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## Technological Forecasting &amp; Social Change



# Analyzing and improving the national innovation system of highly developed countries – The case of Switzerland

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## ABSTRACT

According to the European Innovation Scoreboard, Switzerland is the innovation leader in Europe. Switzerland surpasses countries such as Finland, Sweden or Germany in most of the relevant indicators. Additionally, Switzerland is also one of the most competitive countries in the world, as investigated by the World Economic Forum. This paper addresses the question, how the country can keep its leading position by enlarging and strengthening the national innovation system in a sustainable way. Using a systemic approach, in particular an adapted national innovation system framework, this study analyses the current innovation system of Switzerland and comes up with nine recommendations for improvement. Two years after the presentation of these findings to the Swiss government, this study is also able to report on the implementation of some of these recommendations. Method wise, it is a result of a series of interviews and workshops with major stakeholders in the innovation field in Switzerland combined with the analysis of secondary data from multiple sources.

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## 1. Introduction

The term national innovation system (NIS) was first coined by Freeman and Lundvall in the 1980s [1,2]. While Lundvall [2] originally distinguished between a narrow and a broad definition of national innovation system, today the broad definition is commonly used [3,4]. Next to “organizations and institutions involved in searching and exploring – such as R&D departments, technological institutes and universities” [4], the broader view on NIS includes the diffusion, absorption and use of innovation [4,5]. Additionally e.g. R&D efforts by business firms and public actors, learning processes, incentive mechanisms or the availability of skilled labor as well as interactions between organizations and institutions are also included [6]. Consequentially this broader definition is based on a systemic approach rather than linear push and pull processes. Lundvall and Borrás [7] and Lundvall [3] describe this change as movement from “Science Policy” and “Technology Policy” towards “Innovation Policy”.

Especially in recent years, research on this area has increased and numerous publications focus on innovation policy. The terms ‘national innovation system’ (NIS) or ‘national system of innovation’ (NSI) describe this research stream best and well-known articles and analyses use this approach to benchmark or detail on the innovation capacity and potential of countries or whole regions (compare with the [Literature review](#) section). In the following we will use NIS as an abbreviation for both terms synonymously.

With a detailed literature study, we identify three basic types of publications on NIS: NIS studies in general; NIS studies with a focus on particular aspects of the NIS and theoretical perspectives on NIS. Even though quite a number of articles analyze the NIS of a single country in detail, none of these studies on a developed country is able to draw implications on how to improve the current

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system and at the same time report on changes being made, after these recommendations were issued. Hence, this study will go into detail on the very far developed country of Switzerland, using a start-to-end approach.

By using a systemic approach, this study is not only able to develop recommendations for improvement for the NIS of one of the world's leading innovators, but also to report on the implementation of several of these recommendations. After a thorough analysis of Switzerland's national innovation system and a number of workshops and discussion sessions, the authors propose nine recommendations on how to enlarge and strengthen the Swiss innovation system in a sustainable way, so the country may keep its leading position or even extend its lead.

Methodically, we compiled a literature review and analyzed a large number of secondary data. Based on that we conducted a series of expert interviews, workshops with major stakeholders as well as discussion sessions with a consulting counsel of the government.

1.1. Switzerland

Switzerland, also the Swiss Confederation, is a relatively small country in the middle of Europe. It is bordered by Germany in the north, Austria and Liechtenstein in the east, Italy in the south and France in the west. The country was founded in 1848 and enfold 41.285 km<sup>2</sup>. The 7.8 Mio inhabitants speak four official languages. Switzerland is a very rich country and achieved a GDP of 69.838\$ per capita in 2010 and still has its own currency, the Swiss Franc [8].

The Swiss innovation system ranks among the best in Europe [9–12] (compare with Fig. 1). One major source of this excellent position is the outstanding reputation of Switzerland's universities and scientific research facilities (compare with Tables 1 and 2).

This reputation is mirrored in a ranking of per capita publications, which is headed by Switzerland [13]. Apart from that, Swiss companies also contribute with a substantial amount of R&D spending to the innovation performance of Switzerland [11,14].

Even though Switzerland seemingly succeeds in comparison to other European countries, weak spots can still be identified when having a closer look [11,12] (compare with Section 6).

2. Literature review

To uncover literature, which is concerned with national innovation system-related topics, a literature research in major databases (e.g. Ebsco and ABI/Inform) was conducted. The search of “national innovation system” or “national system of innovation” in keywords, title and abstract yielded 45 results with a direct relation to the subject. Unrelated articles were manually removed from the subsequent data.

According to Balzat and Hanusch [6], many research on NIS use systemic approaches and among those, they distinguish between performance-oriented studies and NIS studies of low- and mid-income countries or regions.

Following our own literature study, we found another distinction for the articles and divide in three basic types of articles on NIS:

- firstly NIS studies in general,
- secondly NIS studies, which focus on particular aspects of the NIS
- and thirdly theoretical aspects of NIS.

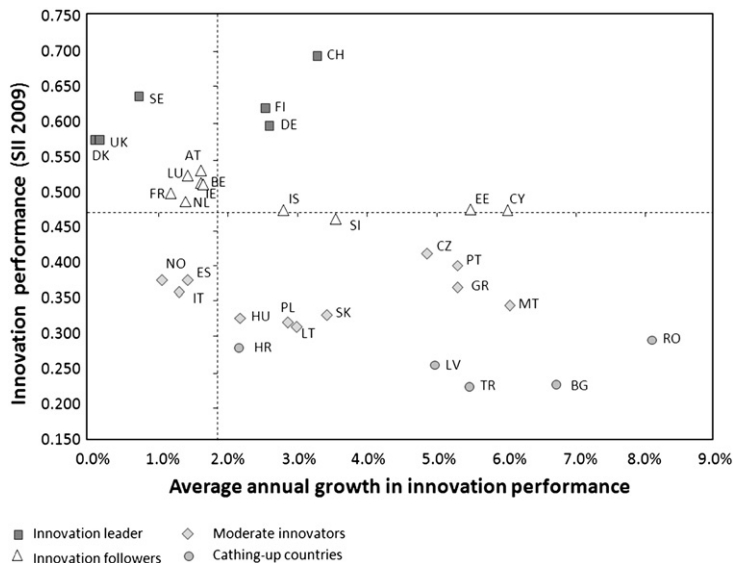


Fig. 1. European Innovation Scoreboard (EIS) – SII and growth 2009 [11,12]. Unfortunately newer versions of the EIS do no longer show Switzerland in this particular graph.

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