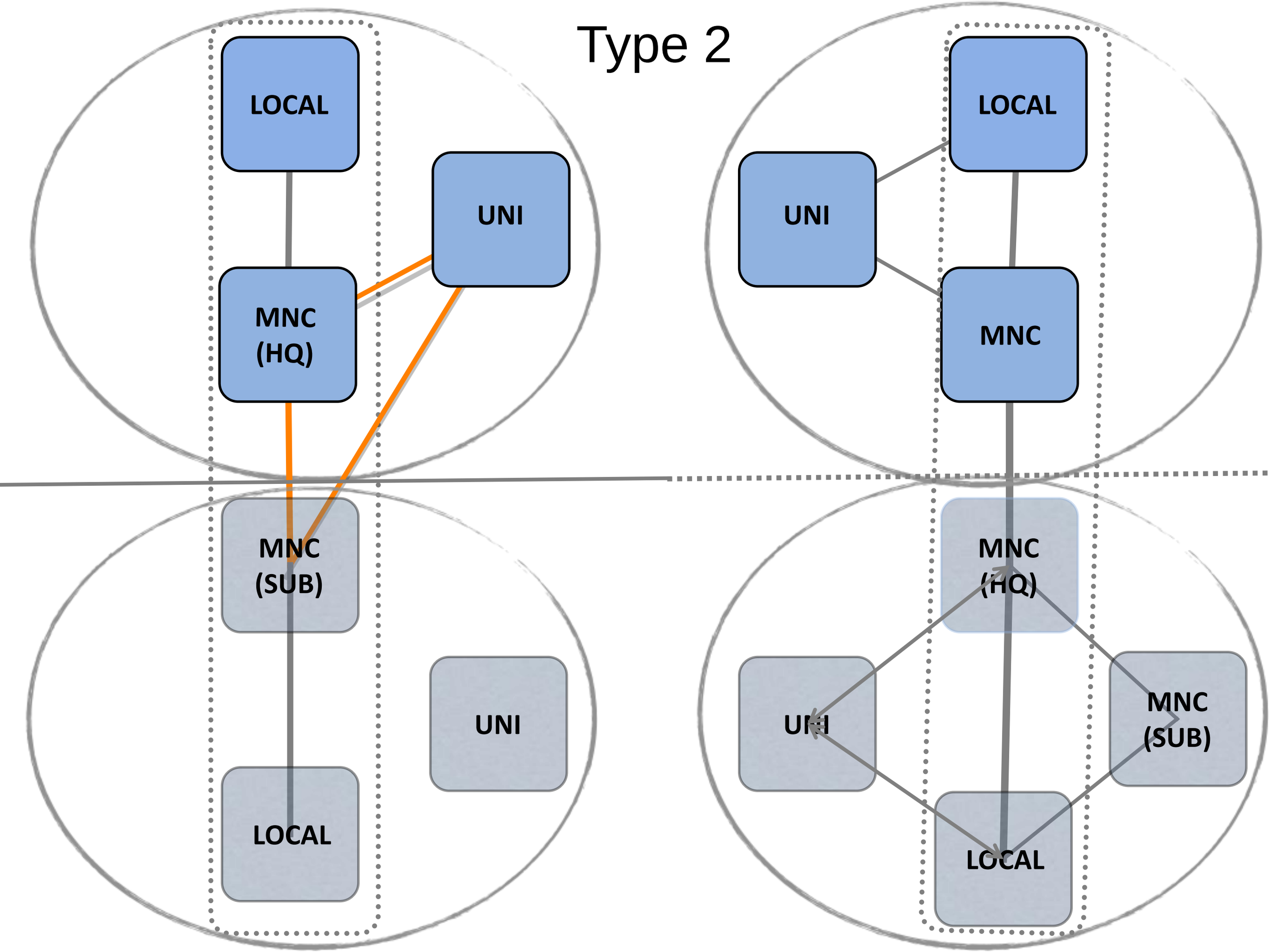
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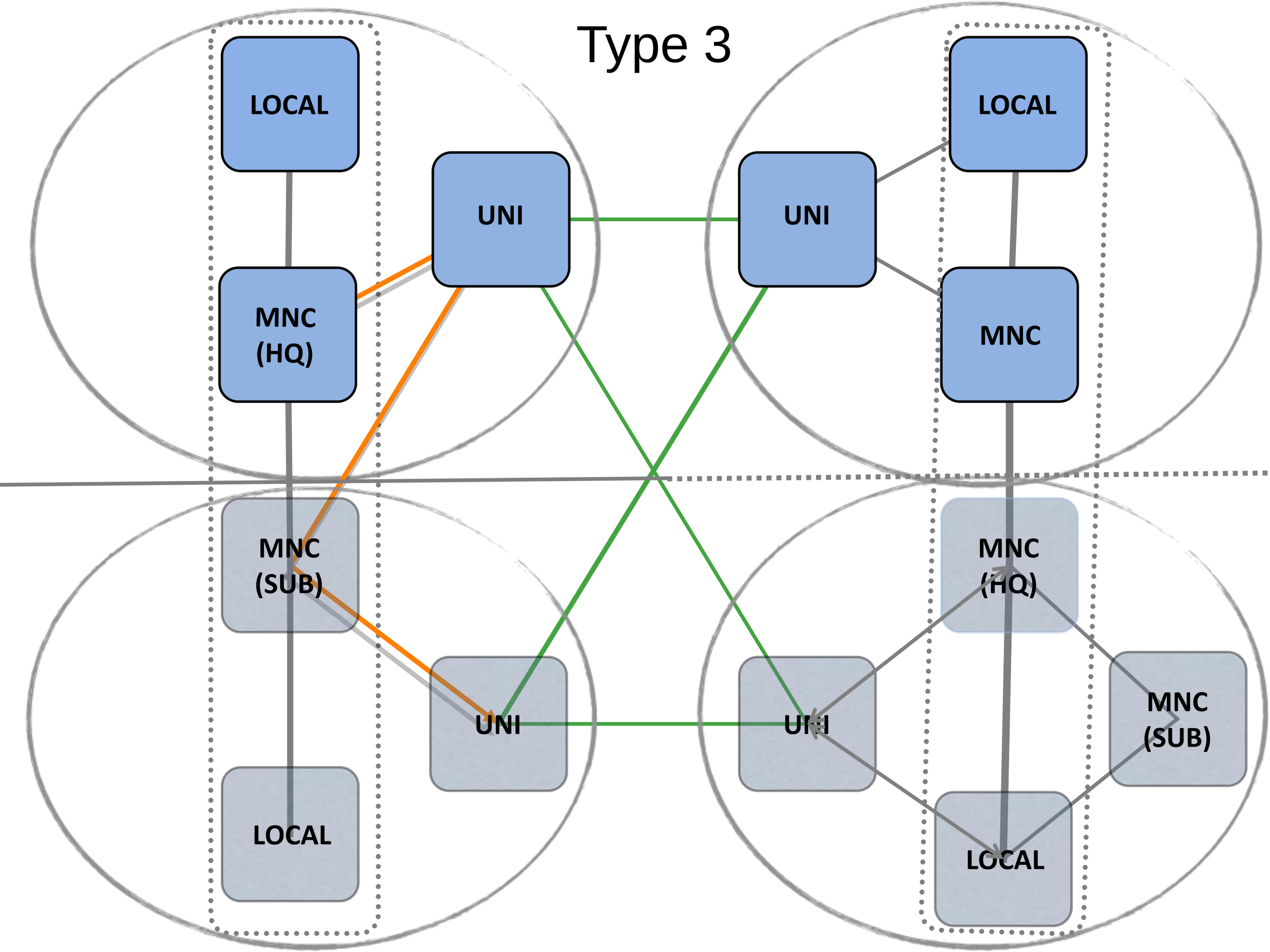
