How are the conditions for high-tech start-ups in Germany?

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1. Introduction

This paper reports the findings of a survey, aimed at understanding the dimensions and the effects of the German innovation system on start-ups and spin-offs. This project is part of another head project of the Japanese Innovation Center for Start-ups (INCS) at the National Institute of Advanced Industrial Science and Technology, (AIST), which was formerly affiliated with the Ministry of International Trade and Industry (MITI). This is the largest public research institute on technology and science in Japan.

According to the OECD's[1] definition of national innovation systems the main scientific and practical focus for the innovative process lays in the flows of technology and information among people, enterprises and institutions. Thus innovation and technology development are the result of a complex set of relationships among these actors. Much is known about the German innovation system, its structures and the general conditions for start-ups. Several studies are conducted on a regular base with respect to the German Innovation system, such as: the BMBF's[2] reports "Research and Innovation in Germany" and "Germany's technological performance", the Global Entrepreneurship Monitor for Germany by Sternberg at al., or the yearly survey on start-ups by KfW[3]. Although all surveys take more than one variable factor into account, cross sectional dependencies have hardly been analysed.
This report thus gives an overview on all aspects of the innovation system and the factors for success and failure of start-ups and spin-offs. It illustrates the strengths and weaknesses of the German innovation system on a national and international base. Cross sectional dependencies will be stressed. Thus offers suggestions for improving the institutional environment.

2. Methodology

An intensive and profound literature review was conducted to gain the most important facts on the German innovation system. Main focus was set on data regarding general economic performance and the environment for start-ups and spin-offs in Germany. In particular the following variables were used in the analysis:

- Investment environment (e.g. venture capital, business angels, governmental support, economic development, incubators)
- Regulatory affairs and bureaucracy (e.g. patent and law system, governmental interventions, labour market)
- Socio-cultural awareness for entrepreneurship (e.g. personal affiliation to entrepreneurship, university centers of excellence in entrepreneurship education, woman entrepreneurship)
- According to these findings R&D in Germany (conducted by research institutes, supported by the government…) and all of their contribution to technology transfer was analyzed.

By logical deduction strengths and weaknesses could be pointed out of the German innovation system with a partial focus on regional aspects. To verify and support the results from the first round of our survey several case studies were conducted in each field (incubator, venture capitalists and start-ups and spin-offs). In this way, the paper shows a broad overview of the innovation system in Germany that encompasses and assesses all main findings of the actual literature derived herein (as well confirmed by case studies).

[1] Organisation for Economic Cooperation and Development
[2] BMBF = Bundesministerium für Bildung und Forschung (Ministry for Education and Research)
[3] KfW = Kreditanstalt für Wiederaufbau (National Banking Group)

3. Results

Germany's innovation system stands on different pillars which are distinguished by a wide net of governmental support.

R&D in private economy focuses on some fields (knowledge intensive services, machinery, biotechnology, high and medium technology). It is mainly positioned in the industrial sector. Governmental research support is increasing and can be seen as a strong point of the German innovation system, while private industrial research slows down. The hope for restructuring of some of the laws (labor market, tax system, and other administrative burdens) as well as the new government seemed to have a positive impact last year. Due to absence of the reforms up to now no significant change is in sight. Governmental interventions are necessary in these points were economy is not able to give the necessary resources such as R&D. Other fields of interventions are overregulated and hindering. Although Germany is one of the world leaders in patent applications; high costs and lengthy patent processing are especially counterproductive for the competitiveness of SME's, start-ups and spin-offs. Overall patent expenses are still higher in Germany than net value created. Therefore deregulation is necessary for Germany to cut administrative burdens and to support start-ups and spin-offs more effectively. Nevertheless positive effects of governmental support can be seen in the fields of networking, financial aid, and infrastructure.

Although Germany's development in research intensive products is outstanding, innovation and R&D are characterized by regional discrepancies. Baden-Wurttemberg, Bavaria, Rhine-Main area, and the Ruhr region are the most important regional innovation systems. Their subsystems, local clusters, composed of big players, SME's and start-ups are an inspiring environment and offer optimum conditions for start-ups and spin-offs. As supported by other publications clusters are an important development factor for industry and regions, at least for some.

Socio-cultural awareness for entrepreneurship is another hindering factor for economic development in Germany, but seems to improve lately. Failure needs to bee seen as a try from which an entrepreneur can learn. Nevertheless mostly one is seen as a loser – a discouraging and a vicious circle for entrepreneurs.

Financing aspects are one of the most limiting burdens for young start-ups. VC (venture capital) is hardly accessable and concentrates on ICT[4], medical research, medical appliances and biotech. Paradoxically sectors such as pharmacy of hightechnology in which Germany holds one of the leader positions on international markets are not in venture capitalists´ interest. Risk avoiding behaviour in Germany is the fundamental reason for the described financial caution.

Another point is the incubator system. Depending on business model, network, and know-how incubators can have a positive impact. It must be highlighted that governmental incubators are often lacking financial resources and know-how. Therefore more non-governmental supported incubators are needed although Germany shows one of the highest quotas in Europe.

4. Discussion

Germany has a good innovation system but implementation and results are non-efficient. This is caused by the already well described factors. A better financing environment, deregulation and a higher level of socio-cultural awareness for entrepreneurship are the most important factors.

Most companies in Germany are SMEs (small and medium sized enterprises). Due to the actual situation, international patens are often not affordable for them. Other problems for SME's are the patent density and difficulties to find niches in some branches, the complexity of patent system (on international level), and high know-how for researching existing patents (only few good patent lawyer are available). Most of the start-ups are facing exactly these

[4] Information and communication technology

problems. Therefore the main potential for entrepreneurial growth is still “asleep” although it could boost Germany’s economy.

Need for action is obvious but still not realized in most aspects by the government. Policy needs to be changed so that the backbone of Germany’s economy – the SME’s – are supported in transacting their business. That means that regulations need to cut to a necessary minimum. Resources which are difficult available for them should be provided or at least supported by government.

A weakness of our survey is that we did not rank the used criteria by importance. As an international acknowledged catalogue of criteria has not been established we focused on the most important criteria to influence the performance and growth of start-ups and spin-offs. Thus, we could generate valuable results showing the strengths and weaknesses of the German innovation system as well as for improving the institutional environment.

Second, interdependencies are only seen form the actual status quo. Possible changes and their impacts on the entire innovations system cannot be forcasted.

According to our findings further research must focus on the national status quo on incubated start-ups especially those from governmental R&D institutes. Furthermore surveys concerning the future of incubated start-ups, the incubation process itself and differentiating incubated start-ups form non-incubated are missing. Last but least, why does German investment lack behind other European countries and which reasons do the patent holders hinder from deploying their patents, are further research questions to be addressed in the future.

In summary existing solutions should be used more often and effectively by the government and companies not only to support start-ups and spin-offs but also to attract foreign direct investment from abroad and foster a sustainable economic development in Germany.

5. Theoretical/empirical/methodological advances of contribution

The advances of this survey must be seen in the cross sectional analysis of a broad criteria catalogue. It allowed us to evaluate the actual entrepreneurial situation as well as implications for potential foreign investors in Germany. Case studies underlined our comprehensive SWOT[5] analyis of the German innovation system.

It should be highlighted that our findings contribute to a differentiated view on policy and its interventions. Thus, the understanding among political and economical actors for best practice and more effective solutions can be broadened.

Literature

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[5] Strength-Weakness-Opportunities-Threats