

THE TECHNOLOGY NETWORK MODEL FOR ANALYZING REGIONAL INNOVATION SYSTEMS

To research whether this is done successfully, the output and outcome of the (regional) innovation system and policies should be measured and compared. The Technopolicy Network offers a specially designed model to measure and compare the output and outcome of the (regional) innovation system and policies, known as the **Technopolicy Model** (from now on referred to as the TPN-Model). The basis for the model is the work of the following four leading authors: Prof. P. Nijkamp (2007: the FIRES Model), Prof. R. Stough (2005; Concept of Leadership) and Dr. R.W. Smilor, and M.Wakelin (1990; Smart Infrastructure Model), of which the first two authors are both members of the Technopolicy Advisory Board.

The TPN-Model

Combining the three models and concepts, the TPN-model shows the essential factors that determine (regional) innovation capacity (see figure 1). This makes this model a tool that assists (regional) policymakers in the formulation of a regional innovation strategy or to assess the performance of the (regional) innovation system.

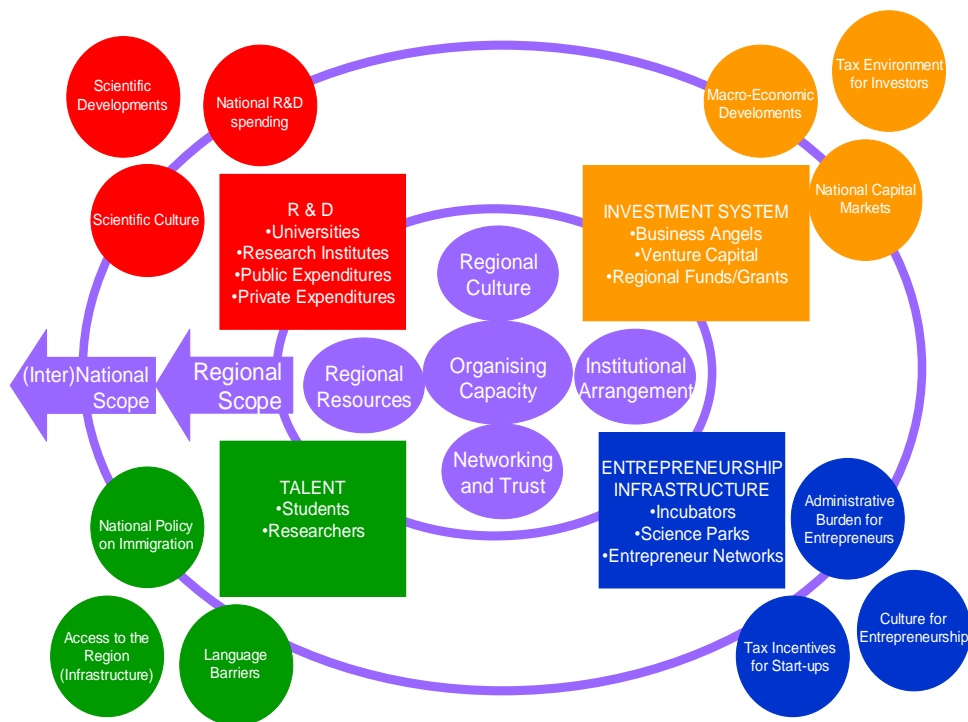


Figure 1: Factors determining Regional Innovation

The model shows the critical success factors for regional innovation at different levels; regional, national and international. The further one moves away from the inner circle, the less control the region has over these factors. In the interest of providing an overview of the important factors from the regional perspective, we have simplified this model to indicate the critical factors within the control of the region, as is shown in figure 2:

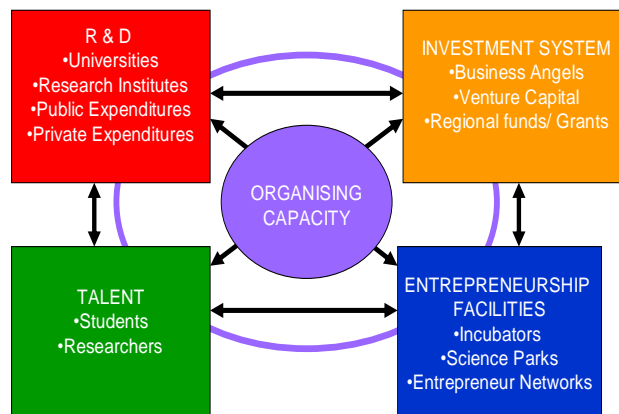


Figure 2: Critical Success Factors for Regional Innovation (within control of regional policymaker)

