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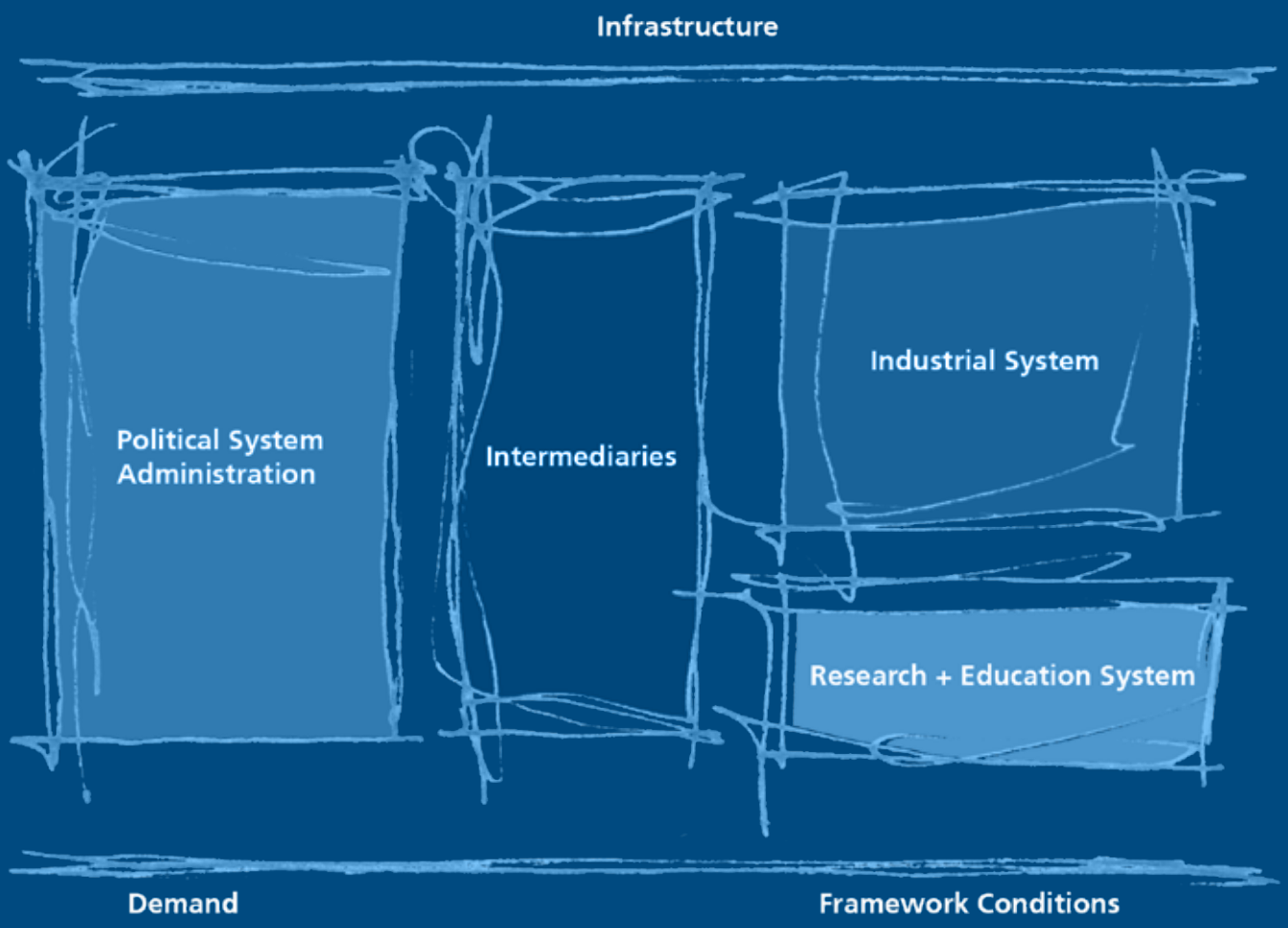
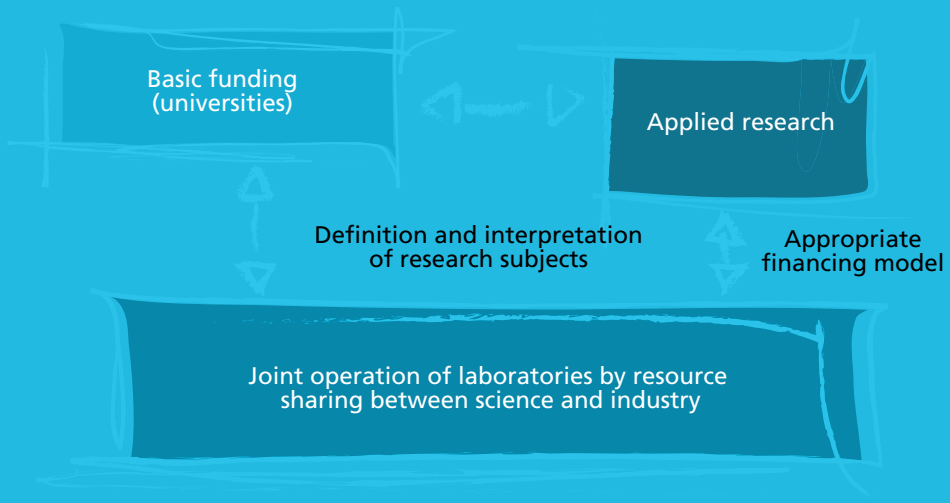
ISI

