

‘Entrepreneurial Universities’ –Lessons from Swiss Universities of Applied Sciences

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In the coming years the field of research and development has to be analysed with respect of the intense interaction between academic research and the innovation activities of private business. In Switzerland research and development (R&D) is undertaken mainly in the private sector with 75% of the overall funding; universities call for only 23% of R&D expenditure.

Because of a lack of further public R&D-capacity, a major involvement of universities is a basic presumption for a competitive and innovation-oriented economy. This depends on knowledge and technology transfer (KTT) with private business and therefore a successful KTT-business model of the institutions of academic R&D. In the late 1990s Switzerland launched a reform of the universities of applied sciences (UAS). Its purpose was to establish on tertiary level a new type of institution which covers all of the nation and is (formally) equal to academic universities. With a close and intensified interaction with private business UAS should contribute substantially to KTT. In addition to teaching and research KTT was a third and new dimension in their performance contract based on the national law of UAS. This was claimed particularly with respect to the small and medium sized enterprises (SME) which dominate the Swiss economy by far. Seen in an idealistic way UAS should translate the results of basic research of the Swiss Federal Institute of Technology and/or universities into applicable knowledge ready for marketing by private business; UAS are supposed to be a translator and mediator between basic research and the practical needs of SME.

Empirical evidence in Switzerland shows however, that there are mainly and first of all top class universities which demonstrate particular strengths in KTT. UAS could materialize this objective up to now only in a very limited way. These findings are based on the analysis of the performance of KTT of universities as well as the analysis of funds used for joint innovation projects between universities and companies. In Switzerland top universities outperform UAS by far with respect to the production of licences, patents or spin-off companies. From companies of all size classes top universities are the preferred and wanted partners. This shows that particularly those universities have a successful business model for KTT which are able to perform in R&D in the medium and long run on an international top level. Major explanatory success factors are substantial differences in quality and size of the resources of these institutions. In addition there are problems in measuring success: the performance in KTT might be systematically underestimated for particular groups of universities; e.g. they might have many informal contacts or a lack of visible impact in the private sector.

But there are good reasons to assume that these factors are not the most decisive ones. In this context empirical evidence point to the trend that basic research itself is more and more oriented towards market purposes. From the beginning of research activities, needs and interests of the market are taken into account; private companies are involved from the early pre-competitive phase of R&D. These R&D-activities leap-frog the phase of applied R&D. They outperform therefore the UAS, which are intended to be active and successful in this phase. Furthermore, this research is middle or long-term oriented,

meanwhile the strength of UAS lies with short term implementation of applied R&D. Examples of this new type of market oriented basic research are new fusion technologies such as life science and nano technology.

Companies which achieved competitive advantage through innovation using this kind of science based technology are for cost benefit reasons likely to conduct fewer R&D in house. However, they are more likely to invest in university institutes (see Novartis in Boston or Basel) and in start up companies. The decentralised model of acquisition and research gives them the opportunity to benefit from a global network of R&D where partners might join or being exchanged according to needs. This is reflected in the model of *Chesborough* about 'open innovation'. Up to now only major multi-national companies are involved in this type of R&D-networking. There are signs however, that in the future small and medium sized companies which look for success in the global market place through innovation are also looking more and more for collaboration with top universities.

In Switzerland, this trend will cause substantial problems for UAS. They might be excluded from the major developments in R&D and technologies with respect to economic success. The challenge might be further increased on the one hand through the weakening of their academic staff by implementing the Bologna-reform. On the other hand an increased number of private companies offers science based service in the area of R&D. They will challenge and compete with UAS substantially. Therefore, UAS will be in a sandwich-position. In future their business model will be competitive in a rather limited way.

In order to succeed in the future UAS should not compete with knowledge intensive business services in the private market place. They are less efficient and less knowledgeable. In order to improve their link to medium and long term research and their competitiveness they need to cooperate with top universities in particular subjects and technological issues. Similar indications can be seen by foreign research laboratories which are strong in application-oriented R&D and have strong practical-oriented links to private business (see for example Fraunhofer Gesellschaft in Germany with respect to bio- and information technology).

If UAS cannot successfully connect with private business, they cannot fulfil simultaneously the three claims of their legally based performance contract, i.e. teaching, research and KTT. If that is the case, it is likely that in the medium term there will be repercussions for their teaching activities. As advanced science is getting more and more important for innovation activities in business, and UAS cannot succeed, there is a threat that the quality of their teaching might deteriorate. The reform efforts of Swiss UAS will be substantially hampered.

The experience of the Swiss UAS with KTT give general insights for an optimal design of KTT business model of an 'Entrepreneurial University':

- The trend to an increased orientation of basic research to business purposes and to open innovation calls for high performance in medium and long term research in selected areas and on a global level as a need for an efficient and sustainable business model in KTT. Therefore, a long lasting and effective **inclusion of UAS to long term top class university research** is a precondition for successful KTT. However, the incentive structure for R&D activities of the two types of universities seem to be incompatible with an efficient collaboration: they have a different time frame and are ruled by different success factors.

- The **Bologna reform** might have a major impact on a successful KTT: the Bologna reform focuses mainly on the harmonisation of the recognition of studies within Europe in order to support students' mobility. But, it might have a major impact on the development of staff in R&D too, and therefore on the personnel able to implement KTT. If UAS are restricted to the Bachelor degree only, they will lack of personnel resources for successful application oriented R&D and KTT.
- A further item for a successful business model of an entrepreneurial university is the existence of a **KTT-service centre which is independent and run in a professional way**. It should supply a relatively broad portfolio of services and stay in an intensive contact and exchange with private business. A stimulating incentive structure for researchers at the universities in order to collaborate with KTT should be installed.
- It is a major challenge for the personnel of KTT centres of a university to be able to communicate well with the different groups involved and their particular language and way of **communication** i.e. in particular with researchers and business people. The KTT-centres should match the different needs and interests and act as entrepreneurs. Newer evidence shows that KTT-centres have major **entrepreneurial independence** but nonetheless close contact to their university, e.g. Gesellschaft für Wissens- und Technologietransfer (GWT), Dresden in Germany or Innovation Centre at Imperial College, London.
- In order to be successful, KTT-centres should avoid direct competition with private sector business which is supplying similar services. This might, however, be in conflict with professionalism and market orientation of KTT-centres. Therefore, in several nations evidence from different cases shows **outsourcing and growing independence of KTT centres** from universities.
- Another precondition for a successful development of KTT at universities is an **adequate legal base**. It should rule intellectual property rights (IPR), the formal positioning of the KTT centres at universities and the employment conditions and benefits of researchers who get involved in KTT. The innovation law in France can be seen as a prototype of a modern legal base.