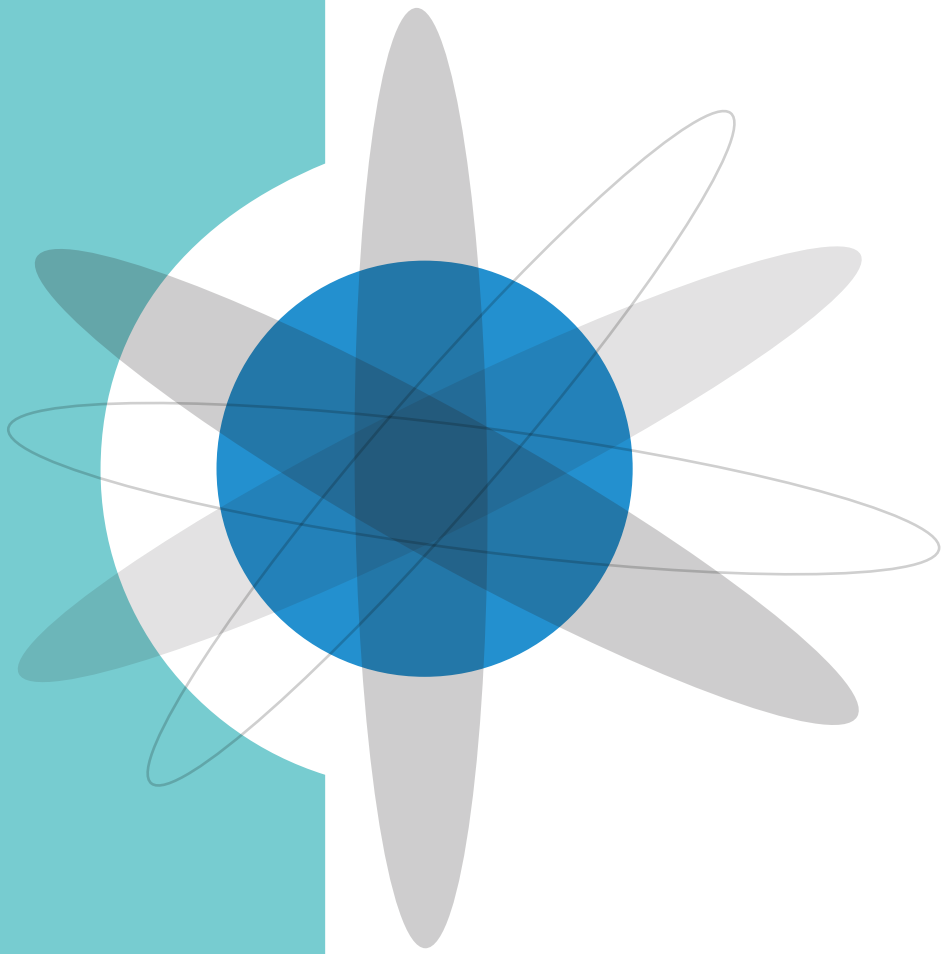
UNIVERSITY OF TAMPERE
TaSTI
RESEARCH CENTRE FOR KNOWLEDGE, SCIENCE, TECHNOLOGY AND INNOVATION STUDIES

Working Papers 9/2013



Models for International Innovation Policy: Transnational Channels and Regional Platforms

Fostering Globalizing Innovation Communities in Finland and Abroad

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Cover design by: Tuula Kaakinen
ISBN 978-951-44-9239-6
ISSN 2323-6213
ISSN-L 2323-6213
Tampere 2013

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ABSTRACT: Framing the internationalizing innovation policy for Finland[1]

The main objective of this report is to *create a systematic framework to conduct policy planning related to the internationalization of an innovation system*. Rather than singular new policy measures, this report proposes a shift in focus and an extension of view in internationally oriented national innovation policy making. We suggest that the **policy framework for a long-term internationalization strategy of the innovation policy should focus more on the development of the next generation of globally oriented "innovators" and the emergence of related global communities**. Innovation communities are based on individuals, but bring together the key actors globally, including large firms and universities. Thus, the framework aims to promote the emergence of regional innovation systems that are more compatible with the global innovation ecosystem due to stronger globally oriented innovation communities. Therefore, four types of policy models shaping the **regional platforms** and **transnational channels** that foster the evolution of innovation communities are proposed:

- To link the policy measures with the regional innovation environments, the concept of a **regional innovation factory (RIF)** as a **regional platform** is introduced. "Regional innovation factory" refers to a recent phase of evolution in science park types of activities that offers a new kind of platform for policymaking with their growing internationalizing start-up and other "innovator training" programmes as well as their community-building mentality.
- **The facilitation model** covers most of the traditional policy measures that increase the internationalization resources and capabilities of firms and researchers. More support for globally oriented innovator training in order to help Finnish firms to move abroad and to attract and root foreign entrepreneurs in Finland is proposed. Both could benefit from the emergence of long-term transnational innovation communities in Finland.
- **Bridging** of the Finnish innovation system with relevant innovation systems abroad refers to the building of **systemic relations of several actors between certain locations**. We propose that beyond the government-agency-based co-operation models (e.g. Finnode), the transnational innovation infrastructures could be based more on the activities of universities or regional actors. The existing "global university campuses" and emerging cross-border regional innovation systems offer a foundation for this type of university–industry–government co-operation.
- **The inclusive innovation model extends the view to those who are not yet actors in innovation activities**, but who could acquire a significant role in transnationalizing the innovation system of Finland. New inclusive policy models refer to stronger innovation orientation in the development policy (e.g. to include emerging hubs in developing countries) and immigration policy (e.g. to include relevant immigrant workers and entrepreneurs) fields that could integrate new communities in Finland and abroad into the innovation system, from outside the usual suspects.

It should be noticed that the focus is not on individual policy measures (although they are illustrated extensively), but on the goal and the main target groups of the policy models. The idea of the framework is to make individuals more familiar and thus more confident with the global innovation environment through consistent and long-term building of global innovation communities. Extending the activities like university training and business accelerators abroad and supporting mobility within this transnational innovation infrastructure will make innovators familiar with the social and innovation structures of the global environment, but still with a clear link to and anchor in the regional innovation platforms in Finland.

[1] Enabling Innovations Beyond National Innovation Systems [IBIS] A comparison of policy models
Final report of a project funded by Tekes

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1 Enabling innovations beyond national innovation systems

A need for policies to govern the globalization of innovation has been evident for decades, but surprisingly few new policies have been created by national governments. This is also the case in Finland, where the innovation policy has had an important role to play and where the low level of internationalization has been a well-recognized challenge. Recently, the conditions for an internationally oriented innovation policy have been altered by the rise of emerging and developing economies to champions of globalization as well as by the growing role of individuals, small firms and open modes of innovation activities. Consequently, we have to move beyond science-based collaboration dominated by multinational companies (MNCs) to the emergence of new markets and the level of individuals and innovation communities energizing the global economy. This report aims to respond to these needs by outlining a framework for internationally oriented innovation policies.

1.1 Framing the international innovation policy for Finland

The main objective of this report is to *create a systematic framework to conduct policy planning related to the internationalization of an innovation system*. Statements from the *Evaluation of the Finnish National Innovation System* (Ministry of Education and Ministry of Employment and Economy 2009; bold added) point out the challenge:

> Finnish innovation policy and policy documents do emphasize internationalization and international collaboration in the context of innovation policy. While the issues have been on the policy agenda for a long time, **Finland remains exceptionally inward-looking** in these respects. Indeed, only international trade and cross-border direct investment have in the past been forcefully promoted forms of globalization. (p. 38)

> The Finnish innovation system is less internationalized than conventionally thought and there are signs that it is falling further behind. Tapping deeper into the global knowledge pool should be one of the main objectives of innovation policy. The rising role of emerging economies in the global innovation system provides huge challenges but even bigger opportunities. (p. 52)

For any national or regional policy makers or other stakeholders, such as corporate decision makers, new challenges have arisen that may be summarized in this context as one key question: How may we reap the benefits of globalizing innovation? In Finland, a fairly extensive set of innovation policy measures has been harnessed to enhance the performance of the national innovation system while a less coherent effort has been made to design an internationalization strategy for the innovation policy. Importantly, the internationalization of innovation activities has

been a constant and acknowledged challenge and therefore the need for a more systematic policy framework is evident (e.g. Research and Innovation Council of Finland 2009, see also Serger & Wise 2010).

Rather than singular new policy measures, this report proposes a shift in focus and extension of view in internationally oriented national innovation policy making. We suggest that the **policy framework for a long-term internationalization strategy of the innovation policy should focus more on the development of the next generation of globally oriented "innovators" and the emergence of related global communities**. Innovation communities are based on individuals, but bring together the key actors globally, including large firms and universities. Thus, the framework aims to promote the emergence of regional innovation systems that are more compatible with the global innovation ecosystem due to stronger globally oriented innovation communities. Therefore, four types of policy models shaping the **regional platforms** and **transnational channels** that foster the evolution of innovation communities are proposed:

- To link the policy measures with the regional innovation environments, the concept of a **regional innovation factory (RIF)** as a **regional platform** is introduced. "Regional innovation factory" refers to a recent phase of evolution in science park types of activities that offers a new kind of platform for policy making with their growing internationalizing start-up and other "innovator training" programmes as well as their community-building mentality.
- **The facilitation model** covers most of the traditional policy measures that increase the internationalization capabilities of firms and researchers. More support for globally oriented innovator training in order to help Finnish firms to move abroad and attract and root foreign entrepreneurs in Finland is proposed. Both could benefit from the emergence of long-term transnational innovation communities in Finland.
- **Bridging** of the Finnish innovation system with relevant innovation systems abroad refers to the building of **systemic relations of several actors between certain locations**. We propose that beyond the government-agency-based co-operation models (e.g. Finnode), the transnational innovation infrastructures could be based more on the activities of universities or regional actors. The existing "global university campuses" and emerging cross-border regional innovation systems offer a foundation for this type of university–industry–government co-operation.
- **The inclusive innovation model extends the view to those who are not yet key actors in innovation activities**, but could acquire a significant role in transnationalizing the innovation system of Finland. New inclusive policy models refer to stronger innovation orientation in the development policy (e.g. emerging hubs in developing countries) and immigration policy (e.g. immigrant workers and entrepreneurs) fields that could integrate new communities in Finland and abroad into the innovation system, from outside the usual suspects.

It should be noticed that the focus is not on individual policy measures (although they are illustrated extensively), but on the goal and the main target group of the policy models. The idea of the framework is to make individuals more familiar and thus more confident with the global innovation environment through consistent and long-term building of global innovation communities. Extending the activities like university training and business accelerators abroad and supporting mobility within these transnational innovation infrastructures will make innovators

familiar with the social and innovation structures of the global environment, but still with a clear to link and anchor in the regional innovation platforms in Finland.

A policy framework aims to facilitate international innovation activities and their governance to the extent that this is possible by public policies. To define the content of the framework in practice, the relevant policy models and real-life examples (or some of their elements) from Finland and abroad will be introduced.

1.2 Motivation and implementation of the IBIS project

The motivation for the study was based on scientific interest in the internationalization of innovation systems and innovation activities[2] and triggered by the observation that surprisingly few scholars have attempted to build comprehensive frameworks to understand its governance. It was also observed that numerous policy measures have emerged in Finland to promote the internationalization of the innovation system and innovation activities, but a crystalized strategic approach or an overall disposition was difficult to identify. In addition, recent changes in the global innovation landscape have suggested that there is a need to rethink the international innovation policy.

The key goal of the IBIS project (Enabling Innovations Beyond National Innovation Systems 2011–2012, funded by Tekes and conducted by TaSTI/UTA) was to study the main policy models deployed in Finland and compare them with (successful) policy models in some other countries, in order **to create a systematic framework to conduct policy planning related to intentional internationalization of the Finnish innovation system** and to provide some examples of related policy measures from abroad.

The key target group of the report is regional and national policy makers interested in internationally oriented innovation policy making. In addition, we hope to offer some tools for researchers who aim to clarify the complex relations and processes of the multilayered and constantly evolving global innovation economy. Although the outcome of this report is based on recent scientific research, on the most recent changes in the real-life practices of the global innovation economy and on the state of the art in policy making, we do not want to anchor the framework *too much* on any of these. Instead, our aim is to provide space for "out-of-the-box" thinking, and the extensive data rather guide our work and link it firmly to real-life activities and existing theories than offering a ready framework as such. We hope that this report will offer some new insights to outline the design of an internationally oriented innovation policy for both practitioners and academics.

In order to accomplish the task addressed to the IBIS project, it was implemented in co-operation with Professor Sunil Mani, Kerala, India (Center for Development Studies); Researcher Dr Ju Liu, University of Lund (CIRCLE), Sweden; and Associate Professor Katherine Richardson, University of San Jose, USA. Each key partner represents a different innovation environment with different approaches and practices to promote the internationalization of innovation activities.

[2] The project is part of a research programme, *Trans-Nationalizing Innovation Systems: Channels and Platforms for Innovation and Competence Building* (CHAPS) of TaSTI (UTA). For more information see www.chaps.fi.

The data for the project were gathered from both primary and secondary sources. Both policy and research-based sources were deployed:

- **A steering group** represented expertise from business, policy making and innovation studies on which the project team (the two authors of this report) was able to lean. Mr Tarmo Lemola has extensive experience of innovation policy, related consultancy and research from the 1980s onwards. Research Director Dr Jukka P. Saarinen from Nokia Innovation Center (NRC) has been strongly involved, besides his activities in corporate R&D, in regional innovation policy making in the Tampere region and beyond. He also contributed to the report by co-authoring the second section on regional platforms. Mr Antti Valle was, during his membership of the Steering Group, the Director of the Innovation Environments Unit in the Ministry of Employment and the Economy. Dr Christopher Palmberg, Chief Adviser, Tekes, has both academic and consultancy experience in the field of innovation.
- **The key partners** contributed to the project in different ways. Professor Sunil Mani wrote an independent report on the Indian case in 2012; Associate Professor Richardson hosted a one-month visit in 2011 to Silicon Valley, where some of the data were gathered through interviews; and Ju Liu worked as a Senior Researcher in TaSTI, Finland, from July 2011 to July 2012, as part of the Innovation Studies Group, focusing especially on global innovation networks (GIN) in her work. After joining CIRCLE, Lund University, she continued to collaborate with the project.
- The most recent academic research in the field was screened and ideas from reports tested through **participation in international conferences** and seminars (11) in the Americas, Asia and Europe.
- The primary sources of policy-related data and insights were the themed, open **interviews and one workshop (in Tampere, 2012) with the innovation policy-relevant stakeholders** in Finland and in the USA (30).[3]
- **The secondary sources of data** included especially, but were not limited to, research literature and policy documents.

Neither all the cases that were studied nor the whole spectrum of research measures conducted will be discussed in this report. Instead, this report attempts to understand the role of internationally oriented innovation policy making from a national perspective and attempts to offer conceptual tools to outline and frame this policy making.

The report is consistently structured: these four models will be defined and their key characteristics and basic functions will be discussed in their own chapters. Some real-life examples will be briefly introduced in separate boxes – not to analyse the policy measures as such but to illustrate some of the key features related to the models. Potential prospects for developing each of the policy models in Finland will also be discussed briefly and illustrative examples from abroad will be introduced, again in boxes. The chapters making up the report are as follows.

[3] The conferences and informants are listed in Appendix 1.

- Chapter one introduces the project, motivation and approach.
- Chapter two introduces the emerging regional platforms, termed here as *regional innovation factories* (RIFs).
- Chapter three introduces the facilitating model: *how to facilitate the emergence of trans-national communities* instead of facilitating the internationalization of the most innovative individuals and organizations only.
- Chapter four introduces the bridging model: *how to bridge innovation systems* with the most relevant innovation systems abroad.
- Chapter five introduces the inclusive model: *How to integrate as many new actors into the innovation economy as possible* – even though those would possess rather low capabilities – in order to maximize the innovation capabilities and the size of markets.
- Chapter six introduces the policy planning framework for the internationally oriented innovation policies based on the four policy models above.

1.3 The broadening landscape of the global innovation economy

In general, the goals of internationally oriented innovation policies are still today frequently conceived in compacted form, as follows (e.g. Archibugi et al. 1999; Archibugi and Iammarino 2001; Halme et al. 2004):

- attract and help to attract investments or talent from abroad;
- facilitate nationally the utilization of those technologies, business models or new practices that are generated abroad;
- facilitate the utilization of exporting opportunities for domestic innovative products;
- foster the establishment of international research-based collaboration to produce new technologies.

Attracting investments or human capital often includes practices that make the national environment more supportive of innovation activities (e.g. tax incentives, IPR rights). These practices related to the general development of the innovation environment are not the focus of this report (although to some extent they are discussed in the context of regional platforms), but the emphasis is clearly put on internationally oriented policies. Further, a broad approach to innovation and the related recent changes in the landscape of the global innovation economy provide a base for the proposed policy frame. A broad-based innovation policy may be challenging to apply, especially so in the global context, but it seems to be mandatory, since the innovation economy, and innovation activities themselves, have become more diversified. These developments are introduced briefly in the following.

A broad approach to innovation and the related recent changes in the landscape of the global innovation economy provide a base for the proposed policy frame.

Large firms and science do not create the only winning combination in the global innovation economy; small firms and heterogeneous innovation communities with experience-based or symbolic knowledge are also increasingly relevant actors (e.g. Chesborough 2003; von Hippel 2005; Lundvall and Lorenz 2011). According to a global survey targeted at executives responsible for innovation activities in large companies:

- 74% agreed that more than ever innovation needs to be localized to serve specific market needs
- 80% agreed that the roles of individuals and small firms have increased
- 73% agreed that meanwhile the role of science may even have relatively decreased[4] (GE 2012).