FRAUNHOFER INSTITUTE FOR SYSTEMS AND INNOVATION RESEARCH ISI

AN ADVANCED TRAINING COURSE ON INNOVATION





1 Conceptual Design

Background and objectives

State agencies for the promotion of innovation are important intermediate actors within the National Innovation System (NIS). They provide services which are crucial for the NIS's performance. It is necessary that those staff who are concerned with the design and administration of innovation support schemes or with operational tasks like supervising concrete projects should – in order to guarantee the best service possible - understand the overall mechanisms of both their own national and the global innovation system as well as the structures and processes within regional, sectoral- or company-specific innovation systems. This is our understanding of a "systemic", "integral" or "holistic" view of innovation support. In this context, it is important to raise the awareness among the agencies' staff that innovation is not only an industry issue but that it encompasses other organisations as well, i.e. the other sub-systems of the NIS like politics/government, science and education, society etc. These sub-systems must be considered and observed as well as those innovation systems with which the NIS interacts (i.e. foreign NIS or even the global innovation system).

Many national innovation agencies do indeed allocate innovation activities to the industry sector, whilst those agencies in charge of R&D promotion - in contrast to innovation promotion – tend to focus on the public research system only. Often, the agencies' competences are limited to only one sub-system and cross-sectoral activities (which we would regard as being necessary in our holistic perspective) are not intended. In order to achieve an optimal performance of the NIS, governance must assume a systemic or holistic view and embrace all the innovation activities in the NIS, i.e. of all sectors. It must be the objective of national Science, Technology and Innovation (STI) policy to raise the willingness of all the actors of the NIS to integrate and interact in a systemic understanding. This implies that – on the one hand - company practitioners and managers should open their minds to the role of the science system and the possible benefits from adopting and applying research results, and – on the other hand – that scientists should also become more open to potential commercialization of their results.

The training programme proposed in this document purposely goes beyond the mere transfer of knowledge in the context of industrial innovation processes. It emphasizes the interactivity between the various sub-systems of the NIS in order to widen the per-spective of innovation agency staff, to enhance their comprehension of what needs to be done to optimally develop the NIS and to improve its performance.

We often observe that many practitioners in innovation agencies are neither aware of the multi-dimensional meaning of the term "innovation" nor of the complex interdependencies behind it. Agency staff should be better qualified regarding these aspects and Fraunhofer ISI is happy to contribute its many years of extensive experience in this area (see a brief introduction to the profiles of the Fraunhofer-Gesellschaft and Fraunhofer ISI in the annex).

Besides national innovation agencies, non-governmental organisations (NGOs) which are concerned with the development of social, educational, scientific, administrative, industrial and technical structures in promising developing countries also need to take this holistic view to be able to position their goals and activities properly in a national or global innovation system.
Subjects related to innovation will be embedded in a course programme as described below.