Type 3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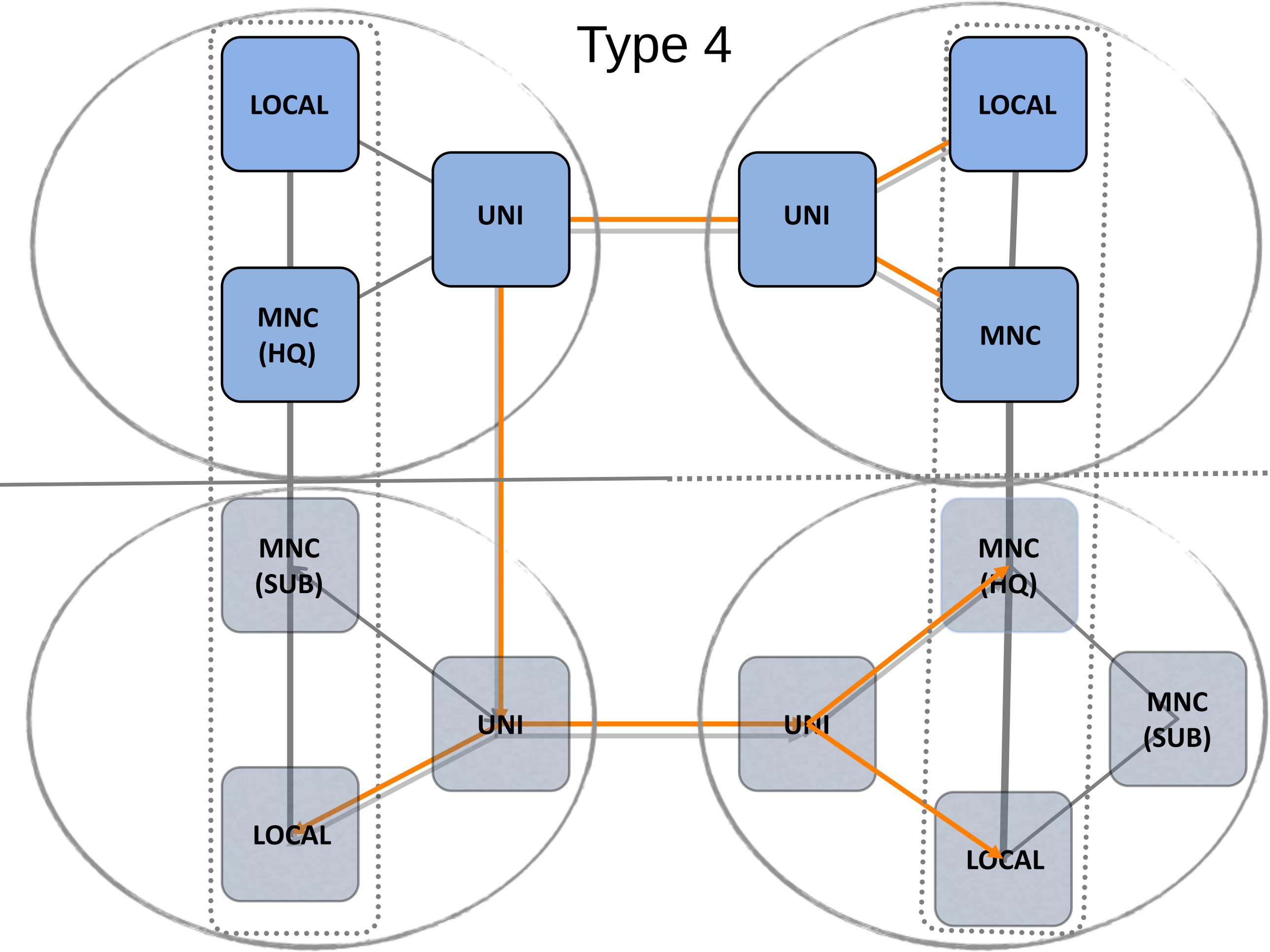