Further, innovation is not resticted to a certain sector only. In Silicon Valley, seasoned business leader and regional development strategist Doug Henton states that how firms compete is more important than what they produce: "There are no high tech or low tech industries anymore—just innovative or non-innovative companies" (Henton 2011). In the Nordic countries, the same message is well pronounced by Lundvall and his colleagues in Jensen et al. (2007), the long-time advocates of the innovation system theory, according to whom science-based learning (STI) represents only a small share of economically important learning.

Lundvall and Lorenz (2011) distinguish *scientific learning*, mostly based on codified knowledge produced in universities and research labs (STI), from *experience-based learning* (DUI: doing, using, interacting). The DUI mode takes place, for example, in everyday work-related situations, in interaction with customers and partners or when a product or a process is used. Table 1 illustrates how science-based learning (STI) is a rather rare phenomenon in most industries and even among the high-technology industries only 26% of learning is mostly based on science. According to the authors (ibid.), the most innovative results are achieved when both the STI and the DUI modes exist at the same time, i.e. when science-based learning is combined with experience-based knowledge.

Table 1. Different learning modes by firm size and industry in Denmark (Lundvall and Lorenz 2011)

		Learning modes		
Number of employees	*Low learning*	*STI cluster (science-based)*	*DUI cluster (experience-based)*	*DUI/STI cluster*
Fewer than 50	56	9	26	10
50–99	33	18	30	19
+ 100	25	13	27	36
Type of industry				
Manufacturing HIGH TECH	22	26	23	28
Manufacturing LOW TECH	35	13	29	23
Construction	61	5	26	8
Trade	58	5	31	7
Business services	27	9	26	38
All firms	*43*	*12*	*27*	*20*

[4] 80% agreed that more than ever **SMEs and individuals** can be as innovative as large companies; 73% agreed that innovation is **driven by people's creativity** more than by high-level scientific research. The role of individuals is valued as the highest in Mexico (95%), Brazil (94%), France (92%) and the USA (89%) and the lowest in China (57%), Japan (60%), Russia (65%) and Germany, Poland and South Korea (70%). The division between the countries that rely on individuals over systems and corporations is quite clear between the Americas and Asia, as well as the division within Europe (GE 2012).

Finnish firms have been among the most active in undertaking internationally oriented innovation co-operation (Figure 1), but **this co-operation has not turned into innovation-oriented growth and business in Finland to the extent that the policy makers would have wished**. Finnish large firms are the most active in innovation-related international co-operation (65.5%) among the 30 countries and Finnish SMEs are the sixth most active. The SMEs are less international (24.2%) than large firms but not when compared with the SMEs in other countries. In fact, Finnish SMEs are among the most active in innovation-related co-operation with partners in China and India (OECD 2011).

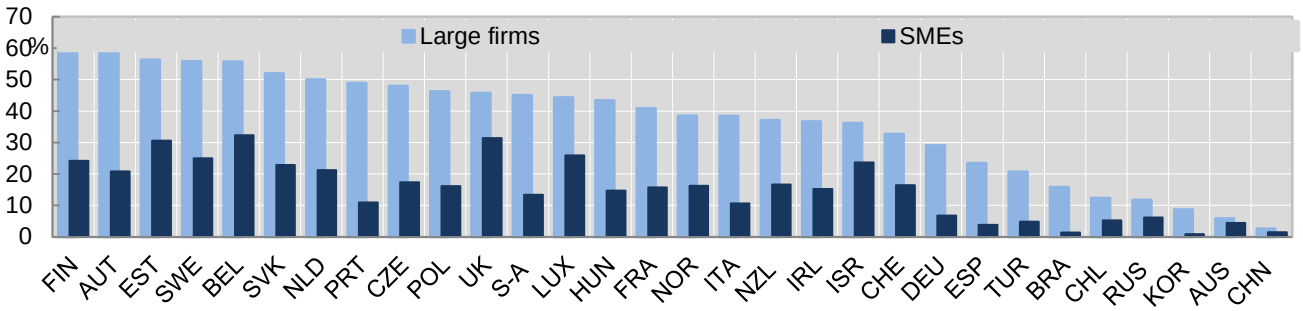

Figure 1. International innovation co-operation of large firms and SMEs 2006–2008 (OECD 2011)

Furthermore, the changing geography of the global innovation economy has broadened the conception of the innovation economy, as (former) developing countries have become major players in the field. Today, many of the most promising innovation hubs are located in Asia, Africa and South America (e.g. Prahalad 2006; Lundvall et al. 2010; Saad and Zawdie 2011). In addition to the geographic scope, this process has also broadened the general view of the innovation economy, as **inclusive innovation has become a worldwide concern along with the new geographical context**. The inclusive innovation approach is interested in *how to connect less advantaged people to the emerging innovation economy*. The approach emphasizes that the innovation policy should be able to integrate less wealthy and less skilled individuals into the innovation economy as well (as innovators and customers). The policy promoted by the World Bank and the United Nations, among others, has been very topical, especially in India but more recently also in China and in many other less advantaged countries (e.g. Prahalad 2006; Globelics 2012).

Inclusive innovation: how to connect more people to the innovation economy, and to gain from it mutually.

Inclusiveness, however, emerges from European egalitarian thinking and also contains a question for Finland and other advanced economies: how to connect those who are excluded to the innovation economy? For example, in the case of Finland, despite the links of SMEs to China and India, the innovation-related connectivity with developing countries seems to be thin. Currently, the **Finnish universities and public research institutions are mostly linked to Western Europe and the USA**, according to a survey conducted among all the heads of departments of universities and public research units in 1999, 2004 and 2009 (Table 2). Collaborators from Asian, African or South American countries were not mentioned among the five most important partners.

Table 2. Three most important research collaborators by country, a survey conducted among the heads of department in Finnish universities and public research institutions in 1999, 2004 and 2009 (Raunio et al. 2010)

Field of science	*Year*	*The First*	*The Second*	*The Third*	*N*
Natural sciences	1999	USA	UK	France	57
	2004	Germany	Sweden	USA	46
	2009	USA	Germany	Sweden	58
Technical sciences	1999	Germany	USA	Sweden	74
	2004	Germany	Sweden	USA	77
	2009	USA	Germany	Sweden	37
Medical sciences	1999	USA	Sweden	Germany	47
	2004	USA	Sweden	UK	40
	2009	USA	Sweden	UK	23
Social sciences	1999	USA	UK	Sweden	92
	2004	UK	Sweden	USA	76
	2009	UK	Sweden	USA	48

Further, immigrants constitute a growing share of the new workforce, especially in the Helsinki region, and 30% of them have a higher education degree, but their role in the Finnish innovation economy is still very modest. Then, the inclusive view emphasizes the integration of those who are excluded from the processes of the innovation economy, and in the case of an internationally oriented policy, the role of developing countries and immigrants could be considered to be more strategic targets for inclusive innovation policies than they are today. This is further discussed in chapter five.

Since recent innovation approaches emphasize **the involvement of several actors, often with incentives other than financial ones being the most important, the conception of innovation communities has become increasingly relevant**. A well-established observation is that groups and innovation communities rather than individual firms implement the various phases of innovation processes**.** The innovation community may be formed of a group of actors essential to or supportive of an innovation process. Communities may occur within or across organizational boundaries, they may be of different sizes regarding the number of their participants and they may range from local to global. For example, the following definitions and types of communities or networks discussed in the literature may be included in the broad definition of an *innovation community*:

- A *technology community* as a group of firms creating a new technology; or an *innovation community* as actors who commercialize a new technology (Lynn et al. 1996).
- A *hacker community* or other web-based communities, such as *open-source software developer networks* (Himanen 2004).

- A *community of practice* (Lave and Wenger 1991; Wenger 2000) is fairly synonymous with an innovation community, referring especially to the learning of a group of actors who share the same interest in solving a certain (temporary) problem.
- *Open innovation* and *user-driven innovation* refer to the same phenomenon, i.e. the need to link more actors to the innovation process in order to create new knowledge or a new product, or to commercialize a new product.
- *A global innovation network* (GIN) connecting distant actors to the same innovation process (Barnard and Chaminade 2011).

For innovation policy, communities provide opportunities to link regional innovation activities globally and to integrate foreign talent through community-building practices.

In the context of regional development, it has also been suggested that innovation communities (e.g. networks of government-supported agencies, university-based groups, business executive groups, NGOs) could create a "community of communities to support the learning enhancing the regional economic development as well as development of innovation communities themselves" (Lippitz et al. 2013, 63–65). We share the view that a "community of communities" could enhance the innovation-based development and there is a need for a regionally oriented home base for this purpose. **Innovation communities are also relevant due to a community-building approach that emphasizes the mutual support among the members.** *Helping and supporting others without expecting financial reward (not at all or not immediately or directly)* are stressed. This community ideal closely resembles an idea of policy support, i.e. to help those at an early stage of their career, often young entrepreneurs, with few resources but with good ideas.

In the case of Silicon Valley, the (business) communities of immigrants themselves played a significant part in breaking down the glass ceiling, alleviating discrimination and *finally creating truly transnational social spaces between the USA and Asia*. More interesting than to know how talent was attracted to Silicon Valley is the process whereby immigrants were integrated so seamlessly into the innovation economy of the region.

More interesting than how talent was attracted to Silicon Valley is how immigrants were integrated so seamlessly into the innovation economy of the region.

In Finland, at the turn of the millennium, the technology programmes of Tekes were successful in strengthening community identities in specific technological fields, especially in the case of research projects (science communities) but to a lesser extent in the case of more commercially oriented projects (technology/business communities). Furthermore, the impact of a community identity was limited mostly to the domestic sphere and there were rather few truly international communities (Halme et al. 2004, 49). It should be noticed that the evaluations of innovation and internationalization services in Finland (see Aaltonen et al. 2010, 29–30; Laasonen et al. 2012) suggest that the synergies and co-operation among the service providers may leverage the efficiency of policy measures. In addition, those services should be (ibid.):

- more visible and better known by potential clients, especially small firms;
- more agile, quick and flexible, and available from one desk;

- more tailor-made and long term in trust-based relationships with service providers;
- enabled rather than provided by the public sector;
- targeted mostly to small firms and those that are just about to begin to internationalize; and
- not for all firms (because not all need those services, especially large firms).

To simplify, these are activities that an innovation(-related) community may provide, without much, or any, public sector involvement. The *Evaluation of the Finnish National Innovation System* (Ministry of Education and Ministry of Employment and Economy 2009) states: "When looking at its various dimensions, it turns out that **the social aspects of globalization** are most highly correlated with innovativeness. Thus, cross-border personal contacts, information flows, and cultural exchange are associated with the density and accessibility of new ideas within a country (ibid. 52)."

1.4 Between the world and the regions: Internationally oriented innovation policy in Finland

Firstly, we should distinguish national from supranational policy making. Internationally oriented policies of national governments aim to enhance national competitiveness, while supranational organizations aim to support cohesion among the member states in order to enhance the competitiveness of that certain supranational region (e.g. the EU) *or* the performance of the global markets in general (e.g. the WTO). Policies are often fairly similar in their content as they reduce the deficiencies of the global market, but ultimately serve different ends (see Box 1). Nevertheless, the programmes of the EU or the World Bank (WB), for example, may be used in national policy making to support the national programmes.

Secondly, in general, policies may be justified by stating that they aim to fix societally and economically the significant deficiencies of a market system. However, it can be argued that strong national innovation systems themselves (or more generally national economies, policies and cultures) **create deficiencies in global markets**, by offering evident advantages to domestic actors, even in the case in which regulations would allow fair competition (which they often do not).

Thirdly, in order to link the **regional, national and international innovation systems** in policy strategies effectively, it should be noticed that they **are mutually linked and dependent on each other's strengths and systemic qualities**. Collaboration supporting a *regional* innovation system (RIS) may emerge with the support of a *national* institutional and infrastructural base, and socially embedded and networked regional innovation systems are needed for a well-functioning *national innovation system* (NIS). To gain from the *international innovation system*'s external inflows of know-how, the absorptive capacity of an RIS is needed (Fromholm-Eisebith 2006, 94). In short, national policies aiming to internationalize innovation activities need *to nourish the social aspects of the regional system when linking international flows to the regional economy*.

Finland, as all the Nordic countries, is a small coordinated market economy with strong national policies and institutions. These structures have lifted Finland among the most wealthy and innovative in the world, but to some extent this legacy is challenging to transmit to internationalization policies because . . .

- On the one hand, governing a national system with a national budget and regulations within a limited geographical area and with culturally somewhat uniform actors is different from supranational governance as the **possibilities of national-level policy makers to steer the process through regulation and budget are much weaker**, *if any exist* (Shapira et al. 2010, 462). Supranational organizations may have a budget to share and to create some shared guidelines, while *national* policies have to focus more on the provision of relevant knowledge, capabilities and links.
- On the other hand, its experience as a small country has forced Finland to find synergies from interaction and collaboration with several policy-relevant actors, since these systemic modes (e.g. triple-helix or similar) are needed in order to compete with the larger economies. Then, the **capability to orchestrate multistakeholder operations may also be deployed in international policy making**, although some other tools are missing from the policy toolkit.

Small size is an issue. Despite the fact that Finland has been among the top performers in several international comparisons on competitiveness and innovativeness during recent years (Lemola 2009), **the "innovation reputation" that really attracts investors and other relevant actors is a severe challenge for the small country**. Not only does good performance in the field of innovationmatter, but also size and global visibility, when countries are ranked as highly interesting innovation hot spots in the global field (Figure 2). This suggests that policies supporting visibility and connectivity might be appropriate.

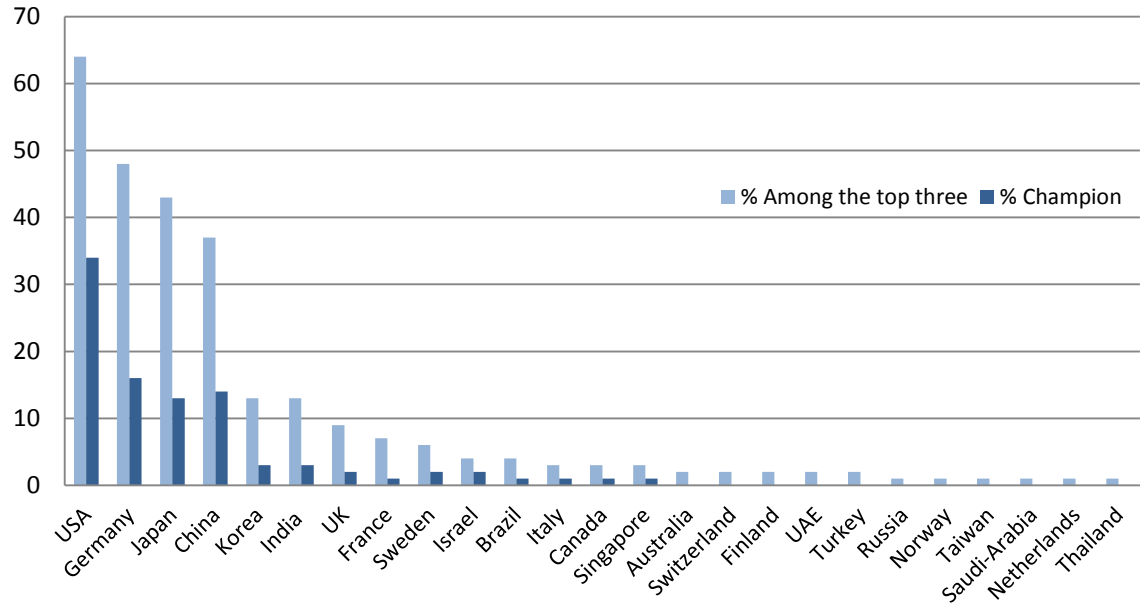

Figure 2. Countries with the best innovation reputation, or ranked among the top three (GE 2012)

2. Regional platforms – Innovation factories hosting and stimulating innovation communities

Regional innovation factories (RIFs) may be seen as the most recent evolutionary phase of science parks. Regional innovation factories offer a constellation of premises and services for different innovation-related communities in the region. They enable and nourish innovativeness and community-building practices among and within these communities. The key functions of regional innovation factories are a) business generation (e.g. new incubator and start-up practices); b) hands-on training of future innovators in the global environment; c) attracting innovators and investors around the world; and d) supporting the emergence of regionally rooted innovation communities. RIFs have extended their practices abroad and thus they offer a suitable platform for international activities and a global gateway for regional innovation systems and their innovation communities.

2.1 From science parks to regional innovation factories (RIFs)

Regional platforms link national policies and programmes to the innovative activities of the regions. Often, science parks, technology centres or specialized semi-public development companies have played a central role as administrators and brokers between the national programmes and the relevant actors in regions. Platforms have evolved along with changes in

Box 1. Building a European Innovation System: ERA and the Innovation Union

The European Union has long-term strategies like the European Research Area (ERA) and more recent initiatives like the Innovation Union programme, which aim to improve the quality of science and innovations as well as their impact on the economy and society and on the quality of life and competitiveness. Additionally, programmes to build cohesion within the EU's innovation environment are plentiful (e.g. FWP, ESF, Smart EU), including specific programmes for internationalizing clusters like TACTICS (Transnational Alliance of Clusters Towards Improved Cooperation Support), programmes supporting the innovative cross-border activities of neighbouring countries (e.g. the Baltic region) or the European Institute for Innovation and Technology (EIT), which was established in 2008. The EIT's goal is to "increase European sustainable growth and competitiveness by reinforcing the innovation capacity of the EU by facilitating transitions: from idea to product, from lab to market, from student to entrepreneur". The EIT headquarters is in Budapest, Hungary, and the network consists of hundreds of partners in 17 *co-location centres* across Europe.