Didactical approach

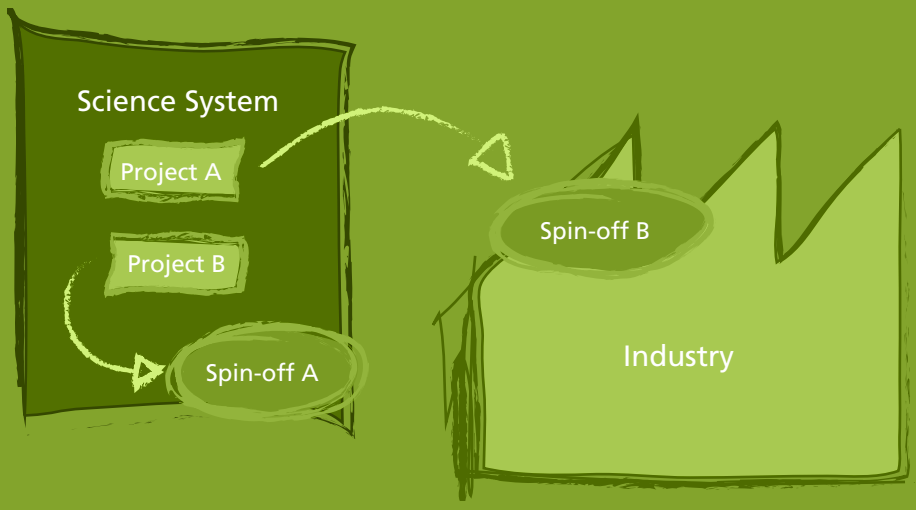
The training programme comprises two distinct parts:

Part I: Workshop and/or Seminar

This part features conventional face-to-face training in workgroups or classes (maximum 15 persons) with the participants and coach physically present. We assume that every participant will be given time off from his daily duties and workplace. The course can be held either in one block over several subsequent days (so called block seminar) or on a day-by-day basis over a longer period.
Each course will be organised in distinct modules, one module per thematic area (see below), and each one lasting half a day (3-4 hours). In block seminars and depending on the overall number of participants per event, each module must, eventually, be offered several times. This implies that each class will take the modules in a different sequence. For this reason and for the courses held on a daily basis the modules must be thematically complete and self-contained in order not to be dependent on any other module or on a certain sequence of modules. At the start of every new module the coach will make brief references to the overall programme and to related modules with the aim of clarifying the role of that specific module in the entire course context.

Part II: Online-Exercises (Optional)

Independent of their classes and their individual time schedule, all the participants have the opportunity to recapitulate the course material online via a dedicated Web-platform, which also offers exercises tailored to the different modules. This is complemented by a FAQ-list and a glossary. All the course subjects are included on the platform and can be accessed or downloaded individually. The coach can supervise the work on the exercises, can comment on or assess them and can interact with each participant via the online-platform. Eventually, the trainer can also produce and provide certificates of attendance through the platform. The platform may also serve as a permanent forum for presenting recent new findings from the arena of innovation research.



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Portfolio of thematic modules

At present we can offer a spectrum of 10 thematic modules (see list below). Each one is based on Fraunhofer ISI's many years of experience in these subjects. The spectrum can be broadened by additional subjects according to the respective agency's specific needs. Fraunhofer ISI will not offer any courses for which it does not possess the necessary expertise.

Terminology and concepts in the context of innovation

Origins, character und current meaning of the term "innovation"; invention versus innovation; product and process innovations versus service innovations; innovations without scientific or R&D base; technical versus social versus organisational innovations; radical innovations versus incremental innovations; examples of innovative business models; degree of innovation or of newness; market readiness, market maturity of an innovation; innovation activities and their impacts on economic development and competitiveness.

The concept of "innovation systems"

National or regional innovation systems (IS) and their sub-systems (science, education, finance, industry, intermediary and governance system); Real-world examples and benchmarking of different national innovation systems (NIS); Innovators and other actors and their roles in an innovation system; mutual dependencies of actions taken by players in the NIS; about the "third mission of universities" (bringing research findings to application); role of public innovation promotion agencies within their NIS; distinction between corporate innovation processes and value chains and their function within the concept of innovation systems.

Innovation processes and innovation management

Global versus corporate innovation processes; circular, recursive or other non-linear models of the innovation process; distinction between innovation processes and value chains; role and function of the most important actors within the value chains; barriers and obstacles in the innovation process; most important items of corporate innovation processes; management of innovative projects: important elements, preconditions, required qualifications and competences; particular requirements for managing heterogeneous or international collaboration projects; importance of innovative culture in enterprises and how it can be achieved; methods for spurring creativity; creativity techniques; role of R&D in corporate innovation processes; innovations without R&D; ways of decisionmaking in corporate innovation processes; innovation acceleration in industry; identification of innovation opportunities and their assessment; transformation of ideas into innovative business models; corporate and academic spin-offs as an alternative to realize innovations.