Type 4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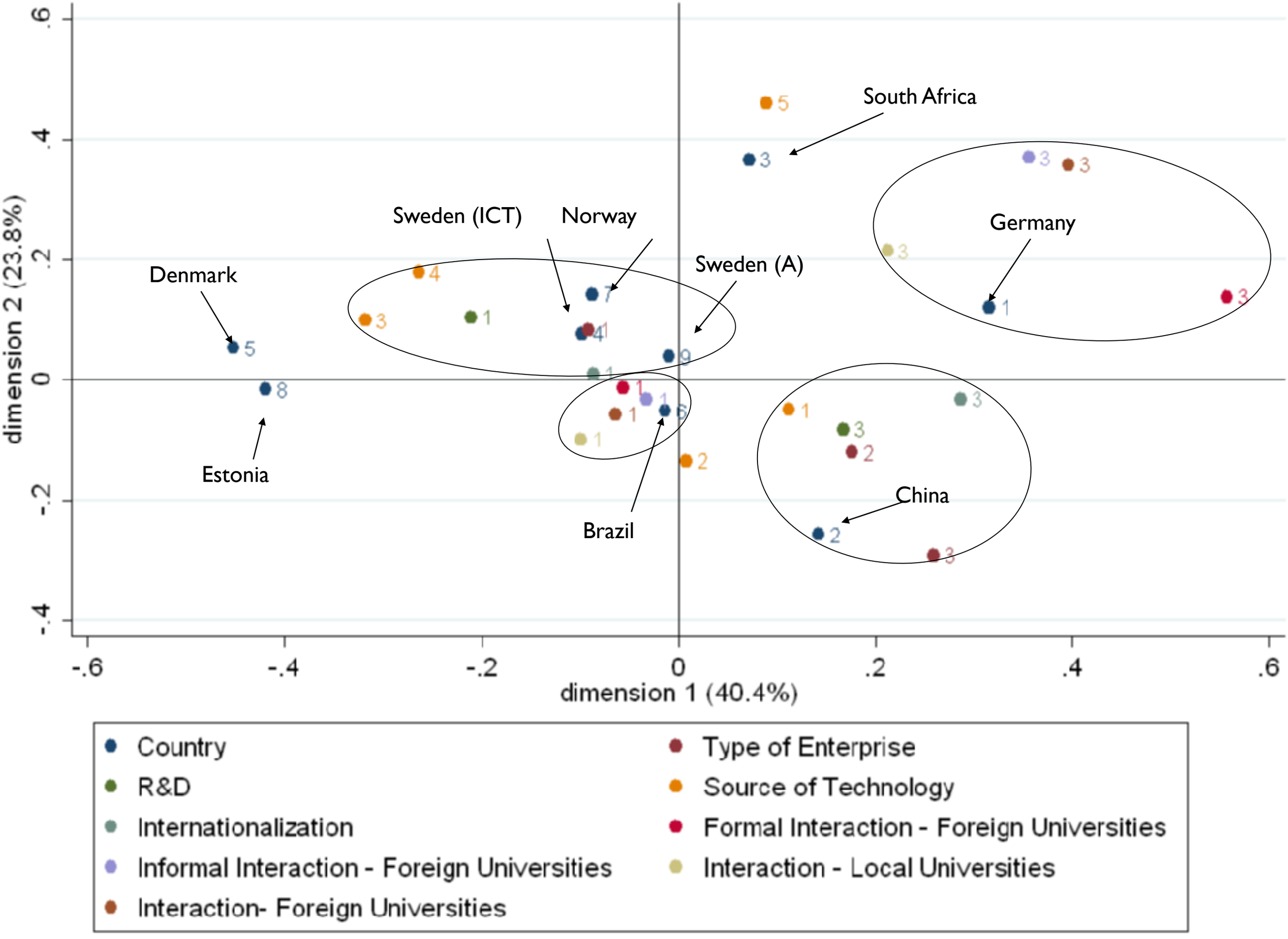
University-Firm Links and GINs