Although these programmes may be utilized by national actors and programmes, they aim to enhance the competitiveness and cohesion primarily of the EU and only secondarily of an individual member state. The EU is an exceptionally strong supranational policy maker and it has the resources to support its policies and to establish co-operation at an operational level as well.

economic and policy environments. The origins of the science park concept may be traced to the 1950s and to the United States, Stanford University (CA) and the Batavian Industrial Centre (NY). The concept arrived in Finland during the 1980s and since then numerous technology centres (as they have been called) have been established to function as platforms for business development and innovation processes in various regions (Halme 2005, 78). In the 1980s, technology centres were merely premises for business in the vicinity of universities. During the 1990s, business services were integrated into the concept. Technology centres also began to host national programmes including the then major innovation policy programme in Finland, *the Centre of Expertise* programme. In 2007, a new major national programme was launched, termed the *Strategic Centres for Excellence Program (SHOK),* with its administration organized around specific companies running the thematic sub-programmes. All these – science parks, technology centres and specialized agencies, among many other institutions – have come to form an established, formal structure within the Finnish innovation system. However, there is a need for a different type of institutional arrangement that would be more agile and informal than those mentioned.

We refer to this more recent and still emerging form of regional platforms as **regional innovation factories (RIFs)**. As examples of these, we point out the Tampere-based New Factory and the Aalto Venture Garage in the capital city region. Regional innovation factories are rather endogenously born constellations of activities than deliberately created organizations assigned to implement national policies. Although an RIF may overlap with some activities of, for example, a science park or a technology centre, it would be appropriate to conceive of them as wider platforms that link individuals and various communities to regional innovation ecosystems. In real life, an RIF is usually strongly geared to many practices and actors similar to or the same as those of science parks and therefore we prefer not to term these two as distinctively different models but instead as different evolutionary phases with different emphases. However, this distinction is relevant to recognize when linking international activities to a regional innovation system. While RIFs are rather loose constellations and are yet to be formed in full, we suggest that they could be considered as key platforms for internationally oriented innovation policies for several reasons, which will be briefly discussed next.

Regional innovation factories are rather endogenously born constellations of activities than deliberately created organizations assigned to implement national policies.

The concept of an *innovation factory* itself has been used to define the practices of research labs (Hargadon and Sutton 2000) and business models (Kaplan 2012) and these definitions may be integrated into, but also distinguished from, the concept of a *regional* innovation factory. According to Hargadon and Sutton (2000), the **original innovation factory** was Thomas Edison's Menlo Park laboratory in the USA. The authors even claim that despite Edison's remarkable career as an innovator, his greatest achievement was the innovation factory. In his laboratory, inventors moved between the fields, used old ideas and materials for new purposes and kept up a fast pace to make small inventions (one every ten days) and a steady rhythm with major inventions (one every six months). Innovations were not produced by a lone inventor hero but by interactive and systemically organized communities. An innovation factory research lab brings together different knowledge bases and supports interaction among the people there, in order to keep inventions

alive and to increase the use of existing ideas and products for new purposes. An innovation factory has a systematic process consisting of four phases (Hargadon and Sutton 2000, 158–160):

1. Capturing good ideas that are often old but applied to a new context;
2. Keeping ideas alive by spreading information about who knows what within an organization and toying with those ideas in different contexts;
3. Imagining new uses for old ideas that an organization is able to remember due to practices it has developed for these purposes;
4. Testing promising concepts and products to see if there is any commercial use for those inventions, and if not, at least the learning process is an important asset.

The authors stress the importance of keeping ideas alive since they tend to fade away quickly. Therefore, persons with stocks of old prototypes and "failed inventions" and knowledge of who knows what and who also share their knowledge and help others are the key persons for an innovation factory. These "Good Samaritans" are a base for the organizational memory and its application to new inventions and, consequently, are crucial for systematic innovation processes, as the authors present based on the case study of IDEO's product development (Hargadon and Sutton 2000, 162). Later on, the model spread widely and now innovation factories can be found everywhere (e.g. the Idealab start-up accelerator producing business models, Hewlett-Packard's supply chain consulting or IBM's business services).[5]

Saul Kaplan (2012) introduced a **business model innovation factory (BIF)**. The model can be used in private, public and non-governmental organizations. The innovation factory business model provides tools for organizations to "reinvent themselves by doing on-going R&D for a new business model" to transform their value delivery creation model. To simplify, the author emphasizes that the business model is a story of how a company creates value and this story (business model) has to be flexible and ready to change quickly in a turbulent environment. To be innovative, one should be able to challenge the existing business model (ibid.).

Both models presented (IF and BIF) are also relevant regarding the content of a **regional** innovation factory and some of their characteristics can be found in the real-life examples discussed here (see Boxes 3, 4 and 5). A regional innovation factory is, however, based on a regional innovation system perspective rather than on an organizational one. The examples from the Tampere and Helsinki regions illustrate the form and content of the proposed concept: the New Factory (NF) in Tampere and the Aalto Venture Garage (AVG), and to some extent the Design Factory of the Aalto University in the Helsinki region, are examples of early days of this development (see Boxes 4 and 5). The concept aims to capture some recent developments, not just of science park and technology centre-related practices, *but also more widely of regional innovation policy*.

AVG provides an example from a large city region where the role of regional innovation policy is less intense, while in Tampere the case of the New Factory is more anchored to the regional

[5] IBM launched its Innovation Factory business service in 2007 by utilizing various Web 2.0 social networking technologies. The aim of the service is to speed up and ease customers' processes significantly as they invent and test new products and services by enhancing co-creation and acquiring well-organized and prompt feedback from an innovation community (IBM 2012).

innovation policy. Therefore, the Tampere model is more feasible for the purposes of policy design.

2.2 Functions of RIFs

In short, we identified at least seven key differences between a traditional science park model and a regional innovation factory model which are introduced in Table 3 and discussed shortly thereafter.

Table 3. Science parks and regional innovation factories compared

Science park: focus on …	**Regional innovation factory: focus on ...**
• Organizations: university top research, science-based firms • Knowledge: R&D, IPR • Science to market, STI • Closed innovation, exclusive practices • Formal collaboration and legal contracts • Organized activities with occasional "cafeteria effects" • Business from science and technology	• Individuals and teams: university students, freelance experts, young entrepreneurs • Capabilities: training/mentoring, practices • Interactive, problem-driven, DUI • Open innovation, many potential stakeholders • Community-based ideals with some formal contracts backing up • Organized chaos • Innovations with creative experimentation

University students, other individuals and teams are gaining more importance as key actors nurturing innovation processes. Regional innovation factories are fuelled by individuals' and small informal groups' innovativeness and strong motivation to excel. Whereas firms and research laboratories tend to follow their long-term strategies and cut out projects that are not in their core interests, RIFs provide seedbeds for numerous short-term innovation projects to flourish. In a spirit of democratizing and open innovation models, phases from idea generation to innovation commercialization may take place in different places and organizations or outside formal organizations. Examples of this can be IPR generated by a firm transferred to a student group to develop it into a demonstration to determine its business value or leftover ideas developed into businesses by specialists who have been laid out from large corporative R&D labs.

The case of university students is interesting. While one aim is to support business creation and innovation processes, an RIF may also include (parts of) study programmes of related universities. In general, innovations are developed in independent student projects rather than in formal research projects in research labs led by professors. This does not imply that research or established scholars would not play a part in many of these processes, but in RIFs the focus is on individuals and informal ad-hoc groups.

- In the Aalto Venture Garage and in the Design Factory, Helsinki, the role of the university has been central, and the latter is rather a new mode of teaching than a business accelerator.

- In the New Factory, Tampere, the "engine room Demola" hosts students from the many faculties of the three universities of the region and provides them with an opportunity to conduct innovation projects that aim to lead to real business activities (see Box 5).

At the core of regional innovation factories are practices (e.g. start-up accelerators, incubators or projects) that support the emergence of innovative firms or products. The transformation of a traditional business incubator model towards a lean start-up accelerator model may be seen as part of the wider evolution. Lean start-up accelerators have been a very visible phenomenon in the USA at least since 2005, when perhaps the most famous of them, *YCombinator*, was established. Start-up accelerators seem to be a significant part of the innovation economy, and are also important learning sites for more entrepreneurial and international mindsets of the future.

It should be noticed that a vast majority of the policies in the EU countries still focus on the internationalization of science rather than of business (Izsak and Griniece 2012, 28), although companies face difficulties in internationalization more often than research institutes (Halme et al. 2004, 63). Importantly, new forms of innovation activities are also likely to require new measures from internationalizing policies.

However, start-ups alone are not enough to function as highly significant national and regional growth engines. There were 70 exits (sold or listed to a stock exchange) of technology start-ups with a total value of 3 billion euros in Finland during the period 1998–2011. However, the fact is that the average exit value has not really been growing during the 2000s in the Nordic countries (Creandum 2012). The achievements of top accelerators in the USA are impressive and these lessons may also be useful in Finland (Box 2). However, it is not only the attraction of investments or the exit values that matter. In the long term, an innovation-oriented and internationally oriented business culture is important, especially among highly educated young people. Therefore, policies that include training and mentoring of the new generation are crucial.

From a regional point of view, important capabilities might be created over time if successful start-ups pay back and provide help as mentors for and investors in the next generation.

In RIFs, valuable knowledge is not only based on IPR and R&D; the development of **capabilities of (young) entrepreneurs is central**. Training takes place in start-up accelerators and incubators, other business training environments (e.g. Pro Academy) or specific university courses related to innovation. Commonly used methods are "innovation boot camps" and "academies" that prepare young entrepreneurs to develop their skills related to business and innovation processes. Training is usually more hands-on learning and the role of mentors emphasizes the transfer of tacit knowledge that cannot be learned from books. **Mentors** may be organized as representatives of the client firms or as investors or "angel investors" of start-up processes, or simply as a group that is dedicated to supporting young entrepreneurs. From a regional point of view, important capabilities might be created over time if successful start-ups pay back and provide help as mentors for and investors in the next generation, as has been the case in the USA (Box 3). In some views, *in situ* learning within start-ups and in other related processes has been conceived as even more important and useful than training taking place in business schools if one

“Start-up schools” are a fast- growing business in the big cities of the USA. They represent a short cut to business, and an alternative to a traditional business education.

wants to be a successful entrepreneur and innovator. “Start-up schools” are a fast-growing business in the big cities of the USA. They represent a short cut to business and an alternative to a traditional business education (Forbes 2012; Wolverson 2013). It may be worth considering whether hands-on innovation training could be more relevant to fostering business in the current global innovation environment than the traditional training of business schools. Could it be that the global innovation economy needs more individuals with practical capabilities to make global innovations rather than individuals who may consider the theoretical opportunities of the global innovation economy? Should there be a shift in training towards apprentice-based or “vocational” business training of innovators in order to turn theory into practice? This shift is partly occurring at the moment within the innovation factories.

RIFs are partly a response to the growing role of various new forms of innovations (e.g. democratization of innovation, user-driven innovation, open and open-source innovation) as well as to a DUI mode of learning. Both require more inclusive innovation environments because various types of actors have to be integrated into those innovation processes. This development has shifted the emphasis from closed R&D projects not only towards more open processes but also towards more business-oriented innovation activities. Moreover, as the advocates of the DUI mode remind us, the production of knowledge as such does not increase well-being and wealth, but competences to transform knowledge into economic and societal wealth – to business and public services – are becoming increasingly important (Jensen et al. 2007).

The production of knowledge as such does not increase wealth and well-being, but increasingly important is how knowledge is transformed into business and public services.

Themes of user involvement, open innovation and engaging universities in innovation have been discussed in the context of innovation policies from the late 1990s onwards (see e.g. Hjelt et al. 2008, 38) and also spurred on the discussion about *communities* as actors who participate in innovation processes in various ways.

Box 2. From incubators to lean start-up accelerators

According to the "Midas List" published by the *Forbes* magazine, the top three accelerators are as follows:

1. ***Y Combinator*** (Mountain View, California) was founded in 2005 and until 2012 it hosted 172 companies with a total value of 7.78 billion USD (on average, 45 million USD per company).
2. ***TechStars*** (Boulder, Boston, New York, Seattle, San Antonio) was founded in 2007 and 114 companies had undertaken its programme by 2012. Of all the companies, 73 have received funding and have raised 134 million USD in venture capital.
3. ***DreamIt Ventures*** (Philadelphia, New York, Israel) was founded in 2008 in Philadelphia and 65 companies have completed its programme. The most well known of its firms is SCVNGR, which raised 15 million USD at a 100 million USD valuation in 2011.

Accelerators gain by having a certain amount of equity (in the case that a firm is a success) and an entering start-up will receive some capital and services to begin with, included in the programme. In general, programmes provide mentoring, guidance and training related to technology, business development and fundraising, in order to turn their good ideas into products and to launch them quickly – basically in three months – to see whether a product is viable. The amount of seed funding is often rather small (yet sometimes may be significant, e.g. 150,000 USD in Y Combinator) and actually the most important asset provided by the accelerators may be high-quality mentors. For example, Y Combinator has a network of hundreds of firm founders "who are known to go to bat for other Y Combinator companies". There are some more issues to consider in this context:

- Start-up accelerators can even be alternatives to MBA programmes. The leading incubator, Y Combinator, also accepts applicants without a start-up idea and the "venture community" conceives the best accelerators as filtering mechanisms. TechStars, for example, accepts only 1% of its 4000 annual applications.
- Mentors, support networks or experienced business persons are the backbone of the process. In TechStars's model, there are ten mentors per firm on average to ensure sufficient attention.
- Accelerators may learn from each other. TechStars has disseminated the information about its model to others by setting up the *Global Accelerator Network* in partnership with Startup America. This open sourcing of TechStars's business model has eased the launching of new accelerators.

Different programmes with different focuses may co-operate and create more comprehensive offerings together (e.g. DreamIt had a programme for minorities).

(Sources: Forbes 2012, www.ycombinator.com, www.dreamitventures.com, www.techstars.com)

Box 3. AVG/Start-Up Sauna: International innovation hub in the Helsinki region

AVG (Aalto Venture Garage) refers to an organization and its premises that are located on the Otaniemi campus of Aalto University, the School of Science and Technology, next to the Design Factory, which is a flagship supporting the innovative activities of students. AVG offers space for entrepreneurs and the like-minded and is open to all from 8 to 16, and 24/7 for keycard holders. There is also some space for entrepreneurs to have their offices in the rear of the hall, but that is clearly a secondary activity. However, although the premises of AVG work on a rather similar basis to the Design Factory next door, the key activity is the Start-Up Sauna lean accelerator, which is a modification of well-known accelerators (like Y-Combinator).

- The activities and premises were set up by the Aalto Entrepreneur Society, established by students who were enthusiastic about fostering entrepreneurship among the students in 2009. They organized events at which students could "pitch" their ideas and prototypes and have meetings with potential coaches and investors. As the activities moved on and new people became involved, the idea of organizing activities more permanently arose and the university offered premises and some funding.
- The creation of a coach network that supports the Start-Up Sauna organizers to develop the concept and to train the selected batches on a *pro bono* basis (including visits to different "warm-up" cities) is a fairly distinctive feature in Finland. Obviously, there is a rather limited number of suitable coaches in Finland, so the possibilities of creating many similar networks are rather limited. This network was at first based on a mentor network of the national Vigo programme, but has evolved on its own since the beginning.
- The search for start-ups crosses the national borders and the "warm-up cities" include Stockholm, Oslo, Tallinn, Riga, Vilnius, Moscow, Yekaterinburg, Novosibirsk, St. Petersburg and Warsaw. Almost half of the selected firms that joined the Start-Up Sauna in 2012 were from abroad.
- There are also some developments that aim to make the concept more international: the first Start-Up Sauna has been opened in Tallinn, Estonia, not organized by the AVG but by local organizers.

The concept of the Start-up Sauna in itself does not contain any "new-to-the-world" idea but is modified to fit the Northern European purposes and is "new to Finland". Ideas have been sought especially from Silicon Valley but also from small countries like Singapore and Israel, whose modes may better fit into the Finnish context.

The budget for AVG and the Start-Up Sauna is about $1 million per year, including the expenses of the Start-Up Sauna (travelling costs, accommodation) and the salaries of the five employees. These have fairly specific tasks: a host and a "mom figure" take care of the visitors and community-building activities within the premises, the coach network is mostly taken care of by one person and one person is responsible for the development, organization and content of the Start-Up Sauna. In addition, there is one person who focuses on the Russian contacts and a person who takes care of the physical premises.

Related to the previous point, formal contracts and legal agreements play important roles in certain phases of innovation processes, but in RIF-related platforms, **community-based ideals** are strongly emphasized in terms of both bringing together several actors to form innovation communities and as community building including mutual cost-free help from other members of a community. The benefits of mutual help, reciprocity, shared interests and interaction are part of the culture in RIFs. There are often hosts whose role is to attempt to foster the community spirit and to enhance the interaction between the individuals and the teams.

The organization of a regional innovation factory as a whole is fairly **loose, evolving as a constellation of platforms and actors. Even more than organizations, the interest in RIFs lies in new ways of action and of thought** (note that old organizations may also act in new ways). In an RIF, there is plenty of room for self-organizing groups and unorganized interaction whereby new elements emerge, the relations between existing elements may change and new platforms (private firms, public services or PPP projects) may be established. These characteristics form a key ingredient of RIFs and therefore they should not be managed and organized in too stringent and formal a manner. At best, an RIF may provide an environment for innovation work with a playful/phenomenal touch.

As noticed, regional innovation factories may be seen as an emerging phenomenon rather than as well-established settings. Consequently, their full impact consists of several elements and is yet to be recognized. Although some elements discussed above (Boxes 5 and 6) are well developed, the concept is still very much work in progress and is not really utilized in internationally oriented innovation policies. However, RIFs work as platforms for innovation activities, and also for internationally oriented innovation policies, because . . .

- they support the internationalization of entrepreneurs with anchorage, services and links,
- they often host a large share of foreign students who participate in training programmes, incubators or accelerators,
- they may attract start-ups from abroad to join the programmes,
- they may transfer their development concepts to international partners or exchange their good practices with them and thus internationalize the innovation factories themselves, and
- their language is often English, making it much easier for foreign people to blend in, especially if there is a non-Finn hostess who has responsibility for the community building in general.

