

Technology transfer and local innovation in the Thai wastewater treatment industry: Evidence from Clean Development Mechanism Projects

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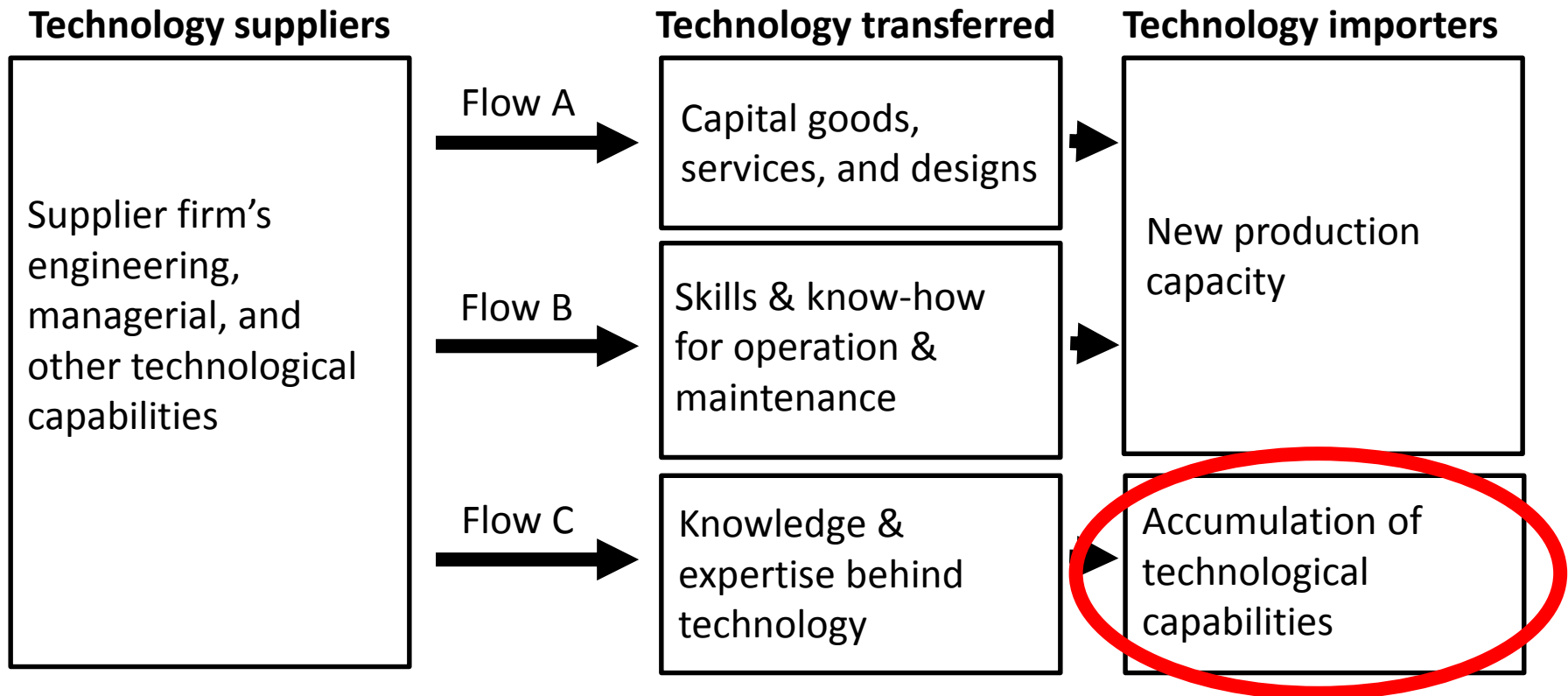


International transfer of environmentally friendly technology

- Environmental stress in Global South due to increasing and interconnected resource demands
- Inventive activity for environmentally friendly technologies mainly takes place in high-income countries
- Diffusion of these technologies in low and middle income countries involves technology transfer
- Successful technology transfer requires transfer of capabilities to use and produce technology



Theoretical framework



Method

- Case study of wastewater treatment technology using anaerobic digestion (AD) in Thailand's agricultural and agro-processing industries
- Focus on Clean Development Mechanism projects
- Determine organisational arrangements used to supply AD reactors in individual projects
 - Trade, foreign direct investment, joint ventures, technology licensing, imitation, joint research & development initiatives, and local innovation
 - Organisational arrangements as indicators for quality of technology transfers

Method (cont.)

