Promoting knowledge transfer and commercialisation: Strategies for knowledge transfer from universities and public sector research organisations in Vietnam

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Recognising that the next phase of Vietnam's development will involve a greater focus on innovation and on building innovation capability in enterprises, there is increasing policy interest in the role of universities in contributing to the development of innovative enterprises.

This report is intended to provide an overview of international studies of knowledge transfer from universities and public research organisations to industry and other users. It incorporates case studies of the development of knowledge transfer policy and performance in four countries: the United States, Australia, China and Taiwan. These case studies also draw on studies and the evaluations of government policies to identify the barriers that have been identified as impeding effective knowledge transfer.

Perspectives from international experience

- Universities are playing increasingly active roles in a widening range of knowledge transfer channels and those roles are recognised as important for the performance of innovation systems. For this reason, they are a focus for policy intervention at national and regional levels.
- Many businesses interact with Research Transfer Offices (RTOs) for business-related goals (including support for improving management, strategy or operations) as well as innovation-related goals.
- The technological relatedness between new knowledge and the knowledge base of an enterprise, and the technological capability of an enterprise are two of the most important determinants of the success of knowledge transfer.
- Patenting/licensing channels account for only a small part of knowledge transferred from RTOs to industry; and overall income from knowledge transfer– and hence too much focus on this channel can reduce overall knowledge transfer. Only a small part of the knowledge created in research and technology organisations can be codified in patents.
- Knowledge transfer organisations need to reach a critical size to retain the required range of staff to be effective; they need to recruit qualified and experienced staff to be effective. Most knowledge transfer organisations are cost centres, rather than revenue generators. Knowledge transfer approaches that seek revenue maximisation can lead to knowledge transfer organisations becoming bottlenecks rather than facilitators of knowledge transfer.
- For many companies, difficulty finding an RTO partner and concerns about a lack of capability for effective collaboration and knowledge acquisition are often major constraints for business enterprises. Relatively few companies identify research and technology organisations as highly important sources of knowledge for innovation (although that proportion seems to be increasing), although many more have some form of

interaction with research and technology organisations. Few companies allocate significant resources and staff time to collaboration with research and technology organisations.

- While both business and research and technology organisations play active role in developing and supporting interaction, it is largely individual researchers and professional staff who help initiate and sustain relationships, emphasising the importance of the networks and social capital of individuals.
- Researchers need to be involved in knowledge transfer processes, particularly in the early stages and the participation of key researchers is a determinant of the speed and success of knowledge transfer.
- Researchers' informal contact with industry and personal networks have an important role with research - industry relationships and in knowledge transfer.
- Forcing collaboration in the early stages of research - when the level of uncertainty over the potential of the technology remains very high - is a disincentive for researchers to disclose their discoveries.
- The effectiveness of researcher led spin-offs as a channel for knowledge transfer is highly context dependent – and few environments provide the conducive conditions of regions such as Silicon Valley.

The development of commercialisation practice and policy in most OECD countries can be seen as evolving through four phases:

- **Phase 1: Patent-licence pipeline:** Confirmation of university ownership of Intellectual Property along with university responsibility for active commercialisation. This leads to increasing patenting and licencing – and university-industry interaction.
- **Phase 2: Deepening research collaboration and increasing governance:** Disappointment with commercialisation performance and a growing awareness of the barriers to knowledge transfer. This leads to increased professionalisation of Technology Transfer Offices (TTOs) and to a wide range of government programs to stimulate and support research-industry research collaboration, along with an increased focus on allocating research funding to industrial priorities.
- **Phase 3: Spin-offs and start-ups:** Increasing technology-based entrepreneurial opportunity, stimulating a growth in spin-offs and initiatives to enhance the role of universities in supporting entrepreneurship and entrepreneurial systems.
- **Phase 4: Beyond the pipeline – rethinking the developmental university in innovation systems:** Rethinking how universities produce talent and knowledge, and how they partner with enterprises and other organisations to contribute to growth, sustainability and equality.

Assessing the barriers to knowledge transfer in Vietnam

While some major universities in Vietnam have a number of cases of technology transfer through licensing or spin-offs, the overall level of technology commercialisation is very limited and is not a source of significant revenue to universities.