This endogenous and versatile internationalization of innovation factories is a good base for internationally oriented innovation policies, combined with other policies. It deploys a bottom-up approach and is an individual- and team-centred way to foster innovativeness.

2.3 Form of the RIFs evolving

RIFs may include technology centres and science parks but they typically contain a wider constellation or network of independent platforms. For example, in Tampere, the New Factory may be seen as the key element of the RIF, being an open innovation environment. Even though the New Factory, Tampere, is ultimately aimed at creating new growth firms and businesses, its focus is first of all on fostering the entrepreneurial and innovative spirit in individuals. Established just a few years ago (the oldest element, Demola, in 2008; the newest, Accelerator, in 2012), and located in a two-hundred-year-old downtown factory building, it has already been the site for approximately 450 demonstration and prototyping projects, and it has helped to create altogether 66 start-ups and 425 jobs (Matikainen 2012). In addition, it has served as a platform for some internationally operating ICT companies, such as Wooga, Intel and Rovio, to begin their development activities in the city. Due to these successes, this new platform has achieved several national and international awards and recognition and sustained the city's image as a vivid centre of innovation in Finland (Box 5). However, we may outline the regional innovation factory in Tampere, which would also include. . .

- other similar forms of entrepreneur- and business-related student training, like the ProAcademy of Tampere University of Applied Science (locating in the same complex),
- some elements of other Tampere-based incubation activities and accelerators,
- infrastructure and services supporting innovative SMEs, such as the HUB Tampere (a company providing a milieu/premises for innovative small firms with an emphasis on the community idea),
- other actors who support and promote the emergence of new innovative products, services or firms along the principles of the RIF.

RIFs offer open access for virtually all actors to join the innovative processes through a wide set of platforms. A regional innovation factory thus offers several access points to a regional innovation eco-system and this quality may also be utilized in the internationalization of innovation activities.

RIFs offer open access for virtually all actors to join the innovative processes and this quality may also be utilized in internationalization.

While the mentioned platforms may be seen as a key structure of the regional innovation factory, its real momentum depends on connections with a wider community that enables and implements (or not) the innovation activities. These are familiar actors of the innovation system, including **firms** providing ideas (and some mentoring) to business incubators and accelerators, **universities** providing students, researchers and teachers, **mentors** providing their networks and expertise for the new entrepreneurs, **investors** and business angels who support young innovators, regional development agencies and **cities** that may provide funding and premises for the activities. Finally, there are various **innovation communities** based on, for example, certain technology (e.g. Meego), a project (e.g. Iron Sky movie production) or another shared interest taking place in (but not limited to) a region.

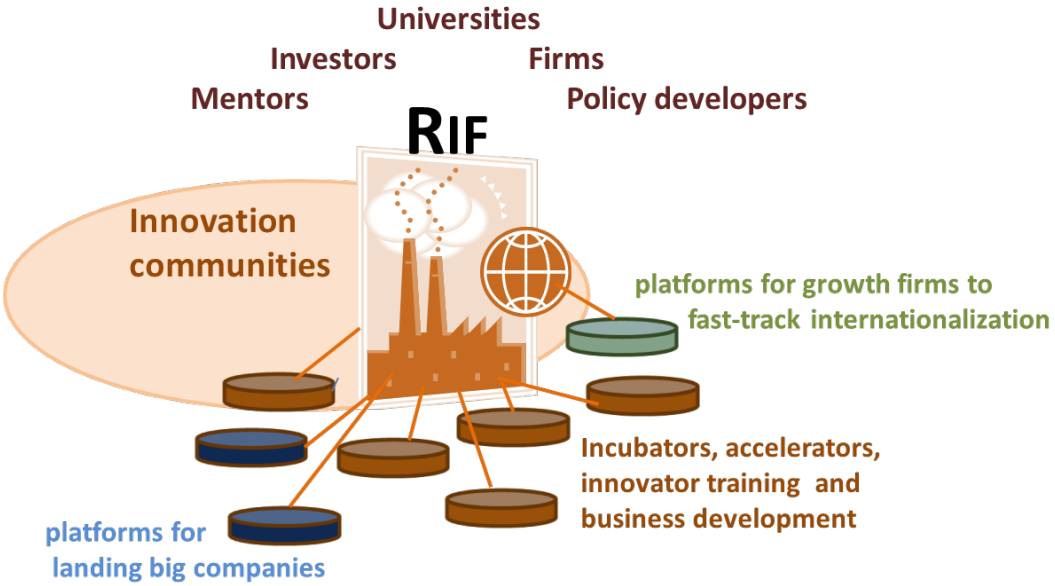

Figure 3. The regional innovation factory constellation and its supporting partners

The evolving form of the RIF may be illustrated by some real-life examples. Single practices evolve all the time.

- An RIF may also spread *outwards from a region*. The concepts of Protomo and Demola were initially developed by the Tampere-based Science Park Hermia, and due to an interest of the Finnish Ministry (TEM), the Protomo concept developed nationwide and the Demola concept has diffused abroad; in addition to Tampere, there are Demolas in Oulu, Budapest, Vilnius and South and East Sweden, due to interest from these locations.
- New platforms may also *arrive from abroad*, as it happened in the case of the *HUB Tampere*, which is part of a network providing premises and services in 40 countries. Originally, the HUB concept was created in Austria and HUB GmbH then grew to become a global network operating on a franchising model, each location set up by independent entrepreneurs. HUB Tampere is a place "where entrepreneurs, innovators and change makers can meet" and work if they pay a certain monthly membership fee.

In addition, innovative projects may move from one RIF to another, depending on the offering of each RIF. For example, a start-up may first work in Demola or Protomo (in the New Factory) and maybe then move to the Start-Up Sauna (in the Aalto Venture Garage) to obtain different kinds of support and for example links to Silicon Valley. In short, RIFs may also enhance their capabilities by linking with each other nationally and internationally.

Box 4. New Factory and Demola in Tampere

The New Factory is a combination of four "engine rooms" (*Demola*, *Protomo*, *Suuntaamo and Accelerator*), which have their own functions but work towards the same goal of creating new businesses through and from open innovation processes. Demola is an environment in which to generate prototypes and demonstrations from ideas coming typically from private firms, developed in projects by multidisciplinary student teams. Protomo functions in a somewhat similar way, but instead of students as its "workers", it employs self-employed entrepreneurs and experts often in a phase of career transition. Suuntaamo is a kind of open test laboratory for new products and processes, and the newest engine, Accelerator, provides new businesses with various business service resources and competencies, including help to find matching venture capital. Common to each engine is an attempt to operate on principles characterized as "customer focused, down-to-earth, agile, cost-efficient and effective". So far, the most long-standing and also most visible engine of the New Factory is Demola. A typical collaboration scenario in Demola is the following:

- A firm that has a concept or idea that is subject to high levels of uncertainty decides to outsource the development process for Demola to come up with a prototype or demonstration through further development and testing;
- The concept is evaluated and formalized into a project design by Demola;
- A multidisciplinary student team is built around the concept, gathering student candidates from the universities and polytechnics, and a project contract is signed by the stakeholders (the firm and the team) including issues related to IPR and the timetable;
- Concept development starts, lasting 3–8 months, with sparring and support by Demola and the firm, and including a concept or prototype testing conducted with the users; and
- Demonstration of the concept or prototype is carried out by the student team, followed by project evaluation and the finalization of license agreements.

The benefits of Demola are not limited to a single firm, since the student team also has a chance to utilize the created immaterial asset by setting up a start-up company in the case in which a firm does not acquire a license for the IPR. Students may also be recognized for their talent, leading to employment. All the IPR generated during the project belongs to the student team. At the end of the project, the partner firm can acquire a license for the results and reward the students for their work according to the performance criteria agreed earlier. The method is notably effective, due to the well-defined IPR framework (avoiding the contractual costs of collaboration), the focus on the concepts preselected by firms and the diverse set of skills and ideas of the students working on it.

Behind the New Factory, there are several key actors of the regional innovation policy, including Hermia Ltd. (a semi-public local innovation agency) and the three universities located in the city. The essential characteristics of the New Factory are openness and many community-like features that make it stand out from the traditional innovation platforms.

(More info: www.uusitehdas.fi/new-factory)

Box 5. Microsoft Innovation Center – MIC

Microsoft has partnered local governments, academic institutions, industry organizations and software and hardware vendors to expand its network of Microsoft Innovation Centers (MIC). They try to be state-of-the-art technology facilities for collaboration on innovative research, technology or software solutions: technology centres offering a comprehensive set of programmes and services to foster innovation and grow sustainable local software economies. They are targeted to connect people and organizations in the software ecosystem and give them access to resources, experts and facilities for collaboration and skills development. While each centre tunes its programmes to the **local needs**, they all provide similar content and services designed to accelerate technology advances and stimulate **local** software economies through skills and professional training, industry partnerships and innovation. The primary areas of focus include:

- **Skills and Workforce Development**: The skills development programme focuses on intellectual capital and people enablement with technical and business courses for local ICT companies and structured employment programmes for students. For example, any student can be involved in many MIC activities, such as participating in an Imagine Cup project, attending low- or no-cost technical training at MIC IT Academy or finding a job through the Students to Business Program. Most of the MICs participate in student-oriented activities and work closely with starting IT student companies.
- **Business and Industry Partnerships**: The Partnership Accelerator focuses on enabling successful partnerships by connecting people and organizations in the innovation ecosystem. The MICs achieve this by offering programmes on partnering with Microsoft, and by cultivating **local** and **regional** industry alliances that support the growth of software "industry clusters" and software quality assurance programmes.
- **Start-Ups/Entrepreneurs**: Each MIC tries to help drive business success for **local** partners, including start-ups and the entrepreneurial community organizations that support them, through a variety of programmes, including Microsoft® BizSpark®, a global programme that helps fast-track the success of early-stage technology start-ups with all the right resources, including software, support and marketing visibility.
- **Solutions and Innovation**: The Innovation Accelerator focuses on enhancing the local capacity for innovation through hands-on engagement. This includes labs, prototype development and testing help for start-ups, partners, students and entrepreneurs.

Particularly in developing regions, commercial software can be a spark plug for long-term economic growth. In Brazil, for example, in 2010 alone, 7,500 students, IT professionals, developers and academics took part in technology labs, skills development, professional certification training, scholarships and research at 16 Microsoft Innovation Centers across Brazil. Since the Brazilian centres opened in 2002, more than 400 software projects and solutions have been developed around the XML open standard and other innovative technologies, in collaboration with 72 universities and numerous local governments and businesses (www.microsoft.com/mic).

RIFs based only on training, accelerators and incubators may be too weak as regional platforms.

As mentioned, RIFs based only on accelerators, incubators and training may be too weak as regional platforms, and thus internationalization policies could have a wider focus. The next steps that could further strengthen the emerging RIFs may be, for example, a) the integration of **platforms for big global** companies searching for a location for their innovation activities; and b) **platforms for growth firms** that have already passed the start-up phase and are in a good shape to grow globally but could benefit from internationalization services and global communities.

Microsoft Innovation Centers provide an illustrative case of a large foreign company setting up regionally feasible activities. There are more than 100 Microsoft Innovation Centers worldwide. Microsoft and partners in each locality collaborate to operate the MICs, which are open to students, professional software developers, other IT professionals, entrepreneurs and academic researchers. Microsoft has supported these **local ecosystems** through ongoing investments in **a robust and affordable computing platform** built around interoperability, partnerships and enhancing local capabilities (Box 5). These kinds of global activities, which are parallel to the idea of an RIF, could significantly enhance an RIF's global dimension, as well as its regional impact.

Finally, even more than an accelerator for start-ups, or to source internationalization-related services, r**egional innovation factories may be seen as platforms hosting and breeding innovation communities that are globally spread but locally rooted**. For an internationally oriented innovation policy, communities provide opportunities to link regional innovation activities globally and to integrate foreign talent through community-building practices and a social interaction-oriented culture. Today, internationalization is taking place among people who are more internationally oriented and less dominated by a "national frame" than the older generations were. Internet enables various types of communities to implement highly complex activities with multiple stakeholders even on a voluntarily basis (see Box 6).

BOX6. IRON SKY – Movie project as an international community effort

Group of Finnish amateur film-makers made their first movie, *the Star Wreck*, as a parody of the Star Trek over seven years period of time, mostly filming in the living room of the producer's mother's apartment, with a 10 000 euros total budget. The movie was published in the internet, and became the most watched Finnish movie in the Internet ever. After this project, the same group worked with their second production, the *Iron Sky* movie. In this production they used various internet-based communities to gather funding, to find actors, to make significant amount of special effects, and to market the movie. The Iron Sky had international line up of actors and it was distributed to movie theaters in over 70 countries. They were able to raise over 7.5 million euros funding for the budget and still gain profit. They also won several movie awards in different countries, and will have games for PC, X-box and PS3 forthcoming, as well as many other products. The movie production was an intentional effort to make a community-based production, and to use internet-based communities in all phases of the process. (Vuorensola et al 2012; more info: www.ironsky.net/site/)

In addition, the present generations have technical means and cheap travel to keep up their international interaction. Among the "Facebook generation", internationalization and international communities are business-as-usual for many. The basic picture of Facebook connections (i.e. social relations) among its over 500 million members worldwide conveniently outlines a social world map that illustrates both the *importance of technological advancement* and *societal openness*; the map lacks regions with a low level of technology (such as Central Africa) or social openness to other parts of the world (such as China) (Figure 4). The map is formed entirely from links between individual persons, pointing to a rather fertile ground for internationally oriented interaction. Today, the world for global community building is rather well equipped.

Figure 4. Map of links between Facebook users (source: Facebook 2012)

3 Facilitating model: Promoting the internationalization of the members of an innovation community

A facilitating model refers to the most traditional forms of innovation policies, including funding, services and knowledge that enable and promote actors to implement their activities at the international level. These policies focus on individual actors to internationalize their activities or on attracting foreign talent and investments to Finland. Three sub-models are recognized; *these are "one-way" policies related to exporting (outward) or attracting investments (inward) or "two-way" policies with transnational practices.* In Finland, the two former sub-models are widely deployed, whereas the third, the transnational model, is just about to emerge. As the next step, emphasis is laid on policies with a training orientation to promote exports and to attract investments, and on policies supporting the emergence of transnational innovation communities.

3.1 From exporting and attracting to nourishing innovation communities

Exporting, attracting and internationalization-oriented policy measures that focus on the most promising individual actors or group of actors (e.g. firms, entrepreneurs, researchers) represent the most traditional policy measures and include:

- **Research funding demanding internationalization**: These are, for example, technology programmes (Tekes) and research programmes (Academy of Finland) that offer both opportunities and strong incentives to engage in international mobility and collaboration through various funding mechanisms. For example, Tekes has incentives to conduct international research by covering 70% instead of 60% of the costs when a project is considered to be international.
- **Support for mobility** is provided, in addition to the research programmes mentioned above, especially by the CIMO (Center for International Mobility, an agency of the Finnish Ministry of Education and Culture), although not directly linked to innovation, but instead focusing on students and personnel who work on educational institutions, including universities.
- **Funding for start-ups about to internationalize**: Programmes like NIY (Young Innovative Entrepreneurs) or Vigo have been launched to support the internationalization of promising young firms with global potential. For example, Vigo is an acceleration programme "designed to complement the internationally acclaimed Finnish innovation ecosystem. The program bridges the gap between early stage technology firms and international venture funding." The key element consists of accelerators, which are independent companies run by entrepreneurs and executives with an internationally proven track record. The Finnish Ministry of Employment and the Economy launched the Vigo programme in 2009. Execution of the programme is managed by a private firm.
- **Training and advice for internationalization** is provided by many actors (e.g. FinPro, Chambers of Commerce, Tekes) and it is also integrated into many other programmes.

- **Hosting and organizing export-oriented international visits and meetings for the firms**: Traditional hosting of small firms as they visit potential locations for business and co-operation has also recently been developed further. In the case of **Brazil** and **off-shore industry**, for example, the Finnish Maritime Cluster Programme has been very active and has made extensive efforts to link with the key sites in Brazil with the support of *FinPro*, a consultancy company backed up by the Finnish Ministry of Employment and the Economy, specializing in supporting international business and exports.
- **Attracting investments and talent to Finland** is, among other things, carried out by providing information and consultancy about opportunities in Finland and setting up networking events for potential investors. FinPro, Invest in Finland and the Finland Convention Bureau are agencies that focus on these activities.

Views that shift the focus more to **nourishing global innovation communities** include the following (with illustrative or potential policy measures as examples):

1) Policies to support the internationalization of RIFs could be strengthened by offering some seed funding for them to organize the platforms abroad (e.g. NEST, Box 7).
2) More emphasis could be put on programmes that train globally oriented innovators and provide networks to link with potential new markets or technologies in practice. Those who are internationally active in their early career also continue to work internationally later on during their career (Raunio et al. 2010) (e.g. GAP, Box 8).
3) The traditional talent-attracting programmes bringing eminent researchers to Finland could be upgraded to create a pool of global mentors for young scholars/researchers in Finland (e.g. FiDiPro, Box 9).
4) More focus could be placed on policies attracting entrepreneurial and innovative individuals or start-ups to regions (as Start-Up Sauna or Demola do). Some countries (e.g. Canada, Chile) have applied immigration law to support the immigration of start-up founders to the country from 2013 on (e.g. Start-Up Chile, Box 10).