1. NIS' maturity influence GIN formation and shape.
2. NIS's maturity associated with different types of university-firm interactions.
3. MNC division of labour shape GINs.
4. Disruptive factors:
   - Southern MNCs
   - International University and Education Networks.

Brazil and South Africa

1. Immature NISs.
2. Red Queen Effect: not moving fast enough.
3. MNCs have a large share of total R&D expenditures.
4. Nature and sectoral position of MNCs matter.


South Africa
Sweden (ICT)
Norway
Germany
Sweden (A)
Denmark
Estonia
Brazil
China
dimension 2 (23.8%)
dimension 1 (40.4%)
.6
.4
.2
0
-.2
-.4
-.6
Country
R&D
Internationalization
Informal Interaction - Foreign Universities
Interaction- Foreign Universities
Type of Enterprise
Source of Technology
Formal Interaction - Foreign Universities
Interaction - Local Universities

MCA (Profiles)

- South Africa: universities and research institutes as main sources of technology.
- Brazil: relative lack of formal or informal interactions with local or foreign universities.
- Germany: close to all categories related to interactions between universities and companies are in this profile.

MCA (Profiles)

- China: significant R&D and a degree of internationalization of R&D or production processes. MNCs HQs and subsidiaries are related to this profile.
- Nordic profile: standalone companies, lack of R&D and purchase of knowledge from other companies.
- Estonia and Denmark: no clear profile.

Case Studies: Auto and Agro

- Confirmed and refined the broad strokes from the MCA analysis.
- Clear division of labour between home and host R&D departments.
- Relative weakness of local GIN and MNCs' presence shape interactions.
- MCSs' internal hierarchy shape extent of local innovative effort.

Case Studies: Auto and Agro

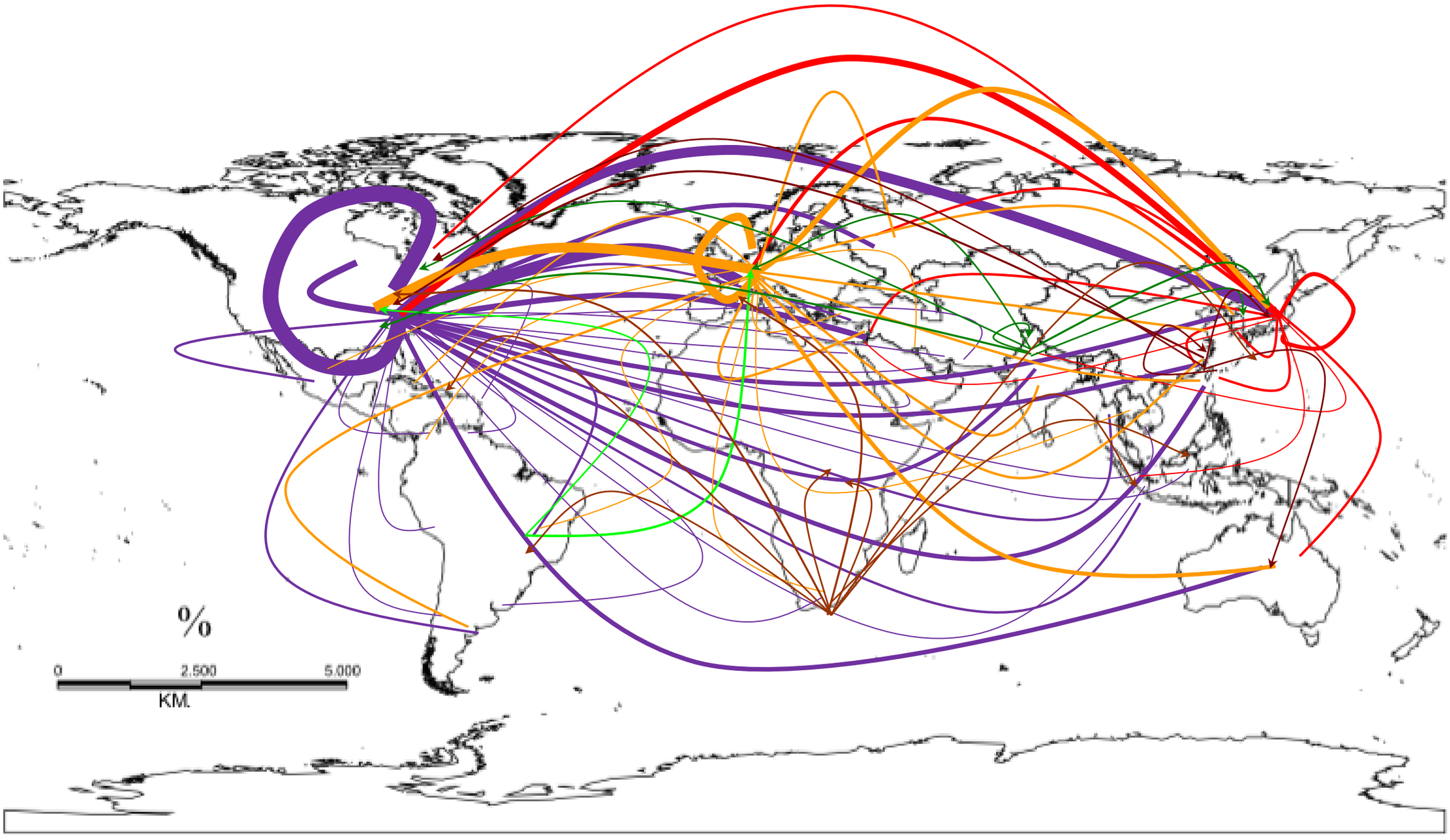
- SA: stronger university-industry interaction.
- Brazil: dependence on informal links and personal individual connections.
- Hierarchical relationships are dynamic: network improvement over time.
- Local R&D teams create can start their own dynamics.
- Informal links to universities may develop over time into formal networks.

