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Recommendations on Science-Business Interactions

- Executive Summary -

The pressure on universities and research institutes to increase their direct contributions to societal needs has grown significantly over the past two decades. This is particularly true in terms of their contribution to economic growth. The expectation is that a more effective co-operation between science and the business sector will lead to an improved performance of the national economy and eventually to the generation of new jobs. Indeed, scientific studies show unambiguously that there is a positive impact of synergies between the two sectors on the generation of groundbreaking innovations and technological and economic advancement of the society. Improving the interactions between universities/research institutes and enterprises thus is a central issue in all current innovation policy strategies of the Federal and Länder governments.

The German Science Council has analysed the status quo of science-business interactions in Germany, identified hurdles for a more effective co-operation and given recommendations on how to overcome these hurdles.

The analysis showed first of all that degree and intensity of science-business linkages have reached a remarkable level in Germany which ranks well above average in international benchmarkings. There are, however, particular circumstances which prevent yet more efficient interactions to take place.

The Science Council regards knowledge transfer as an important task of universities and research institutes besides research, teaching, training of next-generation scientists and lifelong learning. It is self-evident, though, that the desired intensification of knowledge transfer can and must not be reached by orienting the science system as a whole mainly towards the exploitability of research results or the needs and inter-

ests of the economy. Such an orientation would significantly limit the genuine preconditions for scientific productivity and thus in the long run have a negative effect on the innovative capability of the national economy.

A central issue regarding science-business interactions is that the relative importance of knowledge transfer – although determined as one of the basic tasks of universities and universities of applied sciences in the decrees of the Länder governments – is currently rather modest in many German higher education and research institutions. An important reason for this is that increased transfer activities of scientists affect the capacities for their other major tasks. Indeed, it can be observed that in particular the teaching intensity of scientists who are actively involved in knowledge transfer tends to decline and visiting lecturers are recruited to compensate for this. The desirable expansion of the competences and activities of scientists in knowledge transfer thus creates a trade-off with the simultaneously increasing demand in terms of quality in research and teaching.

Central Recommendations:

- In order to be able to intensify knowledge transfer as an institutional task of universities and research institutes and mitigate the described trade-off, a clear institutional profile has to be set up. It is necessary to take clear decisions on the institutional level as well as on the level of the individual scientists concerning the allocation and weighting of their tasks in research, teaching and knowledge transfer. Thus, there should be institutions (and correspondingly scientists) which actively engage in knowledge transfer and those for which knowledge transfer plays a minor role only. Additional activities of university teachers in knowledge transfer should be considered regarding the stipulation of their teaching duties.

- Knowledge transfer should be a strategic goal of universities and research institutes and must be supported by the respective management. Every institution that strives for an intensified co-operation with enterprises should implement a compliant institutional strategy that defines the academic units in which knowledge transfer should be a major task that shapes or significantly contributes to the profile of that unit. Moreover, the institutional strategy should define the preferred form(s) of co-operation (i.e. strategic partnership, spin-offs, licenses etc.), the class of business that is the preferred target and the conditions that should apply for co-

operations with enterprises (i.e. concerning intellectual property rights, full cost pricing etc.).

- Engagement in knowledge transfer must be worthwhile for the institution as well as the individual scientist performing the transfer. Transfer activities must be remunerated adequately in performance-based allocations of funds. This applies to the allocation of institutional funding of the universities by the Länder governments as well as internal remuneration systems within the scientific institutions. Moreover, the existing policies and procedures concerning the private income of scientists who actively engage in transfer activities should be made more flexible in order to provide an additional incentive for such activities. The goal should be to develop knowledge transfer into a task that allows scientists to gain reputation from such activities.

- Technology transfer offices and patent exploitation agencies have to be strengthened in their options for action as well as institutional mandate and standing. They need a clearly defined profile of tasks which has to be aligned to the specific institutional strategy regarding knowledge transfer. Patent exploitation agencies should set strategic priorities regarding their area of expertise in certain technology sectors and co-operate and share their expertise and competences with the technology transfer offices of the universities and research institutes. They should be evaluated regularly and their support by public funds should be based on performance. The public support should have the ultimate goal to develop patent exploitation agencies into profit centres in the long run. Technology transfer offices should directly report to the management of the university/research institute and be the central player in all communication concerning the institutional knowledge transfer strategy for external partners. In order to be effective, technology transfer offices and patent exploitation agencies must have adequate and professional staffing.

- The funding of projects in the *proof-of-concept* phase should be expanded in order to improve the development of academic research results into marketable new products and processes. The Science Council suggests a fund financed jointly by public and private investors which supports projects that are suitable to close the gap between academic research and economic innovation.

- The Science Council sees particular opportunities for the scientific as well as the business side in long-term strategic partnerships between academic institutions and private firms. Such partnerships are characterised by collective financing and implementation of research programmes as well as collective definition of goals. They should be further developed on a broader basis and be supported from all stakeholders.

- The Science Council welcomes the fact that the support of clusters is an integral part of all innovation strategies of the Federal and Länder governments. It recommends implementing stringent conditions for the selection process of clusters to be supported by public funds. Direct financial cluster support by public funds should be restricted to the establishment and support of a professional cluster management structure. The direct support of clusters must always be accompanied by an optimisation of local conditions i.e. in terms of infrastructure and investment incentives.

- In terms of academic spin-off companies the Science Council recommends that public support should be focussed on measures that strengthen the equity capital base of these companies. Those measures should be restricted to the *seed* and *start-up* phases. Moreover, the Länder decrees should give more flexibility to universities with respect to their possibilities for shareholding in spin-off companies.

- The Science Council recommends introducing a grace period into the German and European patent law. A grace period can balance the different expectations scientific institutions have to fulfil: to increase publication output and quality on the one hand and to increase the economic impact of their research on the other hand. A grace period would increase the probability of developing research results into a stage in which they can be economically exploited and marketed. Details of a grace period should be worked out carefully and be based on an international consensus. The ultimate goal must be a worldwide harmonisation of patent laws.