"Our new Startup Visa will help make Canada the destination for the world's best and brightest to launch their companies" (Canadian Immigration Minister)

Box 7. The Nest, New York: An accelerator for start-ups from Northern Europe

The Nest is an accelerator for start-ups mostly from Finland, but is also open to those from Northern Europe and Russia if they invest in some R&D activities in the Aalto Entrepreneurship Society. There is already one Latvian firm from the Start-Up Sauna (see Box 3) in the Nest, extending this emerging eco-system of the Helsinki region. According to its web pages, the Nest serves specifically "as a platform for companies landing in the Mobile Alley (NY) and the Silicon Valley (CA) providing them with full service from market assessment to seed funding".

The Nest searches for proven start-ups and aims to support their development by **relocating senior management** to the USA and by introducing start-ups for **partner networks and VCs. From 500 USD per month, start-ups may rent a desk and services from the Nest (offi**ce manager, meeting room, video conference, etc.). Tekes, FinPro and the Federation of the Finnish Technology Industry are financers of the project. The Start-Up Sauna and Aalto Entrepreneurship Society are also involved. The goal is to have 20 to 30 firms in the Nest annually. (More info: http://www.nestnewyork.com.)

Box 8. The Global Access Program (GAP)

The GAP program provides non-US firms with an opportunity to join the MBA course of the Anderson Management School in the UCLA. During the course, an internationalization strategy is prepared for a participating firm or for some of its products. GAP is an educational programme that matches a team of full-time students of the MBA programme with firms to develop business strategies that help participating firms to improve their business model. Over 100 Finnish companies have participated since 1999.

GAP has been running since the 1990s and Tekes was one of the early advocates of the programme. The programme is designed to be a low-cost (15,000 USD) management consultancy service for non-US companies for strategic advice, especially concerning how to internationalize their business activities. For the participating Finnish firms, Tekes covers their fees, making it virtually free of charge. The key advantage is to gain a highly experienced mentor group, in addition to the professors and selected peer students involved, to guide firms through the strategy development process. Due to the extensive networks of the programme, there may also be practical help in finding partners or distributors from the USA (or from other countries), often leading to a considerable growth of business.

The application process is open on an annual basis. In the selection process, a high-quality business plan and a healthy business are required, but the willingness of a firm to grow and internationalize is nevertheless the key criterion. According to the representatives of the GAP programme, business skills and profit making are at the core, instead of the technology possessed by a firm. In some cases, venture capital firms promise funding in the case that an applicant firm will be accepted onto the programme. GAP focuses on the industries related to ICT, biotechnology, health and medical, energy and environment technologies and on the construction and manufacturing industries. The firms that participate are not at their early stage of development, but they may be at their early stage of internationalization; most are more than 10 years old, have revenues of over 1 million euros and have fewer than 50 employees.

According to an evaluation report based on Finnish companies (2004–2010), the programme is of good quality (Evidence Network 2010). A notable majority of the participating firms have found a business analysis conducted during the programme to be very important, and about every third firm recognized an immediate impact of the acquired knowledge on selling in new markets as significant or very significant. Of the long-term impacts, the best one (about half of the firms) was related to new international customers and exports (Evidence Network 2010). GAP has many similar (private or semi-public) partners, such as Tekes, around the world and it plans to expand to China and India.

(More info: www.anderson.ucla.edu).

Box 9. The Finland Distinguished Professor Program (FiDiPro) attracts talent

FiDiPro is jointly organized by the Academy of Finland and Tekes in order to attract top scientists to Finland and to connect their research work more strongly to the Finnish research groups. The programme includes some teaching obligations. FiDiPro provides the Finnish universities and research institutes with the funding and services to hire "distinguished professor-level scientists" from abroad for a fixed term (2 to 5 years). A grant covers the salary, travel expenses, research costs and related expenses of accompanying family members and partially the costs of the key members of a research team. Finnish scientists who have worked abroad for a long time are also eligible for the programme. Its strength is that the research is in the interests of the Finnish industry. Of the two financers, Tekes finances those who conduct more applied research with strong links with the industry, whereas the Academy of Finland finances those in the field of basic research. More than 50 researchers have entered the programme prior to 2012. According to a study of FiDiPro teams, the individual and group levels are more important for knowledge creation than the organizational level. The actual knowledge creation processes may be rather short term, while individuals and their interaction may last for long periods of time (Hautala 2011).

Box 10. Start-Up Chile – An international innovation hub in Latin America

Start-Up Chile is a programme created by the Chilean Government, executed by the Chilean Economic Development Agency (Corfo), which "seeks to attract early stage, high-potential entrepreneurs to bootstrap their startups in Chile, using it as a platform to go global. The end goal of the accelerator program is to convert Chile into the definitive innovation and entrepreneurial hub of Latin America" (http://startupchile.org).

The programme does not require any equity of the start-ups, but a participant needs to join seminars, talks and classes in local universities and to mentor young Chilean entrepreneurs around the country. A founder of a start-up has to commit to living in Chile for at least 6 months and during that time work only on the project. The programme provides selected start-ups with 40,000 USD (equity-free) seed capital, a temporary one-year visa and support from the key business and financing networks of the country. Selection is carried out in co-operation with Silicon Valley-based experts by the Chilean Innovation Board. In 2010, the pilot programme attracted **22 start-ups from 14 countries. The sixth round, in 2012, resulted in over** 1400 applications and as many as **105 start-up companies were selected to join the programme from 31 different countries.** The most frequently represented countries are: **the USA (24%), Chile (19%), Argentina (9%) and India (7%)**. C**ompanies r**epresent many industries (the biggest were: e-commerce 24%, mobile and wireless 10%, IT and enterprise software 10% and social media 10%) and many top-class educational institutions (e.g. Stanford, MIT, Oxford).

An increasing number of Chileans are being inspired to start their own business. However, it should be noticed that Chile has very difficult financial markets to obtain business loans and the markets are not very attractive. Moreover, the support system for those participating in the programme is complex. Still, the programme offers an alternative for those who find it difficult to go to Silicon Valley due to the USA's strict immigration laws (source: *The Economist* 2012).

3.2 Next step: Emerging transnational innovation communities

Despite a vast amount of studies related to Silicon Valley and excursions there, it seems that one lesson that has been crucial to the success of Silicon Valley has been more or less ignored in the Finnish innovation policy, which is transnational innovation communities and their ability to integrate newcomers. The USA has been able to integrate foreign talent as a crucial part of its innovation activities: 76% of patents at the top 10 patent-producing universities had at least one foreign-born inventor. A total of 54% of all patents were awarded to the group of foreign inventors most likely to face hurdles: students, postdoctoral fellows or staff researchers. Foreign-born inventors have played significant roles in cutting-edge fields like semiconductor device manufacturing (87%), information technology (84%), pulse or digital communications (83%), pharmaceutical drugs or drug compounds (79%) and optics (77%) (Patent Pending 2012).

In the USA, 76% of patents at the top 10 patent-producing universities had at least one foreign-born inventor.

The emergence of transnational communities supporting innovation-based businesses in Silicon Valley is well documented by Saxenian (2006). According to her, the new generation of immigrant investors conceive their task as being to bridge geographically distant hubs of skills and technology. Chinese financer Peter Liu states that "We see ourselves as the bridge between Silicon Valley and Asia". Liu has worked in Silicon Valley for more than twenty years and is now the head of a venture capital firm. Being a "bridge" between the two technology hubs requires a deep understanding of the business culture, community and institutions in Silicon Valley and those many highly differentiated regions in Asia. The match-making role works best when there are trust-based relations and when collaborators have a shared background and world view. Herbert Chang, from a Taiwan-based venture capital firm, states that "We also provide contacts and information for Silicon Valley companies because I know their potential customers and vendors so well that we do not need financial statements and a long due diligence process before setting up partnerships". The majority of the immigrant-owned venture capital firms focus on their own home country because of a need for local connections, linguistic fluency and institutional knowledge. However, some become international by selecting capable multicultural professionals and high-calibre partners in the relevant countries and by allowing the national offices substantial autonomy (Saxenian 2006, 94).

There are powerful associations that focus on the building of business-oriented transnational connections. For example, the relations between China and Silicon Valley have been significantly promoted by the *Hua Yuan Science and Technology Association* (HYSTA) and between Silicon Valley and India by the *Indus Entrepreneurs* (TIE). Both associations focus seriously on breeding the next generation of entrepreneurs (Box 11), among many other similar associations.[6] Instead of random interaction or official relations, the interaction is organized very efficiently and in a determined way by people who are strongly related to business themselves.

[6] Whereas in Finland there are associations like the Aalto Entrepreneurship Society and many networks for business angels (LEDI, BAF, FIBAN and Finnvera's network) with some parallel activities, similar activities organized *by foreign communities or Finnish communities abroad are somewhat less organized and visible*.

For example, HYSTA (华源) (Hua Yuan Science and Technology Association) was established in 1999 by a group of Chinese entrepreneurs who had started as students but moved on to being prominent business leaders in Silicon Valley. HYSTA is the largest Chinese professional organization in Silicon Valley, with more than 6000 members. The association aims to promote business and cultural exchange and to foster mutually beneficial US–China business relationships. It also aims to promote entrepreneurship and provide coaching and support for Chinese professionals in Silicon Valley and in China. It organizes events from golf tournaments and educational programmes to seminars of 20 people and conferences of 1500 attendants. HYSTA aims to support the success of a new generation of Chinese entrepreneurs and business leaders. It serves both young talent and those with long experience and importantly offers a platform for their interaction (for more information, see www.hysta.org).

The success of Indian business society was not based on the openness and tolerance of Silicon Valley only, but rather on the arrivals' capability to learn the rules of the regional business.

Therefore, it may be argued that the success of the Indian business society was not based on the openness and tolerance of Silicon Valley only but rather on the arrivals' capability to learn the rules of the regional business environment and to take advantage of it. According to Wadhwa (2012), who works among his other activities at Stanford and Duke Universities, the success of the Indian business is related not just to talented individuals from top schools but also to:

- Pioneers who broke the glass ceiling and openly communicated the problems they encountered in integrating into the business environment of Silicon Valley;
- A decision to elevate the (Indian) community and promote entrepreneurship in general, especially by teaching and mentoring the next generation of entrepreneurs;
- The establishment of organizations to network, to share information, to teach how to start a business as well as to mobilize the talent and capital crucial to starting many successful technology companies;
- The first generation of successful entrepreneurs (e.g. Sun Microsystems co-founder Vinod Khosla) had visible role models and mentors as well as seed financers for the members of their community.

Associations[7] do not only link, for example, Silicon Valley–Bangalore, but their chapters are also active in other locations. For example, in Toronto, the chapter of TIE has been working to organize the TIE Institute's programme there, and the Government of Ontario has approved initial funding to support the launch of the TIE Institute programme as part of the province's Youth Entrepreneurship Program. Importantly, they do not only attract or "export", but they also create long-lasting and strong links – transnational social spaces – between the locations, and even more importantly, renew themselves constantly, with well-organized backing up of the next generations.

[7] Associations have been important platforms in shaping Silicon Valley as more suitable for the minority groups from these countries, but it should be noticed that they focus on certain groups only, and Afro-Americans and women, for example, still struggle to enter the business life in the "world's greatest meritocracy".

Box 11. TIE in Silicon Valley: Organizing transnational socio-economic space

TIE (The Indus Entrepreneurs) was founded in 1992 by entrepreneurs, corporate executives and senior professionals with an Indian background or from the Indus region who had been successful in Silicon Valley. The mission was defined as "to foster entrepreneurship globally through mentoring, networking, and education". The key focus has been on nurturing the next generation of entrepreneurs. The idea is to support wealth creation but also to give back to the community as well. There are currently more than 15,000 members and over 2,500 charter members in 61 chapters across 17 countries. Charter members are "thought business leaders" and they are key mentors and educators of the next generation, having extensive access to the networks and events of TIE. TIE is the largest transnational non-profit organization for entrepreneurship development. It also has a Nordic chapter in Stockholm, although the USA and Asia are the main locations.

Chapters may have different profiles but it is common that they have charter members and associate members and the chapters aim to inspire, educate and mentor entrepreneurs and host regular events and bigger meetings with entrepreneurs, business leaders and representatives of SMEs, VCs and government, at which they have an opportunity to meet and share business opportunities, raise capital, network and so forth.

The teaching of the new generations is well organized and there are several practices for this. For example, an educational programme called the *TIE Institute* that co-operates with prestigious universities and aims to be the "Entrepreneurs' University", providing "practical training in soft and hard skills, delivered by a world-class faculty drawn from TIE Charter Members around the globe, and their networks cultivated over the years". Its most recent programme is the TIE Young Entrepreneurs (TYE), with a focus on even younger people than university students and on teaching entrepreneurship to them. The founder of the TYE programme states that it is social development and that they are "committed to create and nurture future generation of entrepreneurs or leaders and make positive contribution to not only building a strong network of youth within the TIE organization but also serve its communities and the business ecosystems". The TYE program had 140 participants from India, the USA and the UK and chapters in over 20 cities organized training at weekends over a 6-month period. The best teams competed with their business plan for a prize of 25,000 USD on the premises of Cisco, which was one of the financers of the programme.

(More info: www.tie.org)

There is plenty of useful experience about networking and the creation of social capital embedded in the Finnish regional and national innovation policies that could be utilized in an international context. The nurturing of international communities in the Finnish regions (or innovation factories) could provide significant opportunities to internationalize the innovation system.

The Otaniemi International Network (OIN) and related "Talent Match" concept are examples of this kind of development that may support the emergence of natural links and knowledge to a global innovation-related community. While a process is still emerging, it has progressed a few years, having a strong base on the Otaniemi Campus, the largest technology hub of Finland in Espoo. The *Otaniemi International Network* also participates in a regional project that aims to integrate services for all foreign employees and immigrant workers in the Helsinki region, and consequently the practices are also linked to a wider regional service system.

Box 12. Emerging Otaniemi International Network and Talent Match

The Otaniemi International Network has been running since 2007, aiming to create social and professional networks among the people working and living on the Otaniemi Campus and in its vicinity. The campus area is located within the Helsinki city region and is one of the biggest technology hubs in Europe. The members of the OIN network work mostly in universities, high-tech firms or other research and development-related organizations.

The network was initiated by Otaniemi Marketing Ltd. An active project leader has played a significant part in the development of the OIN and its activities. The network aims to improve the capability of the region to employ and host foreign professionals and their families, by providing information and especially contacts and networks for the recently arrived to integrate them into the business and social activities of the region. Already in the registration form it is asked "what a new member wants from the OIN", thus aiming to be interactive from the very beginning.

As part of the activities related to OIN, regional development agencies have set up a service termed Talent Match to link foreign professionals with the employers of the region. This service concept aims to increase the match between the foreign talent and the local employers. It organizes related events and provides an immigrant with the following:

- *Alternative types of contract (employment, freelance, leased manpower, invoicing);*
- *Liaising with immigration and labour authorities (residence permits, financial support for traineeship, "on-the-job" language training);*
- *Employer training (HR processes, employer branding, diversity management);*
- *Job search skills (coaching, pitching).*

The website provides the possibility to register as an employee or as an employer to use the search facility. The network also informs about job offers that are not necessarily public, which makes it very interesting for highly skilled foreign employees.

(More info: www.talentmatch.fi and www.otaniemi.fi/portal/about_otaniemi.fi/otaniemi_international_network)

4 Bridging model – Connecting with the key sites of the global innovation ecosystem

The bridging model aims to link the national innovation system with the most relevant innovation systems globally. The bridging model differs from the facilitating model due to its many distinctive characteristics. First, the model operates with clearly defined geographical target areas abroad that are usually regional innovation systems in leading innovative metropolitan areas. Second, policy measures are typically conducted as joint operations by several key innovation policy actors, and may often establish shared physical premises in a target region. Usually the targeted innovation systems are those considered as the most important strategically. Three main forms of the bridging model may be referred to as a transnational bridging organization (TBO) led by policy actors, a global campus led by a university and a cross-border innovation system led by regional-level actors. In Finland, the university-led global campus mode is not yet utilized and there are currently just a few cross-border innovation systems emerging.

4.1 Upgrading transnational bridging organizations to global communities

According to Trondsen (2010), a *bridging organization* (BO) may be defined as an actor that connects *several actors of an innovation system with another innovation system in a different country. A BO is usually formed of a network of offices located in those relevant innovation "hot-spot" locations abroad to which it is attempted to create and maintain linkages.* This kind of actor often has funding from governmental sources but also from the private sector. A BO offers various services and activities that showcase and provide benefits for its parent organizations, and it focuses directly or indirectly on innovation activities and may conduct research or facilitate research connections. In addition, it often offers free or low-cost advisory services for home country organizations (ibid. 2010). The notion of a *transnational* bridging organization (TBO) is applied in this report. A TBO aims to link two distant innovation ecosystems together through a policy-oriented organizational arrangement explained above.

FinNode represents a Finnish transnational bridging organization. Its content and organization seem to be fairly advanced (see Box 13), according to a study conducted by Trondsen (a Stanford Research International's Professor) in 2010 in Silicon Valley among similar organizations. In addition, its staff considers the FinNode model as advanced in the field, also including other locations around the globe. Although it may be questioned whether policy makers are the best to define the most relevant regions for the economy, it is appropriate to note that there are few hot spots around the world that are quite easy to recognize. However, the Swedish innovation policy, for example, is not focused on any certain regions, but instead on the national level. A key characteristic of this BO policy model is a traditional Nordic small-country approach, i.e. a search for synergies among several policy agencies. Singular policy measures are rather traditional as such, whereas a TBO aims to put them together in a more effective package.

Box 13. FinNode: Gateway to the Finnish innovation ecosystem

FinNode is an umbrella organization with innovation-related activities carried out jointly by Tekes and FinPro playing a key role, and it is backed up the Finnish Ministry of Foreign Affairs (MFA) and to some extent also the Academy of Finland, the Technical Research Centre of Finland (VTT), the Confederation of Finnish Industries (EK) and the Finnish Innovation Fund (SITRA). As stated regarding the US branches of FinNode, those are "fellow facilitators who seek to cross-pollinate ideas and networks between our two countries. FinNode USA works with America's leading thinkers to share ideas and stimulate economic well-being for all and are the gateway to the Finnish innovation ecosystem". FinNode operates in the USA, India, China, Russia and Japan, with one or several cities as nodal points.