Future Research Agenda

"*There is no data like more data*".

- Search for university-industry links on patents data (USPTO).
- Demographic trends and NIS dynamics.
- Income distribution shifts and innovation dynamics.
- Horizontal vs. Vertical instruments to fund innovation.
- Dynamics of large local economic groups.

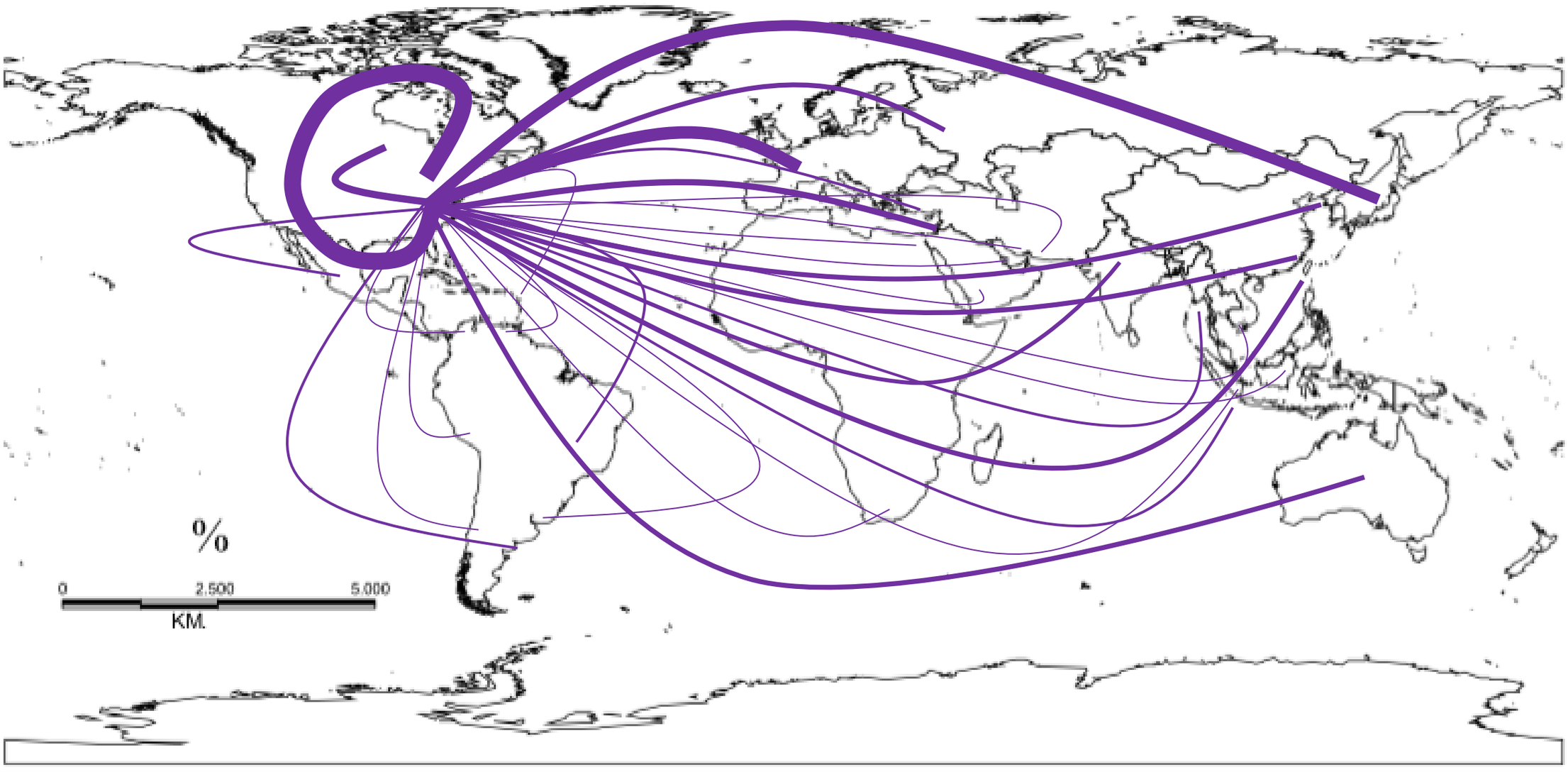
Knowledge flows - “World” (2009)