Knowledge and technology transfer (KTT) and capability for knowledge absorption

Importance of R&D in the innovation process; importance of KTT in the innovation process; variants of KTT (university-industry collaboration, licensing business, contract research, consulting, staff exchange, joint ventures, spin-offs etc.); phases of the KTT process and their dominant actors; KTT agencies and their functions (TTOs of universities, innovation centres, KTT consultants, patenting and licensing services, incubators etc.); measurement and assessment of KTT performance; barriers and impediments in the KTT process; ways of optimizing KTT; preconditions for SMEs to be able to adopt new external knowledge.

Entrepreneurship and small and medium-sized companies (SMEs)

Characteristics of innovative SMEs, characteristics of innovativeness, preconditions and competences for improving innovativeness; importance and role of R&D in SMEs; technology, knowledge- and/or science-based SMEs (with international examples); development phases of SMEs; phases towards the foundation of innovative start-ups (academic spin-offs, corporate spin-offs, autonomous start-ups); particular challenges for innovative start-ups; the question of appropriate growth strategies for a start-up (fast growing star or lifestyle company?); success measures for innovative start-ups; factors of success and failure with innovative or creative start-ups; business models for innovative or creative start-ups (with sample success stories); business plans for innovative start-ups and how they emerge; myths and reality.

Innovation financing of SMEs

Alternative financing instruments for innovative SMEs; the "early-stage financing gap"; optimal financing mix by development phase of a SME; bootstrapping and financing through founder, family and friends (FFF); crowdfunding and other forms of micro-financing; state aid, public start-up financing; business angel financing; equity-financing (VC) and IPO; myths and reality.

Technological trends, foresight, benchmarking and competition analyses

Typical development trajectories of novel technologies; the double-peak curve; methods based on publication and patent statistics to detect technological trends; methods to compare (benchmark) competitiveness and innovativeness between regions and companies; competition profiles by means of innovation indicators; SWOT-analyses for regions and companies; methods to detect current and future technological trends; future research and foresight; selected foresight tools in detail (e.g. qualitative tools like scenarios or roadmaps, quantitative ones like Delphi analyses, regressions or projections, etc).

Intellectual Property Rights (IPR)

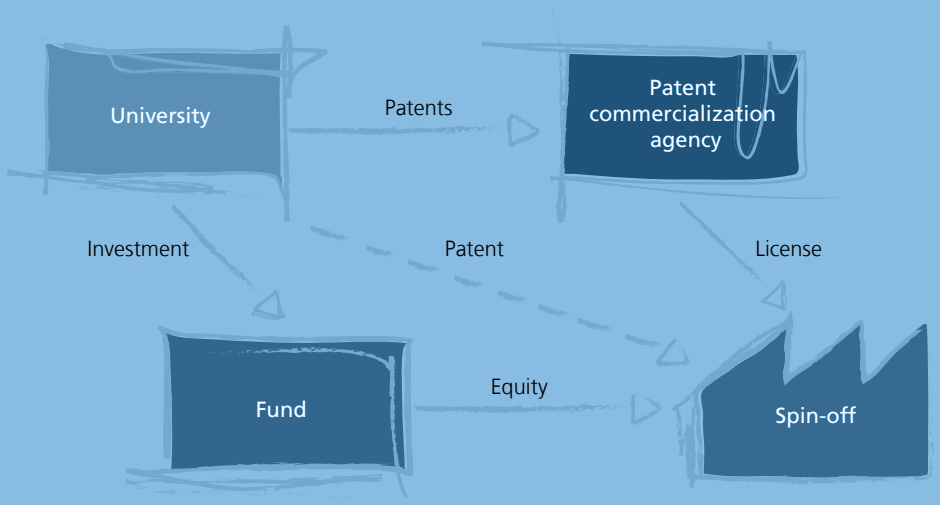
Needs and possibilities to protect exclusive knowledge; safeguarding a company's competitiveness by means of IPR or without IPR; which kind of knowledge can be protected with IPR?; basic principles of the IP business; types of IPR and their application fields; patents versus licences; the role of a proprietary patent portfolio for a company; regional coverage of protection via patents; regional patenting strategies; procedures for patent filing; terms, actors, costs; differences in patents and filing procedures between Europe, America and Asia; ways to defend your own patent; costs of defence; "value" of a patent or licence and their function as a tradable object; the equity (asset) function of patents and licences; tools using patent statistics for trend, SWOT and competition analyses; patenting and licensing strategies for companies and research establishments.