FinNode provides links and expertise to firms that seek opportunities from the global markets. Apart from that, a foresight service, Inno-Watch, and its focused projects are an important part of the work carried out by FinNode and utilize the organizational infrastructure of its member organizations to collect knowledge about the innovation trends for its Inno-Watch service. These insights and information are then disseminated to Finland through online virtual meetings (called signal sessions). To identify the right target groups, large national innovation programmes (Centre of Expertise, Strategic Centers of Excellence) may be utilized to gather relevant audiences in Finland for interactive virtual meetings. This service thus provides firms with targeted market information, lowering the threshold to enter new markets and to launch a product at the right time.

The first FinNode office, called *FinChi*, was established in 2005 in Shanghai, China (see also Valovirta et al. 2007). However, in its beginning, it was a rather traditional technology centre providing premises for Finnish firms and other organizations, whereas the actual development of innovation-oriented FinNode had its beginning with FinNode in Silicon Valley (USA), established in 2007.

Although considered successful, FinNode has faced many challenges, too. The coordination of activities between several agencies has not always been easy, and the fees and compensation from the FinNode projects may not always be as attractive as those from the private sector. A new, partly overlapping model is being put into practice, titled Team Finland, which aims at strengthening the synergies of actors abroad (Hakala et al. 2012). Due to this, an umbrella of FinNode will vanish.

In Silicon Valley, at least, technological expertise and long-term presence are appreciated, while many bridging organizations nevertheless focus on showcasing and rotation of personnel. Networking may suffer from too-fast rotation and erode the social capital. Also, the role of FinNode there may change if its personnel do not possess much technological expertise, as may be the case due to the changed policy of Tekes.

(More info: www.finnode.fi)

The practices clearly evolve as the individuals implementing the policy measures become more deeply embedded in the regional networks. In its early days, FinNode also provided office space for firms to work on its premises as they aimed to land in the new markets. To a limited extent, this still takes place, but is not part of the key strategy. The Danish TBO also had some entrepreneurs in its Silicon Valley office (Box 14), but that was not included in the strategy of the organization. Rather, it aimed to connect the entrepreneurs with the local actors. The TBO's own incubator service in Silicon Valley is not that appropriate, since the region is the most important spot for the incubation industry. Companies such as *Plug and Play* provide a variety of related services. Plug and Play is a global accelerator with a focus on growing technology start-ups. The company's headquarters is in Silicon Valley and its network includes over 300 technology start-ups, 180 investors and universities and corporate partners. The company provides premises, services and access to 100 VCs and to its internal funding system.

In Shanghai, instead, FinNode is located on premises that are precisely created to host Finnish firms and other actors (FinChi) in a traditional technology centre fashion. This may illustrate the difference in local environments for entrepreneurs, i.e. from Finland it is easier to enter Silicon Valley than Shanghai. Obviously, different regions need different policies.

Despite the good "grades" FinNode has received, would it be possible to find even stronger links through communities that are rooted to the local innovation ecosystem of Silicon Valley?

Silicon Valley and the whole Bay Area have traditionally been the invincible magnet for talent and investments, with a very strong business relation to the world's second-largest economy and technology leader (until recently), Japan. However, recent changes in the world economy and the rise of China have made it a timely issue in the Bay Area also to think about stronger relations with China. Therefore, the City of San Francisco has been active with the local Chamber of Commerce and created a bridging organization called SF-China[8] (Box 15) that aims to strengthen the economic links with this new second-largest economy. A regionally organized TBO is interesting in the sense that it signals the usefulness of policy actions to link with other innovative regions abroad, even in the case of the largest technology hub in the world. In stiffening global competition, the policy measures along the lines of a bridging organization are more like business as usual than a source of competitive edge.

However, Silicon Valley is not a new link for Finland. Therefore, despite the good "grades" FinNode has received from different actors, it may be asked whether it would be possible to find even stronger links through communities that are rooted in the local innovation ecosystem of Silicon Valley. To connect these communities, the advantage would be more direct contact with people in

[8] A parallel regional service in Finland is the **Golden Bridge**, which provides insight into and access to Finnish hi-tech innovation and growth companies. The Golden Bridge helps Chinese VCs and PEs by matching the investors with the most potential investment targets with co-investors, to find partner candidates, and Chinese hi-tech growth companies in innovation exchange and business expansion. The Golden Bridge was established by Greater Helsinki Promotion Ltd.

business and innovation. For example, in the case of Silicon Valley, there are already fairly well-established communities and organized Nordic associations, such as the "Silicon Vikings" (Box 16), which have chapters in all the Nordic countries and members who have strong connections and extensive knowledge of the business, science and technology fields of Silicon Valley and the Bay Area and of the Nordic countries. These genuine communities may provide parallel opportunities to the Indian and Chinese communities in Silicon Valley discussed earlier. While this practice is possible only in those locations where there is already a strong community to link with, the TBO and other strategies could be considered for those regions where links are only emerging.

Box 14. The Danish Innovation Center – Bridging Denmark

The Innovation Center Denmark is established in collaboration with the Ministry of Foreign Affairs and Ministry of Science, Innovation and Higher Education. It focuses on the clean tech, ICT and life science sectors. In 2013, there were centres in Munich, Shanghai, Hong Kong, Silicon Valley, Sao Paulo, New Delhi and Seoul, of which the last three mentioned were set up in summer 2013.

The centres serve Danish firms from start-ups to big companies, and research institutions as well as foreign investors who aim to set up a business to Denmark. They provide technology scouts, contacts and knowledge about the business environment. Contracts with business accelerators to serve Danish start-ups and wider support in the growth efforts of firms and entering the markets are part of the services, at least in the Silicon Valley office.

The first Innovation Center was established in Silicon Valley in 2006, based on the Government's globalization strategy. In Silicon Valley, it is very active in organizing showcases and aims to create networks that may be used to serve its Danish clients.

To obtain a more stable network and better connections with the very congested networks of Silicon Valley, an advisory board for the centre was established by its director with twelve eminent persons from the Valley. They offer their contacts to the centre, help to find the right strategic directions and attend the events that the centre organizes. The challenge is to be able to give back to the network, as expected in Silicon Valley. The rewards that an advisor may have include knowledge related to the regulation of the clean tech industry in Denmark, science companies, etc. Networking and the use of networks to connect relevant actors of Silicon Valley to Danish clients are the key activity of personnel.

Box 15. ChinaSF: Linking the giants

ChinaSF was established in 2008 and now has offices in Beijing, Shanghai and San Francisco. It defines itself as a "public-private initiative of the San Francisco Center for Economic Development (SFCED) in close partnership with the San Francisco Office of Economic and Workforce Development (OEWD), supported by funding from private sector partners. Its goal is to attract and retain Chinese investment and business expansion into San Francisco and the Bay Area, and to also support regional businesses in their business efforts in China". Behind the idea there were rather traditional sister-city relations that were not economically oriented from the beginning, but active key individuals changed this.

SF-China is partly funded by the City of SF (30%), the rest of the funding coming from private sector members, who pay an annual fee based on their level of membership (platinum, gold, silver) and receive certain services based on that (the possibility to attend meetings in the Mayor's office, trips to China, etc.). Its premises are co-located with the Chamber of Commerce.

ChinaSF has three employees, one in each location, and in addition some trainees/internships. The founding director had long experience from SF-based NGOs and the other employee in China has good knowledge of Chinese. In practice, ChinaSF uncertakes rather typical BO activities, like showcasing, and aims to build an exchange relationship between China and San Francisco in business, attract investments and nourish networks. It helped 13 firms from China to locate to the Bay Area between 2008 and 2012.

However, it also has wider goals and SF-C aims to market SF-region-based educational organizations and gain some visibility for schools in China (other than UC Berkley or Stanford), including graduate schools and programmes like the School of Management's "green MBA" programme. It should be noticed that it is not Stanford or Berkeley that produce the most of the engineers for Silicon Valley and the Bay Area, but the *University of San Jose*, which is not found among the tens of global university rankings. The goal is also to have a US institution open up a campus or programmes in China. For further co-operation is this field, it aims to understand the Chinese educational system and the rank of the top schools better.

The director spends 50 to 60% of her time on relationship management and then maybe 10% of her time on fundraising for the activities. The non-profit structure gives more freedom than working within the city budget, since Chinese relations may be difficult to fit with public policy goals and they are quite free to brainstorm.

(More info: www.chinasf.org)

Box 16. The Silicon Vikings – Bridging Silicon Valley and the Nordic countries

Silicon Vikings is a non-profit collaborative business networking organization for the technology sector started in 1997. The network helps its members to succeed in their professional and personal endeavours by providing technology- and business-driven networking events and projects and offering relevant information based on the interest of members. The business and activities are allocated to a) Silicon Valley, b) the chapter and c) the discussion group level. Silicon Vikings connects the Nordic region through chapters (Denmark, Norway and Sweden) and discussion groups (in Estonia, Finland, Iceland) to Silicon Valley's networked business and educational ecosystems (San Francisco Bay Area, California, USA).

Relevant topics presented and debated by business and thought leaders often attract large audiences. Silicon Vikings has arranged some fifteen events per year; the events range from one-speaker monthly lunch series, pitching events, business mixers and pub mixers to large panel discussions with global business leaders.

Silicon Vikings has a nationality-related network and through its members is strategically positioned to connect the innovative high-technology development of the Nordic region with Silicon Valley. Recently it has increased its collaboration with Nordic bridging organizations, including FinNode, the Innovation Center Denmark and Enterprise Estonia, as its key partners.

Silicon Vikings offers Nordic entrepreneurs access to established business networks and connections. It acts as "the natural nodal point for connections between established and recently arrived entrepreneurs and professionals in emerging technology companies". It is also active in facilitating cross-fertilization between industry and academia and the members of the network are well represented in prestige organizations in both sides. They also have the potential and desire to strengthen or complement the tasks similar to the ones FinNode, Innovation Norway or the Danish Innovation Center have been planned to serve.

(More info: www.siliconvikings.com)

4.2 Next steps: A global campus for new regions and cross-border for twin cities

In addition to TBOs, there are also other long-term policy solutions to link distant systems with the "triple-helix" approach, which is not as government-led as TBOs tend to be. Two models introduced here are the university-led **global campus** model and the regionally oriented **cross-border innovation system** model. For example, Denmark has set up a university campus in China (Box 17) as a joint project of several Danish universities. Alternatively, it may be possible to join the global campuses that are set up by host-country-based organizations, which invite selected universities around the world to launch their study programmes there. The Songdo campus in South Korea (Box 18) in the vicinity of Seoul is an example of this strategy. Of course, university-

based co-operation alone is not sufficient, but links to industry (and government) have to be established. These are, however, rather well-recognized needs of triple-helix or innovation system discussions, and thus the only new issue would be the application of these ideas to transnational connections.

Many universities in Europe and the USA have set up study programmes on global campuses like Songdo in South Korea. The key goal is not the international experience of students only, but more profound linking of innovation-related co-operation and activities between the regions in the long term.

The international collaboration taking place on the global campus is vital for building the global technology management and technology policy.

For example, in the case of the STI department of New York-based Stony Brook University with an educational programme in Songdo (SUNY), nearly all students are Korean in the first round, but it plans to attract students from all over Asia and has already organized recruiting activities in China, Taiwan, India and other regions. In the future, the aim is also to attract students from outside Asia. Further, the plans include taking Stony Brook undergraduates to SUNY Korea for the summer, where they will take courses in technology management and interact with Korean companies. The future goal is to build strong collaborative research and project activities with Korea and use SUNY Korea as a major collaborator. Professor Ferguson, Chair of the Department of Technology and Society at Stony Brook University (NY, USA), emphasizes that international collaboration is vital for building the kind of global technology management and technology policy work that the university carries out.

Finland is undertaking some joint efforts with other countries, where common research facilities have been set up in different locations, like Scancor (est. 1988) in California for visiting researchers from Nordic countries, or the Nordic Center in India (NCI) established in 2001 in Delhi, for example for meetings, lectures, seminars and conferences. Despite the recent interest, little significant outward internationalization in the higher education sector has taken place, although joint degrees have been awarded and some courses and training organized abroad. Triple-helix-oriented global campuses offer serious opportunities to link innovation systems globally over time.

Box 17. The Sino-Danish Center for Education and Research (SDC)

The SDC is a joint project on education and research between the eight Danish universities, the Danish Ministry of Science, Technology and Innovation (STI), the University of the Chinese Academy of Sciences (UCAS) and the Chinese Academy of Sciences (CAS). The overall aim of the SDC is to promote and strengthen collaboration between Danish and Chinese research and learning environments for the benefit of both countries.

The establishment of the Sino-Danish University Center is based on the Danish Ministry of STI's *Knowledge-Based Strategy for Collaboration between Denmark and China in the Fields of Research, Education and Knowledge* from 2008. In May 2008, a Danish delegation visited several Chinese universities to find the right partners and in September 2012 the first 110 Danish and Chinese students started in these programmes. Virtually all Danish students also enrol on Chinese language courses.

The university centre also works as a platform for research collaboration within areas of high relevance to the future development of both Chinese and Danish societies. Especially Chinese challenges related to the environment and fast growth and change in the society are addressed. Therefore, master's programmes include Water and Environment and Public Management and Social Development, as well as two more directly innovation-related programmes, Neuroscience and Innovation Management.

Master's courses are related to the research of the SDC and in addition to the themes mentioned above, there are also Chinese–Danish research groups focusing on social sciences with themes of 1) welfare with an emphasis on welfare regimes, social innovations, institutions and the labour market and 2) innovation studies, with a specific focus on innovation systems. In addition, collaboration with industry is highlighted as a central element of the SCD's activities. The aim is that students are trained through internships and theses conducted in collaboration with companies, and researchers will work with company labs on commercializing the results and offer access to high-quality technology. Finally, companies may benefit from university co-operation and recruiting students from the SCD and participating Danish universities.

The SDC is located in the UCAS Olympic Village Campus, close to the centre of Beijing.

(More info: www.sinodaniscenter.com)

Box 18. Songdo Global University Campus (SGUC), South Korea

The SGU campus is a university complex of several foreign universities. The Global University Campus is one part of the South Korean strategy to support its innovation economy, whereby about 80% of the population enrols in tertiary-level education. The construction of Songdo started in 2009 and it is situated just 20 kilometres from Seoul. South Korea already has two foreign university campuses (the Netherlands Shipping and Transport College Korea and the Friedrich-Alexander University of Germany), which opened in 2008, and there are expectations of more establishments in the immediate future.

The campus is located in Incheon Free Economic Zone (IFEZ), where there is an international industrial city, tax support, free economic activity, high-quality administrative services and good-quality living environment that supports the relocation of foreign university programmes, staff and students. To attract foreign universities, the IFEZ authorities also provide, for example, 1) support funds for preparation activities, 2) complementary faculty housing and 3) funds in the early stage of activities.

The aim is to create an educational hub (like Dubai and Singapore). However, the concept is "a testing board" for many universities, which in addition to the global economic downturn may cause delays in the process, but both local and central government work in order to solve these challenges. In addition, possible devaluing of new overseas programmes or the requirements of the government of a high share of foreign students may create challenges that hinder the development of this "platform".

In practice, universities will grant their own degrees on this global campus, but there will be independent administration for the campus facilities. The aim is to attract at least ten universities to the campus with their "best academic programmes". Eventually, the aim is to attract as many as 30,000 students. This would make the campus as comprehensive as traditional universities. The universities planning (or having already decided) to set up undergraduate programmes on the Global Campus include North Carolina State University, George Mason University, the University of Southern California, the University of New York at Stony Brook and Belgium's Ghent University. According to the director of educational affairs at the University of Ghent, offering courses in South Korea is important, because it is

> of great strategic importance to have a foothold in a part of the world that is in full expansion. It [Ghent] hopes to attract students from all over Korea and neighboring regions and to set up a close working relationship with IFEZ, the Ministry of Knowledge Economy, the University of Incheon and other academic and industrial partners. (University World News 2011)

An important question is how these students (mostly management, engineering, science, etc.) are connected with the innovation activities, and in which location.

(More info: http://www.sgu.or.kr/sgu/eng/main.htm)

The cross-border model refers to building more intense connections between two innovation systems next to each other, or at a very short distance, but in different countries. In Finland, Helsinki and Tallinn and Lappeenranta and St. Petersburg have been the focus of several plans to create cross-border activities. In "Talsinki/Hellinna", a science city, joint universities and other plans have, however, remained somewhat modest, although the region has become integrated as a common labour market area during the recent year. Cities, universities and science parks have worked together with different plans to find ways to speed up this development and Euregio has promoted the idea (e.g. Raunio 2005; Demos Helsinki 2010). These plans have contained innovation-related elements and the potential is well recognized. A tunnel connecting the cities has also been discussed. In Lappeenranta, parallel developments and several projects have been launched with St. Petersburg, although the size difference between the cities makes the situation rather different from the Helsinki–Tallinna case.

According to Lundquist and Trippl (2011), the policy focus depends on the stage of integration. The physical connection and logistics are the first phase of development (Table 4). An example may be found in Copenhagen and Lund, which Lundquist and Trippl (2011) use as a case in point. The Copenhagen–Malmö bridge was a key element for further development, including innovation-oriented development, which also required the overcoming of the cognitive distance (Box 19).