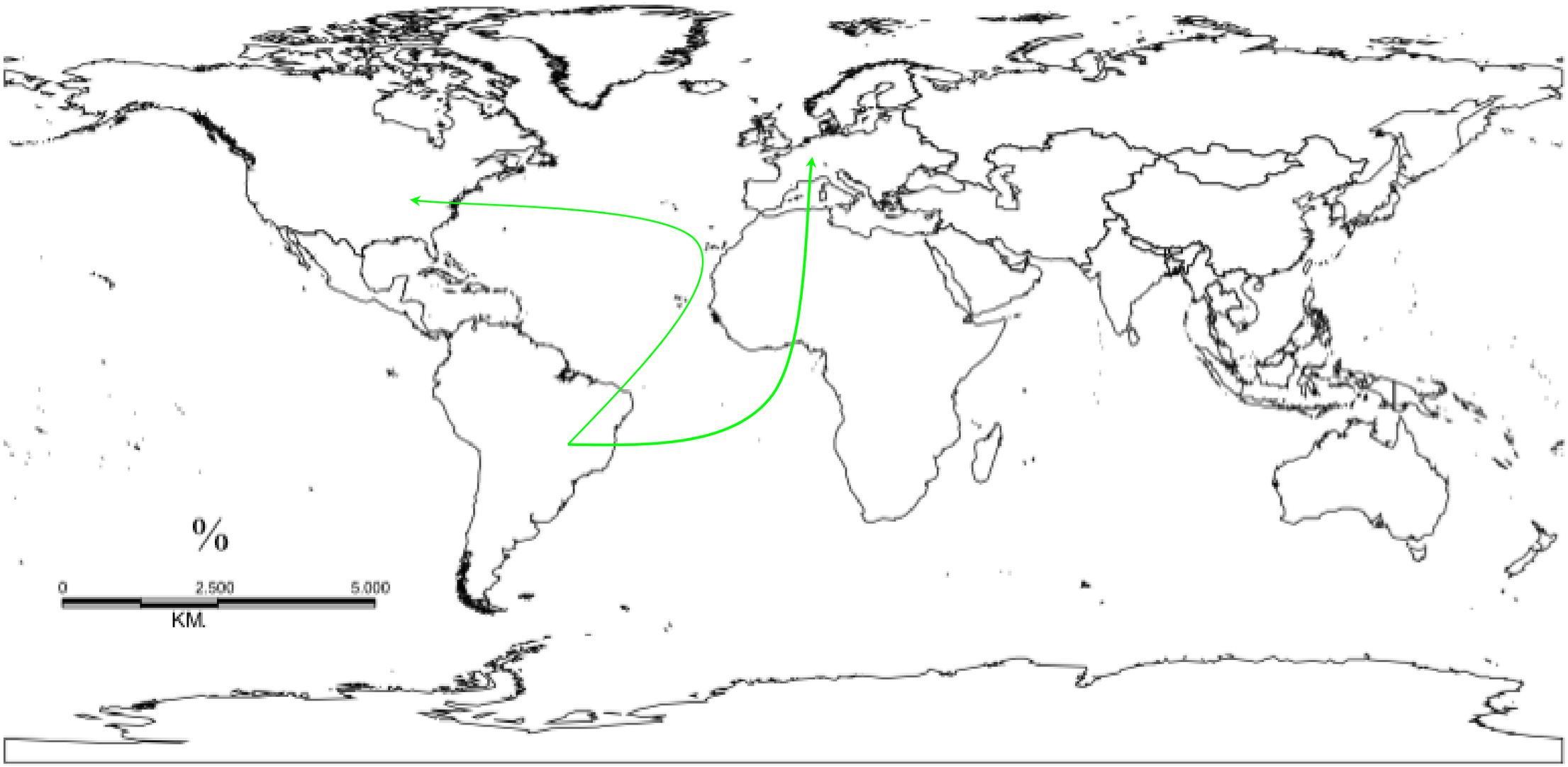
83,000 patents - 156,000 citations

Knowledge flows - “Europe” (2009)

Knowledge flows - USA (2009)

