Implemented by:

SInnovation Germany-ASEAN Project

1st Innovation Management School (IMS 1): "Knowledge & Technology Transfer (KTT) – Selected Instruments & Organizational Models"

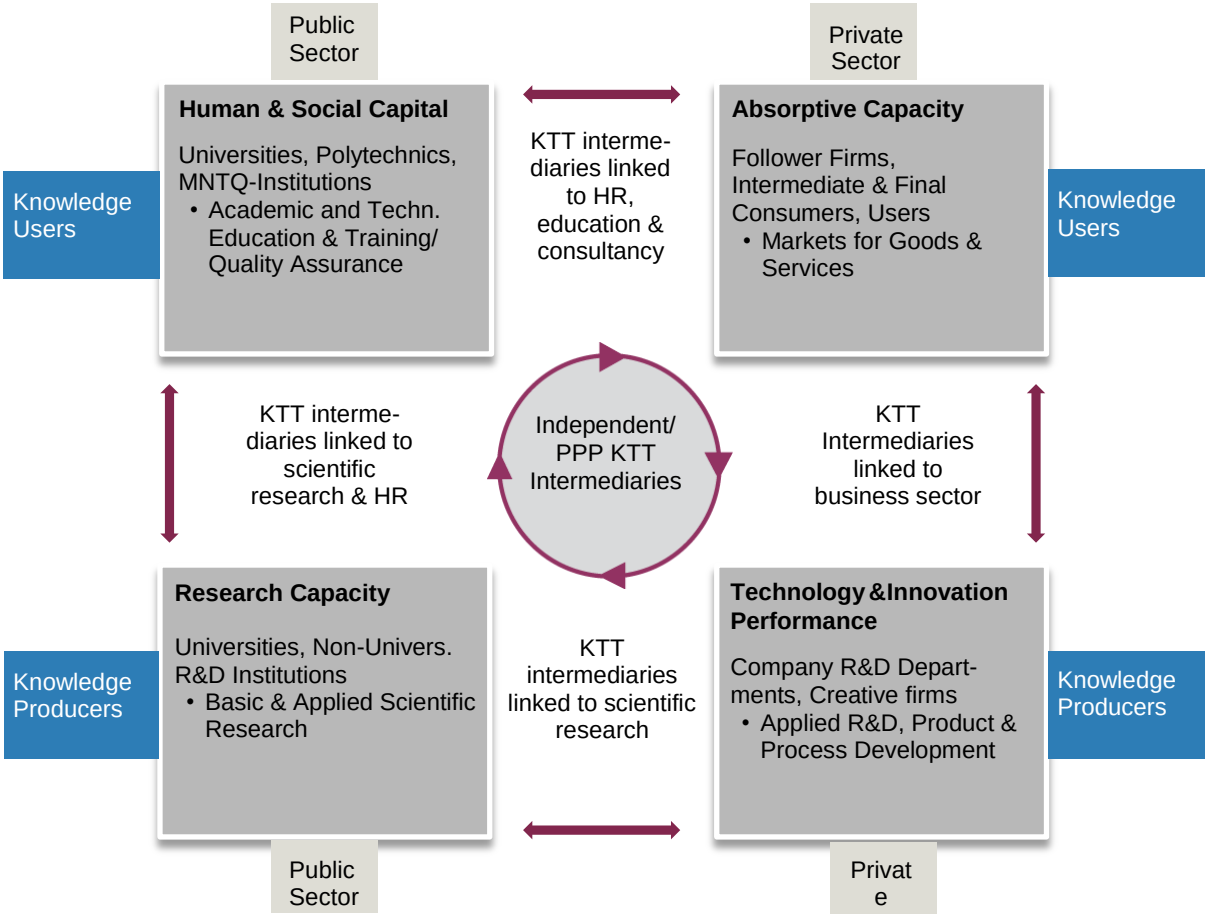
BRIEFING PAPER

1. Introduction[i]

This briefing paper introduces the 'philosophy' of the SInnovation project, outlines our understanding of Knowledge & Technology Transfer (KTT) being the main topic of IMS 1, and gives more background on the contents of IMS 1. The objective of the briefing paper is to enable its readers to decide whether the course can be useful for them and will lead to practical results in their work. All potential applicants should carefully read this briefing paper and take it as a basis for their decision whether to submit an application.