Table 4. Policy focus on different stages of development of cross-border RIS (Lundquist and Trippl 2011)

Stage 1: Policy focus on overcoming the physical and hard institutional distance	**Stage 2: Policy focus** on overcoming the soft institutional and functional distance	**Stage 3: Policy focus** on overcoming the cognitive distance
Promoting physical accessibility and integration:	*Promoting integration in key areas:*	*Developing joint strategies to avoid future lock-in:*
• Investment in infrastructure • Harmonizing basic legal and regulatory frameworks • Promoting the acceptance of cross-border region building	• Harmonizing laws and regulation in key areas (labour market, educational systems, etc.) • Identifying science and business areas with sound levels of functional and cognitive proximity • Redirecting public research and higher education in areas with sound levels of functional proximity. • Promoting knowledge links by creating hard and soft institutions in key areas • Promoting the development of a shared CBR identity and culture	• Joint strategies for scouting and promoting new areas of relatedness • Coordinated strategies for the allocation of public R&D and higher education resources • Common efforts to attract FDI and R&D facilities from the national/EU level • Further development of institutional thickness

Lundquist and Trippl (2011) see the overcoming of cognitive distance as the most advanced level of cross-border IS. This is well in line with the literature, which constantly emphasizes the importance of social networks and “social capital” for innovative interactions. The EU has been active in cross-border activities, and there are several programmes that may be utilized for border-crossing practices. These programmes have been used especially in the Baltic region (e.g. the Baltic Health Region network and Baltic Star programmes), but strong border-crossing innovation systems are still lacking in Finland. Like the global campus model, the cross-border model also aims to create science-, industry- and business-based links (triple-helix) between the regions and nourish the emergence of transnational innovation communities too.

Box 19. Cross-Border Innovation System – Copenhagen /Malmö/Lund

The Öresund bridge, which connects the Malmö (Sweden) and Copenhagen (Denmark) regions, has played a part in the creation of a more intense cross-border innovation system as trains and highways enable easy travel. These interactions ease cross-border knowledge linkages and innovation partnerships between researchers, firms and institutions. Relationships have also acquired quite organized forms in the context of initiatives like "Öresund University" (ÖU), "Öresund Science Region" (ÖSR) and "Medicon Valley Alliance" (MVA). The institutionalized form of cross-border co-operation between the knowledge organizations includes more specifically the following:

- The **ÖU** is a consortium of 11 universities and aims to create a strong cross-border science-based region by increasing interaction around research and education.
- The **ÖSR** consists of four network organizations (or platforms) in the fields of IT, logistics, food and the environment.
- The **MVA** does not only focus on increased collaboration among scientific organizations, but also aims to promote interactions with business and industry.

The Öresund region thus has a rather thick web of coordinating institutions, promoting scientific collaboration and knowledge exchange. Both Denmark and Sweden are characterized by decentralized political–administrative structures, delegating many responsibilities to the local and regional levels. Consequently, the national governments are mostly indirectly involved in cross-border projects in the Öresund region.

Öresund Committee represents a decisive step in the institutionalization process of the cross-border region. In the first ten years, the Öresund Committee initiated several cross-border network projects, including the Medicon Valley Academy. Today, the Committee promotes regional cross-border cooperation at all levels and sees itself as an "embassy" of the Öresund region. It has 12 members, i.e. the regions and main municipalities of the areas, with representation of 36 politicians, 18 from Denmark and 18 from Sweden. The organization has three long-term strategic goals: 1) to sustain and promote long-term economic growth and competitiveness, 2) to sustain everyday integration by promoting mobility, institutions and identity and 3) to secure a more connected region by infrastructure, communication and co-operation. In terms of innovation and regional knowledge production, the focus of the Committee is more blurred, but the ÖU, ÖSR and MVA as specialized organizations form a rather stable governance structure, promoting innovation-oriented integration. Still, institutional distance hampers cross-border networking and knowledge sharing, i.e. differences in educational systems, taxation systems and legislation (source: Lundqvist and Trippl 2009). It should be noted that the ÖU ceased to exist in 2012.

5 Inclusive model: Integrating new members and linking with the new sites of innovation

The inclusive model characterizes policies that aim to connect new foreign actors to innovation activities rather than to internationalize already innovative actors and thus increase the "windows of opportunity" globally. While there are many inclusive characteristics in all the models discussed in the preceding chapters, the key inclusive policies are 1) development programmes that aim to enhance the emergence of the innovation system in developing countries and 2) those that focus on immigrants in Finland in order to support their involvement in innovation activities. Both policies exist already, but there would be room for more systematic linking with the future innovation hubs and integration of immigrants to innovation factories. This is clearly a field in which altruism-oriented development policies and social policies converge with a business-oriented innovation policy; therefore, the involvement of the public sector is needed to balance the aspects of competitiveness and cohesion. The innovation-oriented perspective of Finnish development policies could be upgraded to the next level, but a bigger step ahead would be to apply the innovation approach to the labour immigration policies.

5.1 Upgrading the development policy – Transnational hubs of rising Africa

The idea of inclusion has been discussed in the context of the Finnish innovation system model from its early days. The Finnish welfare state model has been compared with the Silicon Valley model, state-led Asian models (Himanen 2004) and those of other countries, and inclusive societal practices have referred to the egalitarian practices of Finland. However, inclusive ideas have not emerged in relation to internationally oriented innovation policy. Here it is suggested that the idea of the inclusion view could also answer the question of how to integrate new groups into the innovation-based value creation process, which is the major question in developing countries (Globelics 2012). In the context of international innovation policy, this refers to the inclusion of immigrants in Finland and linking with the less developed regions abroad.

Innovation and development have already created at least three significant groupings, the **Globelics network** supporting the innovation system view, the **Triple-Helix group** focusing on university–industry–government interactions in the economy and **the bottom of the pyramid approach**, seeking innovative business opportunities from poor countries. These approaches complement each other well, and while some countries have more problems with the business sector, others have more with societal institutions (or the lack of them). Both are significant obstacles to wealth creation in many nations. There is already a history of building innovation-related development projects in Finland to South Africa, Zambia and Mozambique (Box 20; see also Koria et al. 2010), but this is not really established as a significant part of the Finnish

innovation policy yet. Finnfund and its expert service Finnpartnership are also working to make the process more economically and mutually beneficial.

Box 20. Bringing in new sites of innovation – Development policy and innovation

As a Finnish example here, the programme ensemble of **Innovation and ICT Projects of the Finnish Ministry for Foreign Affairs for 2010–2013** supports co-operation with long-term partner countries that are mostly located in Africa. The total budget of these projects is approximately 75 million euros (compared e.g. with 1 mill. euros for FinNode in 2011). The programmes include, for example, "South Africa–Finland Knowledge Partnership on ICT" (SAFIPA, 2008–2011) and "Co-operation in Science, Technology and Innovation between Finland and Mozambique" (STIFIMO, 2010–2014). These programmes often co-operate with actors such as the World Bank (InfoDEV) or the Nokia Group (Ministry of Foreign Affairs 2012). The first and maybe the most comprehensively documented was COFISA (*The Cooperation Framework on Innovation Systems between Finland and South Africa,* 2006–2010), which was implemented in three countries, and was the first national innovation policy measure implemented nationwide. The important impact was in the new networks and mindset, which may enable more efficient policy making in the future.

Finnpartnership is a service provided by Finnfund, which manages and implements this Business Partnership Programme on behalf of the MoFA. Finnfund has professional capabilities and international networks with the development financing institutions. Finnpartnership aims to "increase commercial cooperation and promote business partnerships between companies in Finland and in developing countries and hence help to achieve positive developmental effects in developing countries". The service programme provides 1) advisory services and a consultant database to set up, run and finance projects; 2) financial support in the planning, development and implementation phases; and 3) matchmaking services by identifying potential business partners. The services are free of charge. In sum, most of the activities focus on the patching of missing community relations and the knowledge that these relations could provide between actors in different countries.

It should be noticed that a peer review assessment of the Development Policy of Finland (OECD 2012) stated: "Having so many possible areas of action without identifying priorities for implementation with clear objectives and expected results risks creating a dispersed development programme, thus undermining the achievement of Finland's strategic goals" (ibid. 2012, 1). Therefore, the innovation view could offer one alternative to focus development policies, since Finland has a long and strong history in the implementation of national innovation policies and national institutional structures that support the innovation-based renewal of the economy. The capacity-building programme of MoFA and MEC/CIMO (HEI-ICI) is related to innovation-oriented development policies, although the emphasis is on education, but there could be some more ambitious and more innovation-oriented policy programmes that would have a significant role in the Finnish innovation strategy.

For these policies, Africa is perhaps the target with the most potential. “Africa rising” has been a view in many recent publications, although evident challenges occur:

- The **fastest-growing economies in the world are sub-Saharan** poor countries, many with growth rates (GPD) over 4% and some, like Ghana, with much higher (14% in 2011) and with other significant advancements, like primary school enrolment increasing by 20% in four years, reaching 100% in 2007.
- According to Hausmann et al. (2012), in the immediate future **of the ten-fastest growing economies by GDP eight will be African**.
- Since 2007, **the Internet bandwidth has increased 20-fold** and the **continent’s mobile phone markets have become bigger than the markets in the USA or in the EU**, with 650 million subscribers.
- In addition, the **basic resources of the economy, like young people, arable land, oil and gas**, are all abundant in Africa compared with other continents (Perry 2012; World Bank 2012).
- In the field of ICT, which is an important force transforming Africa, **there are several remarkable ICT hubs in Africa**, not just random growth in the market. These technology hubs (e.g. iHub and NaiLab in Kenya, HiveCoLab and AppLab in Uganda or Kinu in Tanzania) may enhance the regional development poverty alleviation, but also offer rather advanced contact points for actors entering African markets and innovation-oriented collaboration projects.

However, growth is often based on population growth, not growth of the *GDP per population*, and **governments are failing to convert the growth into jobs and well-being** (Hausmann et al. 2012).

“The real emerging giant is Africa. Africa is not built on natural resources alone, but based on a new cadre of entrepreneurs.”
(Ratan Tata, CEO Tata Group)

To simplify, the problem is not growth but converting the growth to economic and societal processes that increase the quality of life and prosperity of the people of these countries. For this purpose, the Finnish innovation system and wider history of building societal institutions guiding Finland from one of the poorest countries in the world to one of the wealthiest could offer a significant amount of knowledge.

In Africa, a parallel development with regional innovation factories is emerging. In the past years, since the growth of the ICT infrastructure in Africa, African governments have shown keenness to develop open innovation platforms – such as Living Labs, co-creation forums and technology test-beds. Many African countries (e.g. South Africa, Namibia, Tanzania, and Kenya) are piloting and testing ICT-enabled trial environments that connect ICT application developers to research institutions, users/consumers, business partners and policy makers to solve local/global challenges. African innovations, such as Usahidi and mPesa, have introduced game-changing technology platforms, transforming how millions of people interact. Cheaper technology, open access and skilled labour can contribute to service delivery for citizens and value creation for corporations. Some recent World Bank studies point out the speeding up of ICT-enabled innovations. The emergence of high-speed networks (NRENs), virtual R&D platforms and shared clouds aid open innovation. Initiatives like Mobile Monday, technology boot camps and Hackathons are linking young programmers and developers. Together with

incubators, clusters, technology programmes and innovation funds, open innovation platforms provide the key ingredients for the modern African innovation ecosystem. They help to find and validate solutions applicable to local circumstances. They are collaborative platforms, and enable the feedback loop needed for evidence-based policy making. Coordinated joint activities help to create a more strategic master plan for the development of the local innovation ecosystem. A well-managed local ecosystem also makes a country an interesting partner to external players and can thus connect the local ecosystem to cross-border projects and new markets. However, the success of open innovation requires a strong focus on skills development at the local level (World Bank 2012). This development offers opportunities to create links to the Finnish innovation system as well.

Box 21. Innovation and development: Innovations Against Poverty (SIDA)

The Swedish International Co-operation Agency (SIDA) is a government organization under the Swedish Foreign Ministry, which administers half of Sweden's budget for development aid. **Innovations Against Poverty** is SIDA's programme for companies that are based or operate in a poor country. The programme is "a risk sharing mechanism for sustainable business ventures" for companies (and market-oriented organizations) with a business plan with the potential to reduce poverty.

The programme supports small firms and organizations to develop their business strategy and enter new markets in developing countries and larger companies as they develop inclusive business models that improve the opportunities of poor and disadvantaged people (e.g. as employees, suppliers or consumers) in the development country markets. The programme is not limited to certain sectors; the only requirement is that innovations should support poverty reduction. Companies that are eligible to apply may compete with their business plans for the **small grants** (under 20,000 e) or **large grants** (up to 200,000) that the programme offers.

Over 30 firms have received the grants to pilot or to scale up their inclusive business projects from sub-Saharan Africa and South Asia.

- **Small grants were received for example for pilots and pre-studies** related to the local production and distribution of bottled drinking water to rural populations in Tanzania, manufacturing and distribution of clean energy in Zambia and value chain development to sell high-value organic rice in US markets.
- **Big grants were received to develop products or business models, for example** to manufacture and distribute low-cost clean off-grid lighting and low-power energy to poor consumers in India and to build and scale a commercially viable sanitation infrastructure in the slums.

Information and help is provided online for applicants, who may sign up to the *Practitioner Hub*, which is a joint virtual platform with the similar UK-based development programme Business Innovation Facility. The Business Innovation Facility is the UK's Department for International Development (DFID) programme and offers advisory support to companies developing inclusive business in Malawi, Zambia, Nigeria, Bangladesh and India. Thus, programmes with similar goals may share knowledge more efficiently and improve the collaboration among the donors.

(More info: http://businessinnovationfacility.org, www.sida.se)

There are some international examples of how to integrate the innovation approach very strongly into development policies. For example, the *Swedish International Co-operation Agency* (SIDA/Foreign Ministry) (Box 21) and *Canadian International Development Research Center* (IDRC) are active agents in combining the views. SIDA has recently launched the business-oriented Innovation Against Poverty (see Box 21) programme and is responsible for about 50% of the

Swedish development budget, while the IDRC has a long history from the 1970s in applying science and technology to local problems in developing countries (responses ca. 4% of the Canadian development budget). The IDRC has its headquarters in Ottawa and regional offices in Uruguay, Egypt, Kenya and India, and it has significant global influence in the field in terms of research and policy-relevant discussion (IDRC 2012).

5.2 The next step: Immigration and innovation policies converging

Another way to conduct more inclusive innovation policy in the context of internationalization is to focus on immigrants and immigrant policies. From traditional attraction programmes for scientists and researchers it might be possible to move on to more comprehensive innovation-oriented labour migration policy. To some extent, the whole report at hand emphasizes this convergence, but there could be more specific policy measures and strategies that also emphasize the integration of immigrants in the innovation economy. It should be noticed that the innovation economy should increase the productivity of the work, but also produce jobs that create more value. As immigrants represent an increasingly important share of the labour force, they should not be excluded from this development. For example, in Helsinki, the region's population growth is based on immigration only, and the share of immigrants in the workforce is growing steadily.

There could be more specific policy measures and strategies that *also* emphasize the integration of immigrants into the innovation economy.

In this context, **employee-driven innovations** (EDI) are relevant. According to the EDI approach, all employees should be able to participate and interact in the workplace, in order to unleash their innovative potential. The EDI approach assumes that *employees have hidden abilities for innovation* and this potential can be made visible, recognized and exploited to the benefit of both the firm and its employees. Employees are seen as innovation assets. Innovation is embedded in everyday critical and reflective experiences and work practices, which in turn are often triggered by social interaction and exchange (e.g. Hörup et al. 2012). As Finland receives an increasing amount of immigrant labour, it is important not to create labour markets in which immigrants work in less innovative workplaces, as their human capital, as well as their cultural competences, will be wasted. It should be noticed that there are already many occupational fields in which the share of highly skilled foreign workers is quite high. Table 5 compares the average share of all foreign-born members of the population in Finland (approx. 3.5%). These fields offer opportunities to learn practices for integrating global human capital into the Finnish labour market, on the one hand, and potential target groups for policy measures to support the integration of foreign workers into employee-driven innovation processes, on the other.

Table 5. Selected occupations with a high percentage of foreigners as a share of the total employed in 2009 (Statistics Finland 2010)

Occupation (main statistical category in brackets)	%	(persons)
1. **Philologists, translators and interpreters** (professionals)	**20.3**	(772)
2. **Clearing and forwarding agents** (technicians and associate professionals)	**14.5**	(373)
3. **Housekeeping and restaurant supervisors** (service, care and shop workers)	**11.5**	(2 025)
4. **Travel consultants and organizers** (technicians and associate professionals)	**10.5**	(123)
5. **Managers of SMEs of restaurants and hotels** (senior officials and managers)	**10.4**	(149)
6. **Lecturers and senior assistants** (professionals)	**10.3**	(378)
7. **Choreographers and dancers** (professionals)	**9.5**	(78)
8. **Teaching professionals not elsewhere classified** (professionals)	**9.2**	(964)
9. **Other medical doctors** (professionals)	**8.4**	(799)
10. **Biologists, botanists, zoologists and related professionals** (professionals)	**8.3**	(207)
11. **Electronic and information technology experts** (professionals)	**7.1**	(842)
12. **Central government professionals** (professionals)	**8.0**	(1 296)
13. **Assistants and part-time lecturers** (professionals)	**7.3**	(181)
14. **Electronic and information technology professionals** (professionals)	**5.9**	(587)
15. **Information technology experts** (professionals**)**	**4.4**	(1884)

Some practical policy tools already exist, although they may require some readjustment. Numerous development projects have been conducted from 2007 (European Social Fund) onwards to support the labour-based immigration policy in Finland. These projects have produced several practices and services for the labour market that could be utilized in various working environments to enhance the learning and interaction opportunities of immigrant workers and thus their abilities to participate and contribute better to the innovation processes (see Raunio et al. 2010, Huttunen and Äärilä 2011). Several projects included the basic elements of international recruiting, relocating services, coaching and language training as well as more advanced career development practices involving both the newcomers and the employers (Figure 5). These practices could also be considered in the context of innovation-oriented policies that aim to renew the Finnish working life to utilize the non-Finnish human capital more capably. The shift in labour migration policies from the Ministry of Interior to the Ministry of Economy and Employment, which also has significant responsibility for innovation policy, should ease the coupling of these two related fields. Importantly, the legislation has also changed in Finland and aims to treat immigrants as human resources instead of stigmatizing them to be clients of social services, which supports the emergence of new practices to integrate the immigrants into labour markets and learning and innovative processes.