The model shows the five critical success factors:

- **Talent:** this factor indicates those people with bright and unique ideas. By this definition, it refers not only to entrepreneurs who recognize and exploit market opportunities, but also to the students and researchers that develop new knowledge. Regional policymakers can influence the amount of talent available in the region through policies directed towards an increase in the quality of life conditions that attract and retain this talent.
- **R&D:** this factor refers to the presence of high level universities and research institutes in the region. These facilities serve as a location to generate knowledge. This is stimulated with investments into R&D by both the public and private sector. R&D is defined as “creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society and the use of this stock of knowledge to devise new applications” (OECD, 2002).
- **Investment system:** this factor indicates the presence of capital providers for the support of technology start-ups, including both private organisations (such as business angels and venture capital companies) and public organisations (through funds and grants). The regional government can influence the investment system through the creation of a policy that is attractive to investors. Further, she has control over the distribution of funds and grants.
- **Entrepreneurship facilities:** entrepreneurs need locations to develop their new knowledge into marketable products. Examples for these kind of locations are incubators and science parks. Within these locations it is possible to learn the necessary business and technical know-how. Also, entrepreneur networks are a way for entrepreneurs to get into contact with other entrepreneurs to exchange experience and knowledge. The regional government can stimulate the creation of science parks and incubators and the formation of networks for entrepreneurs.
- **Organising capacity:** this factor refers to the way in which activities of different actors are coordinated. By this definition, it does not necessarily have to be the same thing as leadership, because leadership is often interpreted as a top-down approach. As such, one could think of

policymakers as one of the leaders of the region who govern other actors in the regional innovation system through their laws and procedures. It is also conceivable that activities are coordinated through a bottom-up approach: the actors themselves get into contact with one another and coordinate activities. Therefore it is necessary to investigate multiple indicators when to identify the organizing capacity, these include: collaboration, trust, shared power, flexibility and entrepreneurialism.

For all five factors, various indicators have been formulated. The collection of data on all these indicators in the various regions allows for a comparative analysis of these regions. The full overview of these indicators can be found in Appendix A.

It should be noted that the various factors are related to one another and therefore, should not be considered in isolation (this is shown in the figure by the black arrows). Since different actors are mostly responsible for the different factors, a combined effort is needed for the successful transfer of scientific knowledge. The information obtained during the interviews should provide more insight into the direction of the linkages and the intensity of the combined effort (organizing capacity).

APPENDIX A:

LIST OF INDICATORS GROUPED PER SUCCESS FACTOR

Public R&D:

- Public R&D Expenditures as a % of Gross Regional Product
- Number of top universities per 1000 inhabitants

Private R&D:

- Private R&D Expenditures as a % of Gross Regional Product

Talent:

- The share of higher educated students in relation to the population size of the region
- The share of higher educated people that attained higher education in relation to the population size of the region

Public Investments:

- Public R&D Expenditures
- Presence of (pre)seed funds for start-ups
- Presence of grants for start-ups
- Availability of risk bearing capital for entrepreneurship: this indicator has been combined with the presence of (pre)seed funds to assess the size of the funds compared to the ideas present in a region.

Private Investments:

- Presence of Business Angel Networks
- Size of the Financial Sector: the share of value added earned by the financial services sector compared to the Gross Value Added in a region.

Entrepreneurship Facilities:

- Number of incubators in the region per 1000 inhabitants
- Number of science parks in the region per 1000 inhabitants
- Presence of Entrepreneurship Societies

Organizing Capacity:

- Presence of a shared regional innovation strategy
- Does the region measure its innovative performance as a whole?
- Presence of Economic Development Agency that actively works on innovation