2. The Functional IS Model

The SInnovation project applies the so-called functional IS Model as a framework for analysing and learning about innovation and technology transfer. IS stands for Innovation System and underlines the systemic perspective on innovation. The following chart illustrates the IS Model with its main actors and main linkages within an innovation system.



The functional IS model is based on three fundamental empirically founded insights:

- Knowledge producers are usually not the main users of the new knowledge produced by them.
- Transferring knowledge into technology and turning technology into marketable products and services is a process that does not flow freely on its own.
- KTT intermediaries improve the flow of knowledge, thereby lead to more efficient innovation systems, and ultimately increase the benefits a society can derive from innovation and technology.

Technology transfer is thus at the very heart of the IS model. The model highlights not only the importance of KTT intermediation, but also provides a framework to analyse different types of KTT and how they fit into the overall innovation system.

3. Levels of Intervention

An innovation system is formed by actions of various actors that can broadly be classified into three levels of intervention:

- STI policy level: Actors on this level design policies and programs that are meant to provide incentives for innovation and technology transfer. One can say that they shape the innovation system from the outside.
- STI system level: Actors on this level implement and manage policies programs that have been defined on the policy level. They are to a large extent performing the intermediary functions within the innovation system.
- STI market level: Actors on this level participate in STI programs or react to STI policies, e.g. by submitting a proposal for a project to be supported in the framework of an STI program. They are to a large extent knowledge producers or knowledge users that cooperate with the help of various forms of intermediation.

However, in practice the distinction between two levels may often not be so clear cut and individual organisations or persons may perform more than one type of intervention.

For example: The allocation of public funds for a KTT promotion program will be decided on the STI policy level. Actors on the policy level will also define the basic outline of the program, e.g. defining a sector. Further specification of criteria for promotion, types of activities that receive support, and other specifications can either be done by the same organisation or by another organisation (or another unit in the same organisation). Thus, one organisation may partly act on the policy level and partly on the system level.

Another example is the following: A research institution that participates in a KTT program may develop a project proposal in which it acts not only as knowledge producer, but also undertakes to perform important intermediary functions. In this case, the research institution acts partly on the market level and partly on the system level.

The analysis of the levels of intervention does thus not necessarily produce a picture that allows you to place any organisation unambiguously on one level or another. However, the systematic analysis of the levels of intervention will help you to detect at which levels there is a lack of actors or performance of actors is not adequate. Ultimately this can be used to identify respective capacity building needs.

IMS 1 is designed mainly for professional that act at the STI system level, but is considered to be suitable as well for professionals at the other levels who work at the interface to the STI system level.

4. Instruments for Knowledge & Technology Transfer

As the IS model indicates, KTT intermediation is about linking knowledge producers and knowledge users. While the purpose of KTT intermediation is always to link different actors in the innovation system, this can be achieved with a wide variety of KTT instruments.

If we take the example of a researcher who has developed a new material, there are different KTT instruments that could be applied to link the researcher (knowledge producer) with potential users of this new knowledge / technology:

(A) He may publish his results in a scientific journal. In case the article is read by an R&D officer of a company that is searching for a material with the respective properties, already some form of intermediation has taken place and the R&D officer has the opportunity to establish a link to the researcher.

(B) He may send an abstract of his results to a technology transfer institution that enters the main characteristics into its databank and searches for companies or other actors that could have a practical application for the new material.

(C) He may found a technological start-up company as a spin-off from the university that further develops the material and tries to bring it to market.

This brief example illustrates that KTT intermediation does not necessarily require a specific person or organisation to perform the intermediary role. Successful KTT intermediation can also be the result of an interaction between different persons without a third person in an active and distinctive intermediation role. In example (A), the publisher of the journal certainly plays a role, but he/she rather provides a KTT instrument that is used by the two involved parties and does not actively and specifically promote the link.

The following table provides a categorisation of six types of KTT instruments, ranging from "Education and further education & training" to "Intellectual Property Rights". Each type is further distinguished into groups of KTT instruments (left column); and for each group up to three specific KTT instruments are listed.

It is evident from the list that certain KTT instruments are bound to specific organisation models (e.g. transfer agencies), while others can be applied by very different actors in the innovation system.