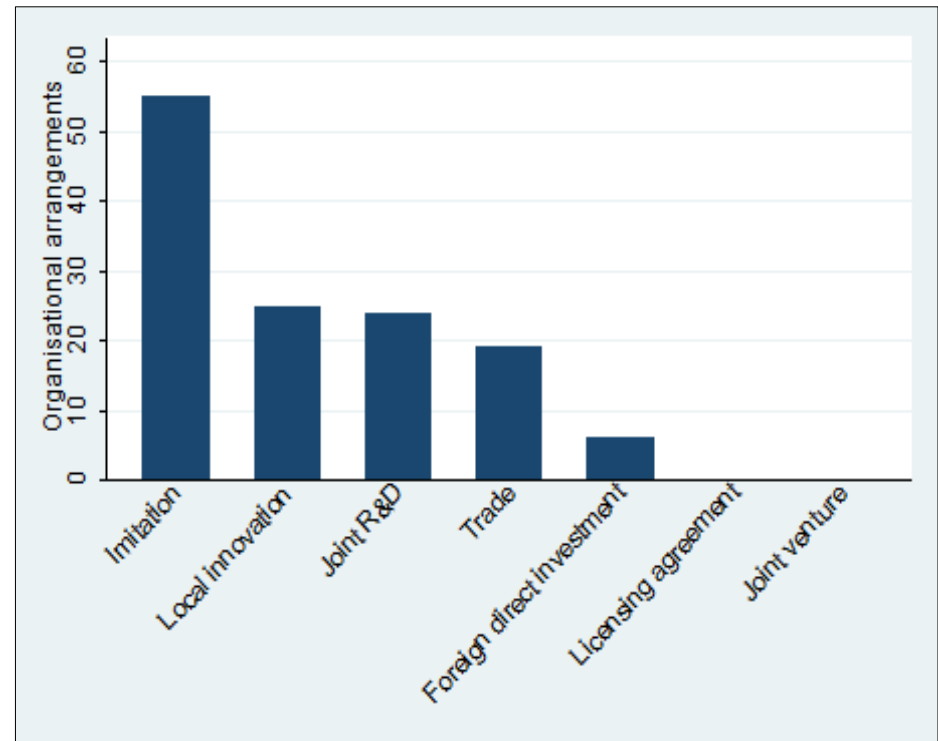
Organisational arrangement type	Location of company in charge of detailed design & engineering	Location of ownership of design & engineering company	Location of technology ownership	Origin of technology
Trade				
Foreign direct investment				
Joint venture				
Licensing agreement				
Imitation				
Joint R&D				
Local innovation				

Method (cont.)

Organisational arrangement type	Location of company in charge of detailed design & engineering	Location of ownership of design & engineering company	Location of technology ownership	Origin of technology
Trade	External	External	External OR N/A	External
Foreign direct investment	Internal	External	External OR N/A	External
Joint venture	Internal	Shared	External OR Internal OR N/A	External
Licensing agreement	Internal	Internal	External/conferred	External
Imitation	Internal	Internal	N/A	External
Joint R&D	Internal	Internal	Internal OR shared OR N/A	Shared
Local innovation	Internal	Internal	Internal OR N/A	Internal

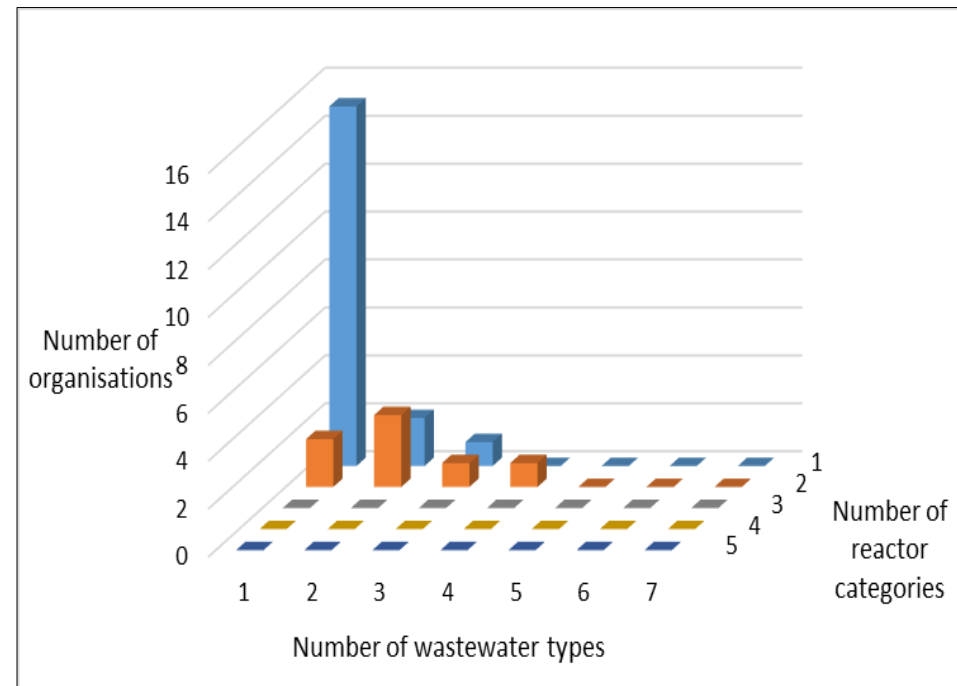
Results

- 81 CDM projects
- 129 organisational arrangements (one per project location & reactor type)
- Distribution of organisational arrangements suggests that
 - Thai firms hold high levels of technological capabilities (imitation, local innovation)
 - Transfer of technological capabilities (joint R&D)
 - Limited involvement of foreign-based companies (trade, FDI)



Results (cont.)

- Firms which ‘imitate’ acquire technological capabilities in different ways, e.g.:
 - Labour turnover
 - Learning by using
- Industry fragmentation
 - Most companies only supply a single reactor type for a single wastewater type



Lessons for technology transfer policy

- Need for precise definitions of what technology transfer means
- The role of organisational arrangements for technological learning
- Technology characteristics affect transferability



Thank you for your attention.

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References

- BELL, M. (1990) *Continuing industrialisation, climate change, and international technology transfer*, SPRU: University of Sussex.
- LEMA, A., LEMA, R. (2013) Technology transfer in the Clean Development Mechanism: Insights from wind power. *Global Environmental Change*, 23, pp. 301-313.
- LEMA, A., LEMA, R. (2016) Low-carbon innovation and technology transfer in latecomer industries: Insights from solar PV in the Clean Development Mechanism. *Technological Forecasting and Social Change*, 104, pp. 223-236.
- OCKWELL, D.G., HAUM, R., MALLET, A., WATSON, J. (2010) Intellectual property rights and low carbon technology transfer: Conflicting discourses of diffusion and development. *Global Environmental Change*, 20, pp. 729-738.