Cooperation within the (global) innovation system

Pros and cons of innovation-related cooperation (incl. R&D collaboration); the phenomenon of mutual reservations and prejudices between scientists and industry practitioners; proven forms of successful innovation-related industry-science collaboration demonstrated by international examples; proven forms of successful innovation-related domestic industry-industry collaboration demonstrated by examples; proven forms of successful innovation-related international industry-industry collaboration demonstrated by examples; national or international R&D collaboration teams from companies and scientific establishments; how SMEs can defend their interests and their autonomy against stronger partners in collaboration teams (e.g. project consortia or joint ventures); variants of state support of innovation-related collaboration projects; myths and reality.

Innovation policy and governance

The need for state Science, Technology and Innovation policies (STI-policies); internationally accepted innovation indicators; the concepts of liberal markets versus market failures versus government failures; governance of the innovation system; direct and indirect public support instruments; thematic or specific versus non-specific or generic support instruments; in-depth discussion of selected fields of state support (e.g. support schemes for R&D, start-ups, incubators, SMEs, innovation networks and clusters, innovation centres, TTOs, business angels networks, equity or seed capital funds); proven policy instruments dedicated to promoting the innovativeness of companies (demonstrated by examples from European countries); approaches and tools to evaluate policy instruments and support schemes; national innovation strategies (incl. benchmarking and examples).



3 Costs

The actual costs of a course programme like the one presented above depend, of course, on the individual contractual framework (mix of modules, number of participants, location and venue, contribution of the commissioning agency to venue organisation and catering etc.). The costs for each module will be calculated individually based on the specific customer needs and will include the costs for the trainers, the preparation of the course subjects, the didactic material and the online-learning parts. The smaller the number of modules per course programme, the higher the share of fixed cost items like the production of the web-based E-learning platform.
Organisational costs, travel expenses and other material costs (catering, translators and interpreters, equipment and room rent etc.) are supplementary, but depend on the contracting agency's own contributions.

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Fraunhofer-Gesellschaft

At present, the Fraunhofer-Gesellschaft maintains more than 80 research units in Germany, including 60 Fraunhofer Institutes. The majority of the more than 18,000 staff are qualified scientists and engineers, who work with an annual research budget of €1.65 billion. Of this sum, more than €1.40 billion is generated through contract research. Two thirds of the Fraunhofer-Gesellschaft's contract research revenue is derived from contracts with industry and from publicly financed research projects.

With its clearly defined mission of application-oriented research and its focus on key technologies of relevance to the future, the Fraunhofer-Gesellschaft plays a prominent role in the German and European innovation process. Through their research and development work, the Fraunhofer Institutes help to reinforce the competitive strength of the economy in their local region, and throughout Germany and Europe. They do so by promoting innovation, strengthening the technological base, improving the acceptance of new technologies, and helping to train the urgently needed future generation of scientists and engineers.

Fraunhofer ISI

The Fraunhofer Institute for Systems and Innovation Research Fraunhofer ISI analyses the framework conditions for innovations. We explore the short- and long-term developments of innovation processes and the societal impacts of new technologies and services. On this basis, we provide our clients from industry, politics and science with policy recommendations and perspectives for key decisions. Our expertise lies in a broad scientific competence as well as an interdisciplinary and systemic research approach. With 180 staff members from the areas of science, technology and infrastructure, we are a highly motivated team whose scientific expertise and systemic research approach fulfils the diverse requirements of our clients. The increase of our annual budget to over 19 million euros which was achieved in 290 projects documents this successful work.

As an internationally leading innovation research institute, we collaborate with other countries and thus guarantee different perspectives of the research subject. Visiting scientists come to us from the USA, Japan and the BRICS countries. We cultivate an intensive relationship with China and Russia and have begun to establish cooperations with research institutions in India and Brazil.