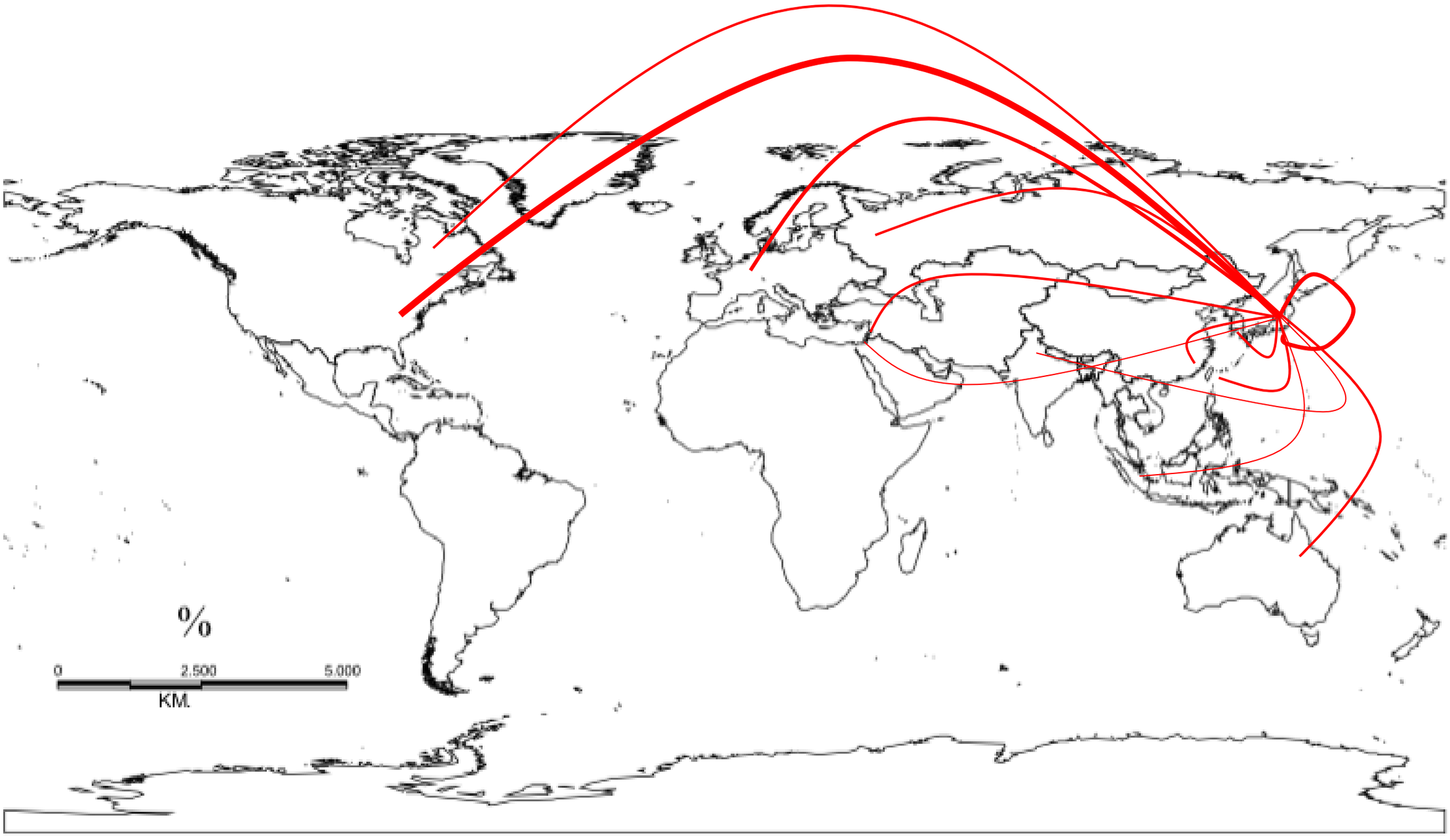


Knowledge flows - Brazil (2009)