Major knowledge transfer barriers in Vietnam

Based on discussions with universities, government and other sources among the main barriers to knowledge transfer in Vietnam include:

- Ownership of IP: universities to not have ownership of IP generated by public funding and lack the freedom to operate in commercialising IP.
- Employment status of researchers as public servants limits their role in and incentive for most types of knowledge transfer, particularly commercialisation.
- Industry demand for new knowledge from universities is limited.
- Universities lack the capabilities and resource for commercialisation.
- There is a narrow focus on some knowledge transfer channels by some universities and by government.

Knowledge transfer barriers - experiences of the case study countries

International experience and the experience of the four case study countries (USA, China, Taiwan and Australia) provide insights relevant to the development of knowledge transfer policies in Vietnam, including:

- Effective university-industry interaction is challenging in all countries. The cultural, organisational and motivational gaps are significant and hence the challenges are systemic.
- The primary role of universities in the past was teaching – and hence knowledge transfer through graduates - and this remains their key role.
- Most enterprises do not look to universities as sources of technology nor major sources of knowledge inputs for innovation.
- There is a clear trend in most countries to affirm university ownership of IP from public-funded research, to allow universities the freedom (and responsibility) to operate, to make them accountable for knowledge transfer performance and in many cases to assist them to develop the capabilities to manage knowledge transfer effectively.
- A more systems-oriented approach to knowledge transfer has developed in most countries and this is expressed in government policies aiming to shape and support the knowledge transfer system (strengthening links, improving capabilities and subsidising collaboration), with an increasing awareness of the need to address the demand side. This represents a more enterprise-centric perspective. It also expresses a realisation that talent investment in research in universities complements but cannot substitute for private investment. Initiatives to promote university-industry links have generally been in parallel with an increase in funding for university research. However, many funding programs also seek to steer research toward areas with high application potential.
- The relative emphasis within universities' overall knowledge transfer activities, on the commercialisation of research results has declined in most of these countries.
- Industry demand for graduate recruitment, consulting, contract research and collaborative research is generally much higher than for licencing technology.
- Universities have become increasingly active in promoting entrepreneurship in staff and students, in addition to any initiatives supporting spin-offs. In many cases, activities supporting entrepreneurship are developed in collaboration with regional governments.
- Knowledge transfer organisations, incubators, joint research centres, science parks are institutional innovations that have been developed in response to the need to strengthen innovation systems.

- Knowledge transfer intermediaries, and policies to promote knowledge transfer, take time to become effective and for the participants, managers, policy makers and funders learn what works.
- Regional governments have increasingly become partners with universities to develop innovation and entrepreneurial ecosystems, often funding network building and knowledge transfer facilities.

Policy options for strengthening knowledge transfer in Vietnam

The following principles, based on international experience, inform the policy suggestions of the report:

- The primary objective for knowledge transfer from universities is the creation of the maximum economic and social value, and this should be the criteria for assessing national knowledge transfer performance.
- The impact of innovation on economic and social value creation is determined by the level of adoption and diffusion through the economy.
- The economic and social value creation through innovation largely comes from incremental innovation, enabled by the diffusion of knowledge and technologies.
- The effective management of knowledge transfer from universities is the responsibility of universities and they should have 'freedom to operate' - taking into account government policy goals - and be accountable for their performance.
- The knowledge transfer system is complex, all channels are important, and an effective system requires strong supply, strong demand and flexible linkages. Hence, there are complementarities between research, innovation and industry policy that lead to challenges for coordination.
- Regarding knowledge transfer and knowledge acquisition, the level of ambition, capability and opportunity will be very different for different types of universities and enterprises.
- International experience demonstrates that the development of an effective knowledge transfer system involves a long learning process through which all participants - including policy makers - build understanding, capabilities and relationships.

The full report suggests five policy priority areas designed to respond to the identified knowledge transfer barriers: ownership of IP and freedom to operate; knowledge transfer strategies and organisation development support programs; support for the development of a National Knowledge Transfer Organisation; developing the demand-side of knowledge transfer and strengthening university-industry links; and addressing the proof-of-concept gap.

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