Group of KTT Instruments	Specific KTT Instruments
1. Education and further education & training	
Education / training	• Utilisation of technology transfer results and experience in (higher) education • Involvement of transfer partners in teaching (guest lectures) • Know-how transfer to partners through teaching / lectures
Exchange of personnel	• Short internships • Exchange of scientists / technicians between industry and research institutions or universities
Further education / training	• Elaboration of teaching materials
2. Scientific communication	
Publications of research institutions	• Universities' publications of research findings • Publications of individual institutes or chairs
External publications	• Publication in scientific journals • Colloquies, conferences, symposia, workshops • Presentations at fairs and exhibitions

3. Technology services provision	
Services	• Consulting services of universities / research institutions • Evaluation services of universities / research institutions
Transfer institutions	• Transfer agencies connected to research institutions • Transfer agencies connected to industry / business • Independent transfer agencies
4. Technology-based new venture creation	
	• Spin-offs from research institutions or universities • Joint ventures by industry & research institutions
5. Project-related instruments (direct transfer)	
Commissioned research	• Commissioned research • Diploma / BA / MA theses, PhD theses
R&D cooperation	• Research in cooperation of several organisations (industry & public research institutions) • Joint research
6. Intellectual Property Rights	
	• Patents (sale) • Licensing • Other property rights

IMS 1 will focus on three of the six types of KTT instruments, namely (i) Technology services provision, (ii) Project-related instruments, and (iii) Intellectual Property Rights.

5. Contents of IMS 1 & Follow-up Activities

IMS 1 is an activity by the ASEAN – German cooperation project 'SInnovation' that aims to promote innovation and technology in ASEAN Member States. The project supports the ASEAN Committee on Science & Technology (COST) and the ASEAN Secretariat (ASEC) in pursuing respective objectives, most notably the implementation of the Krabi Initiative and the ASEAN Plan of Action on Science and Technology (APAST).

In July 2012 the project conducted an inaugural international conference in Thailand that served to introduce the functional IS model to ASEAN stakeholders and to identify specific fields of activity. In the follow-up to the conference ASEAN (COST and ASEC) conducted further events to determine how to operationalize the Krabi Initiative.

In February 2013 ASEC and GIZ decided that IMS 1 will focus on the topic **Public-Private Partnership** as one of the five paradigm shifts outlined in the Krabi Initiative. IMS 1 will therefore introduce participants to **three types of KTT instruments** that can be used to increase involvement of and cooperation with the private sector in innovation and technology development. **Science & Technology Parks and TBIs** will be one instrument that receives special attention during the IMS, in order to link up with activities that have been conducted in the follow-up to the inaugural conference.

The regional dimension of KTT will also be addressed through inputs on Innovation Relay Centres as a tool applied by the EU. And examples of KTT capacity building projects from other developing countries will be used to illustrate concrete practical approaches for STI stakeholders working with limited resources and under difficult framework conditions.

As another major activity of the project, the International Leadership Training (ILT) started in 2012 with a preparatory phase comprising a workshop in Bandung, Indonesia, and an E-learning program. As a result 13 participants have been selected and arrived in Germany in

December 2012. During the ILT they will complete eight training modules on innovation systems management and technology transfer and an internship of five months.

The main objective of IMS 1 therefore is to enable participants to adapt and apply KTT instruments that have been introduced in their own contexts. Related objectives are:

- Participants develop a clear idea of their role in the IS model and how they can contribute to effective KTT (in-depth understanding of participants' segment of IS model).
- Participants gain a general understanding of the IS model as a whole, and – as a results – are able to value and assess project ideas that are developed by ILT participants.
- Participants relate the knowledge acquired during the IMS to the objectives of the Krabi initiative; in the follow-up they specifically aim at improving private sector involvement in KTT.

In the follow-up to IMS 1 internet-based formats will be used to assist participants in applying acquired knowledge to practical tasks or projects. All participants are expected to participate in these follow-up activities for an exchange of experiences and networking. Respective outputs, or non-confidential summaries, are made available to COST, ASEC and SInnovation project management in order serve as inputs for further operationalization of Krabi and related activities.

The specific nature of outputs to be developed in the follow-up is determined by the participants themselves and should be in line with their resources, needs and abilities. The project mainly provides conceptual support and can, for example, assist in 'mapping' KTT instruments in participants' home countries. Such KTT instrument maps can be starting points for concrete projects at national level and/or for dialogue and peer learning at the regional level of ASEAN.

[i] The Briefing Paper was drafted by GIZ based on conceptual inputs provided by Bernd Kadura, who works as a Management Consultant intensively on Innovation & Technology Transfer among other topics.