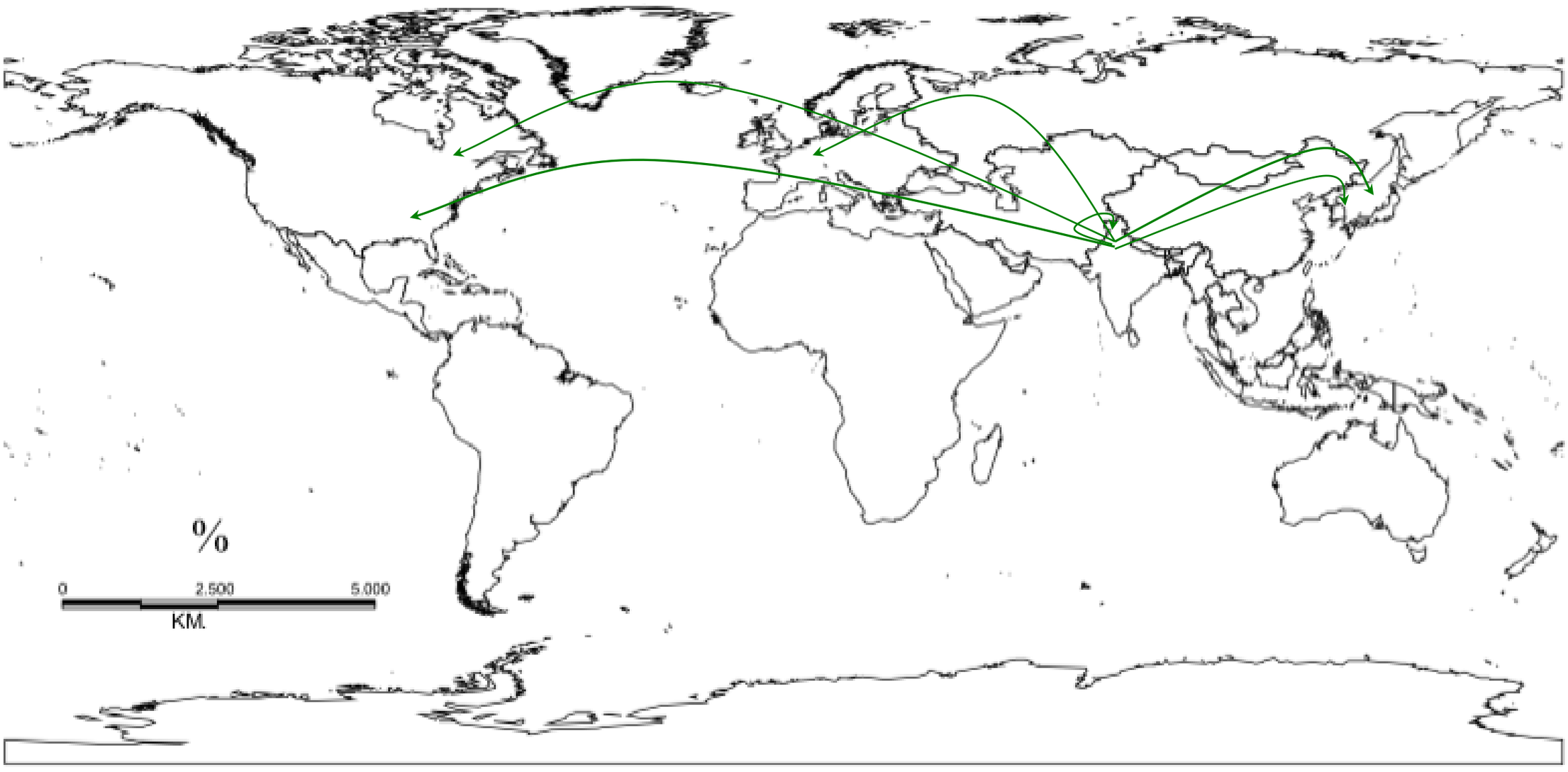


Knowledge flows - South Africa (2009)

Knowledge flows - China (2009)

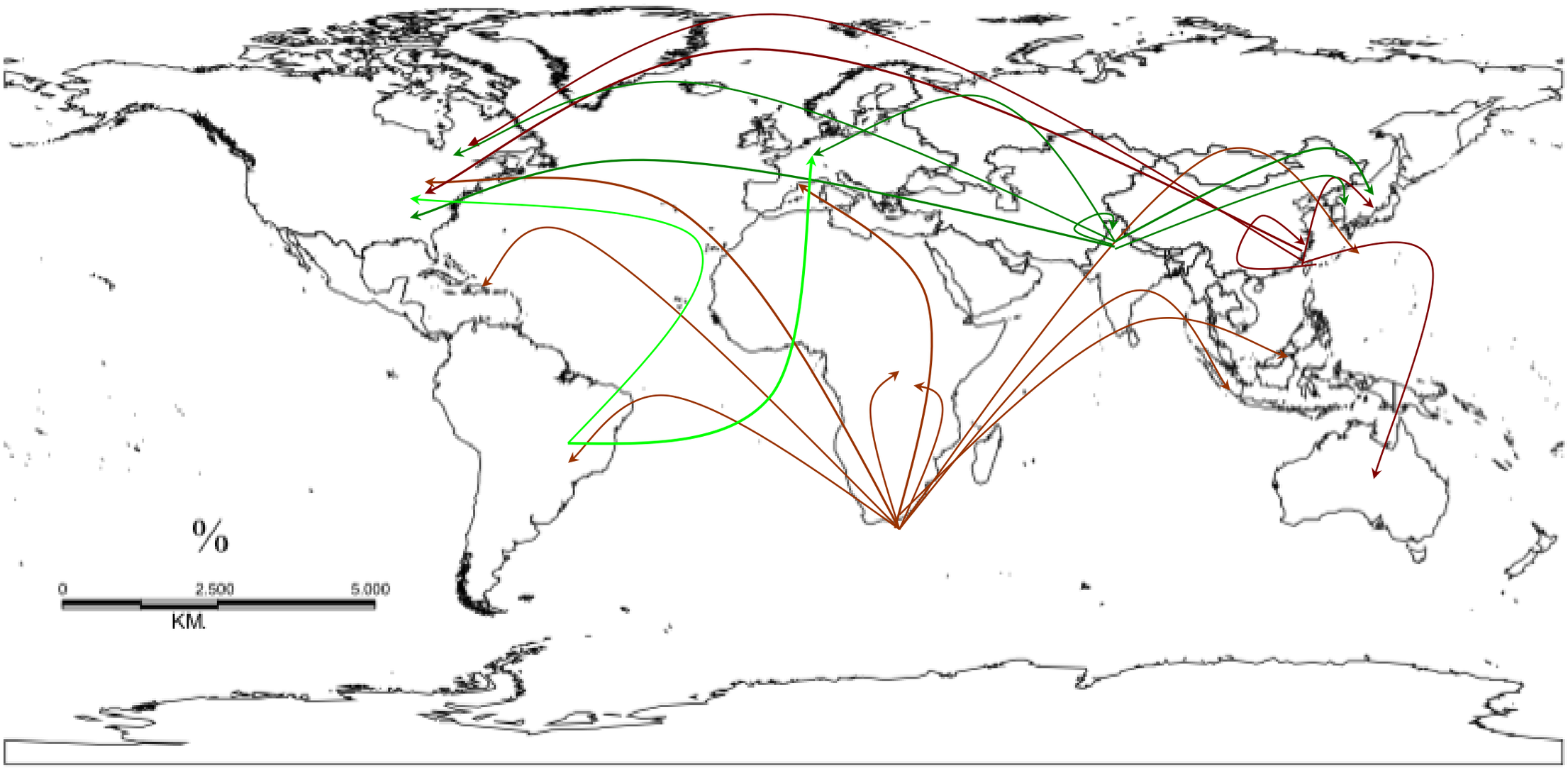


Knowledge flows - India (2009)



Knowledge flows - China (2009)

Knowledge flows - “South” (2009)



Thanks for your attention/questions

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