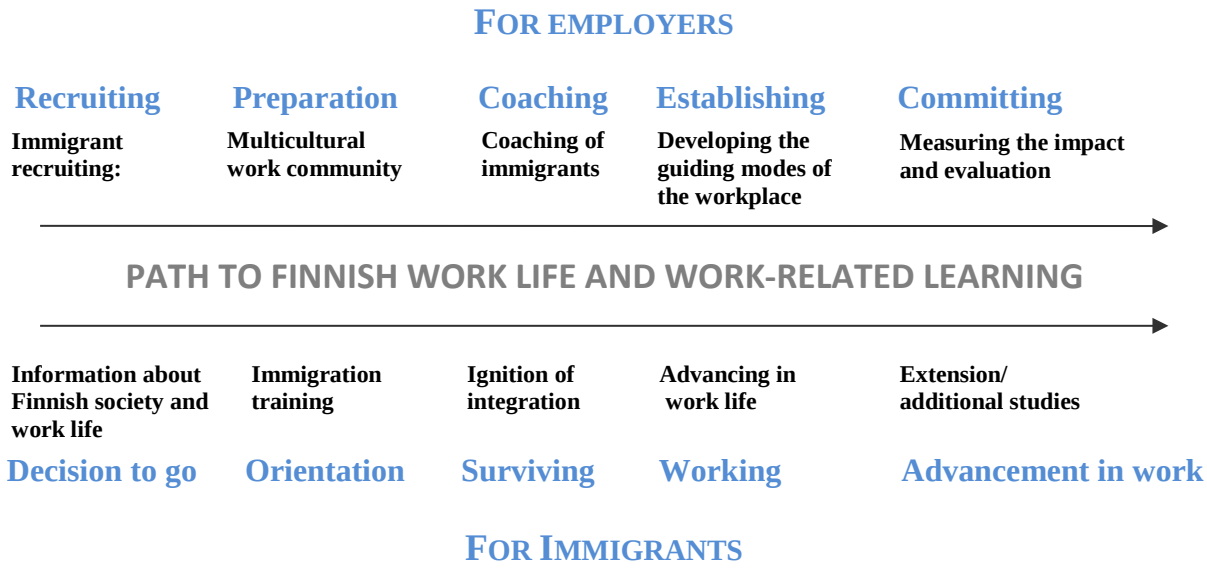

Figure 5. "MultiForce" – Service package for work-based immigration (Amiedu 2008)

In addition, **entrepreneurs with an immigrant background may be significant resources** for the regional economy. In addition to students related to AVG or Demola, more traditional incubators may also deliberately develop their services for immigrant clients (who may include foreign students). This has been carried out for example in Helsinki (Box 22). The share of foreign-born entrepreneurs of the total is about one-third in the Helsinki region. Therefore, similarly to the case of immigrant workers, entrepreneurs could also benefit from the practices that elevate the quality of business towards more innovation, in terms of products or business models, and thus increase the value that they acquire. This may be supported by applying the innovation approach to immigration policy.

The real opportunities lie in the integration of innovation and labour migration policies.

It might also be possible to link these policies to the development of regional innovation factories and seek platforms on which the integration of immigration and innovation policies may be tested. For example, it might be possible to facilitate highly educated immigrants from Africa (who have the most difficulties in finding work that equals their qualifications) to work in projects with promising innovation hubs in Africa and utilize their cultural competences related to both locations. Beyond this singular example, the real opportunities lie in the integration of innovation and labour migration policies, more profoundly. The creation of social capital among small and homogenous nation states has been strength for small Nordic countries like Finland and Denmark, and it is important to seek new tools to create inclusive practices for the society that may create similar social capital among the more diverse population to support further innovative actions (see Lundvall 2012).

Box 22. Inclusive incubator for immigrant entrepreneurs in Helsinki

As many as 35% of clients have a non-Finnish background. Recently, multicultural teams have also appeared as new entrepreneurs, and often they are university students. The aim is not to set up a specific incubator for immigrants, but rather to develop the existing services so that they are able to serve a multicultural and diverse group of clients. This is in line with the wider strategy of the city, which aims to mainstream the immigration services, i.e. they are not separated from other services, but capabilities are part of the public services.

Since there is no efficient follow-up system for the firms receiving guidance or incubation services, it is not possible to compare the success rates of immigrant firms. However, the rate is 80% in total and around 70% for immigrants.

The project focuses on immigrants who live in the Helsinki region, are considering setting up a business, are at the early phase of their career, and need guidance and assistance in networking with other entrepreneurs. There is also a specific target to find growth firms for the programme, but they are rare, as growth firms usually are. In co-operation with universities, the incubator concept will be developed for these growth firms. The aim is that the services for immigrants will be organized as one total, permanent activity and as part of the regional business services. The services utilize the immigration information office in the city centre, which offers versatile information for all immigrants and is now part of the permanent services of the city.

There is some guidance and material available in different languages (English, Russian, Estonian, and Arabic) and more information material is being produced. Moreover, networks with immigrant and native entrepreneurs are being created. Although activities on physical premises will cease as an incubator when there was quite natural interaction among native and foreign entrepreneurs, there are plans with universities to organize a place for business-related meetings and other interactions.

In practice, Helsinki business services have already been working for decades and many parts of the immigrant service are already an integral part of the service package (although developed as the ESR project). It is difficult to estimate the results, since there are not really long-term follow-ups with the firms that complete the incubation process or receive guidance.

(More info: http://www.yrityshelsinki.fi/en)

6 Channels and platforms: A systematic framework for policy planning

The framework for internationally oriented innovation policy planning consists of four policy models that may guide the orchestration of the policies. The *facilitating*, *bridging* and *inclusive models* aim to enable and govern the innovation activities that cross the national borders (*transnational channels*). The *regional innovation factory model* (*a regional platform*) characterizes a policy that links the transnational channels with regional innovation ecosystems and their communities. Innovation factories can attract, host and breed globally oriented innovation communities and entrepreneurs, while facilitating, bridging and inclusive policies can support these processes. A key long-term goal embedded in the policy framework is to support the emergence of a more globally oriented generation of innovators and innovation communities. Links with relevant hubs of the global innovation ecosystem are built on their often very personal relationships. The short-term goals include the attraction of foreign firms, investors and individuals to the regions/country.

This final chapter sums up the **framework for the planning of internationally oriented innovation policies** with some practical examples. Internationalization is simplified as the functioning of transnational **channels** that link remote locations (around the globe) and regional **platforms** that integrate the links to the regional innovation systems and to the national innovation system in Finland. Four generic policy models can be deployed when there are deliberate attempts to enable and govern these channels and platforms. The presented policy models are based on the established and emerging practices in Finland and abroad. While bridging and especially facilitating models represent mostly established practices, the inclusive model and regional innovation factory model are more novel and emerging practices in Finland. Examples from Denmark, the USA and other countries are mostly used here to illustrate the next steps that could potentially be applied in Finnish policy making (to conduct a full range of policies according to the presented framework).

Traditionally, the linkages between national innovation policy programmes and locally and regionally initiated policies have been related, among other things, to science parks and cluster management with their typical institutions for relevant stakeholders' mutual interaction (i.e. platforms). Along with the recent advances in understanding and managing innovation, we interpret the most recent phase in the evolution of platforms as the emergence of **regional innovation factories (RIFs)**. Regional innovation factories originated from changes in an innovation

environment (e.g. new innovation models and a pronounced emphasis on exploitation, i.e. making business) and thus they may also serve as the key platforms on which to initiate and conduct many of the internationally oriented innovation policies. Importantly, RIFs resemble some of the logic of open innovation and democratizing innovation ideals and are often appealing to the new generation of innovators. RIFs stress the mode that is based on the couching and hands-on training of future innovators, such as students, young entrepreneurs, start-ups and small firms, rather than (although not exclusively) PhD programmes and traditional formal R&D projects. In addition, community-based ideas of openness and mutual help support early-phase innovators as they need peer support and specific technical or business-related advice in a flexible and agile way. It should be noticed that social capital and community building in general are even more important goals in the global than in the national context due to a lack of policy and budgetary power outside the national borders. Therefore, many global communities may function as platforms of innovation activities, including the transfer of tacit knowledge. Consequently, at best, RIFs not only host, but also breed both new innovators and innovation communities that may contribute to open innovation processes.

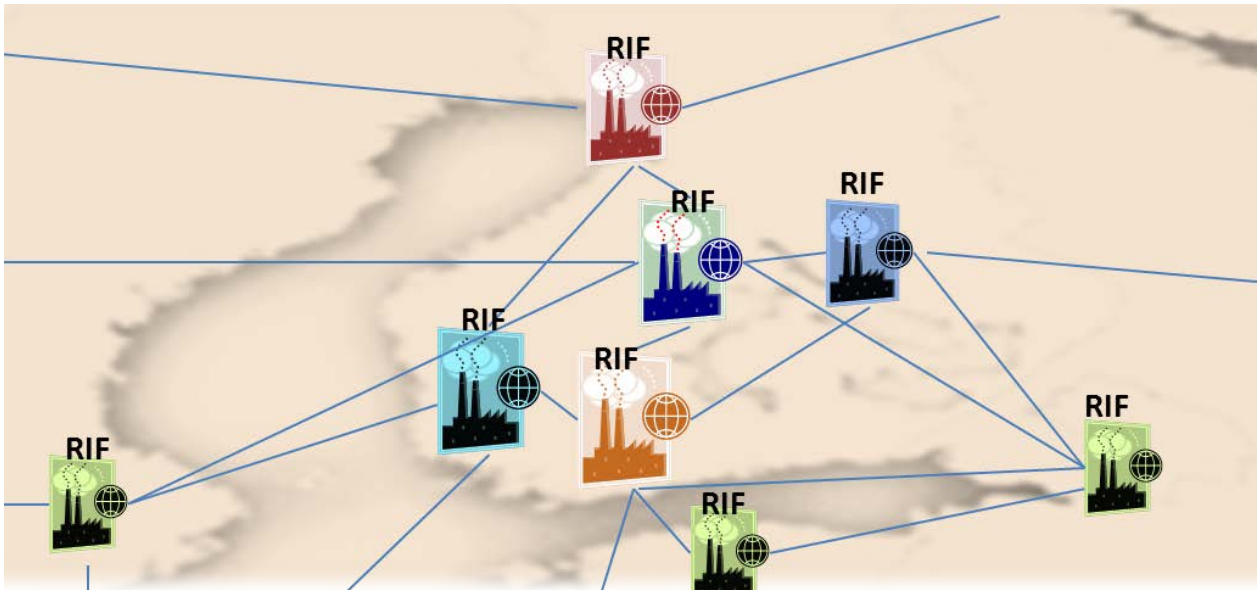

Figure 6. Regional innovation factories (RIFs) as platforms for transnational channels

Government policies may aim to support the integration of transnational channels and RIFs to upgrade RIFs into more globally oriented platforms. Prospects that regional innovation factories (RIF) will open up in terms of supporting the internationalization of the national and regional innovation systems are, for example:

- New **platforms** for **practice-oriented education and training** breed globally oriented innovators by utilizing (lean and agile) start-up accelerators, innovation camps, proto-projects and so forth with systematic mentoring practices and other hands-on innovation processes. University–industry relations focus more on students and student groups as actors in innovation processes than on top scientists and research labs. These new initiatives provide learning environments that are authentic innovation platforms with many international

connections from the start, and with real-life networks, communities and innovation processes instead of simulations (e.g. *Demola*, *Aalto Venture Garage*).

- RIFs host (and breed) **innovation communities** and may intentionally enhance their internationalization through opening up programmes, project training and education for international student applicants, as well as by attracting foreign entrepreneurs and firms to establish their activities in an RIF and to build relationships in order to join its communities.
- **The transnationalization of the entire platform concept, with its extensive range of services**, promotes opportunities for education and for a variety of innovation-related communities, but also for small firms and individual entrepreneurs to reach new locations within the globalizing RIFs. These processes can be thought of as parallels to the global structures of multinational companies (MNCs) as links with new markets, partners and talent globally through new hubs in relevant locations around the world. Some elements of RIFs, such as the Start-Up Sauna of the Aalto Venture Garage or Demola of the New Factory, have **transplanted their activities abroad** through different collaborative agreements. In such a way, they have created platforms for the interaction between the RIFs and may even sow the seeds of such platforms that can be termed as globalizing innovation factories (GIFs).

Policies along the lines of the three other presented models may support the emergence of international activities and relations in regional platforms by enhancing the emergence of transnational *channels*, for example, as follows.

The policies of the facilitating model focus mostly on the internationalizing of individual actors and form the most traditional mode of internationally oriented innovation policy making (in Finland). These policies include funding, mobility programmes or guidance for Finnish firms, researchers, entrepreneurs and organizations planning to internationalize some of their activities. This model also includes policies targeted to foreign actors with activities that involve Finland or Finnish innovation actors in some way (investments, mobility, etc.). Three main categories of activities that policy measures typically focus on may be defined as:

- **Exporting of Finnish innovations** to foreign markets. While traditional export-related services may be enhanced by providing public services in a more systematic and visible manner (e.g. Team Finland), the opportunities to build the long-term internationalization capabilities of firms and individuals should be considered as well. The latter option refers to more extensive use and development of networked international training programmes (e.g. GAP) that help firms to help themselves to build their capabilities and networks to go global.
- **Attracting talent and investments**. Science-related talent and investments may be further extended to focus more on business-related innovation actors by developing platforms with RIF characteristics, e.g.
    - **Large companies** seeking platforms to locate their innovation-related activities benefit from the agglomerations of innovation communities and related services that they may reach and tap into through RIFs (e.g. *Microsoft Innovation Centers*, MIC) and
    - **Foreign start-ups and young entrepreneurs** may be attracted to apply to programmes hosted by RIFs (e.g. *Start-Up Chile* or S*tart-Up Sauna* on a smaller scale).

The next step in policy making could be a *more systematic creation of* **transnational innovation communities** that link regions with global networks over long periods of time by supporting personal networks, as the examples of *HYSTA* or *TIE* in Silicon Valley and the emerging case of the *Otaniemi International Network* in Finland indicate.

The policies of the bridging model connect the multiple functions and actors of an innovation system with selected innovation system(s) abroad. The model represents a fairly recent mode of policy making in Finland. Such policies support the emergence of transnational channels that include bundles of innovation-related activities (e.g. research, business, policy, education). Accordingly, policy measures are created as joint efforts by representatives of several sectors and different policy fields. The bridging mode enhances the flows and activities crossing national borders, especially between (two) regions that are typically (but not necessarily) innovation hubs in their respective countries. Discussed in the Finnish context and with Finnish examples, the main sub-categories are as follows:

- The **transnational bridging organization** of Finland (*FinNode*) seems to be quite advanced, compared with some other models deployed by other countries, and is further developed towards a wider approach (*Team Finland*). However, greater emphasis could be placed on more systematic use of the existing innovation-related communities abroad (e.g. *Silicon Vikings*), which are extensively networked and embedded in innovation ecosystems abroad.
- The **Global Campus** approach, the potential next step to consider in policy making, would be based on Finnish universities locating some of their activities abroad in close co-operation with the business life linking selected foreign innovation environments through the "triple-helix model" with the Finnish innovation ecosystem (e.g. *Danish Universities in China* or global campuses on the *Songdo Campus* in Korea).
- **Border-crossing innovation eco-systems** could be developed further. For example, the cases of Lappeenranta–St. Petersburg and Helsinki–Tallinn have already been initiated, but the collaboration in these could be much more intense (c.f. the *Öresund case*).

Following the inclusive policy model, policies may bring in new actors and connect new countries and regions to the Finnish innovation ecosystem. Inclusive innovation policies are especially related to the **labour migration policy** (employment policy) **and the development policy** (foreign policy) and may be divided into two categories accordingly. New groups refer to immigrants and new countries and regions refer to innovation hubs in developing countries or in emerging economies. The logic of the inclusive model resembles the facilitating and bridging models, but its targets are not the usual suspects of an innovation policy. For innovation policies, it is characteristic to integrate a range of different policy fields, and here the policy measures are extended to immigrant labour and development policies:

- For example, **linking with the emerging (and sometimes already fairly advanced) innovation hubs in Africa** promotes opportunities not just for development policies, but also for more mutually beneficial relations between countries and regions. The next steps could be more comprehensive programmes that link the innovation and development with multiple actors, in order to link the innovation hubs of emerging economies in Africa with Finnish actors (a policy programme with a stronger innovation orientation than, for example, the current HEI-ICI programme).

- In the case of **policies that aim to integrate immigrants and the foreign-origin labour force into the Finnish economy**, an innovation perspective should also be applied and secure economically significant learning processes for newcomers. Incubators and training and start-up programs could add some specific elements to make it easier for non-Finns to participate in innovation processes, in addition to the language services and other such existing elements that open access to the Finnish society in its entirety. It would be arguable to consider including some innovation-oriented elements in policy programmes and practices related to immigrant labour and to use RIFs as platforms to integrate educated immigrants into innovation processes (e.g. student programmes, incubators).

The policy programmes of global actors like the United Nations or the World Bank or supranational actors like the EU may be used to leverage the national policy measures by joining them and involving the planning processes of these programmes more eagerly. "**Global innovation initiatives**" could be attached organizationally to relevant settings, such as the World Bank's or the United Nations' activities. Initiatives could enhance and steer the content of innovation activities by creating global demand for technologies developed in Finland as well as new global collaboration and partnership opportunities. They would focus on the big global-scale problems and issues (global warming, health and nutrition, peace and safety, communication and knowledge management, etc.).

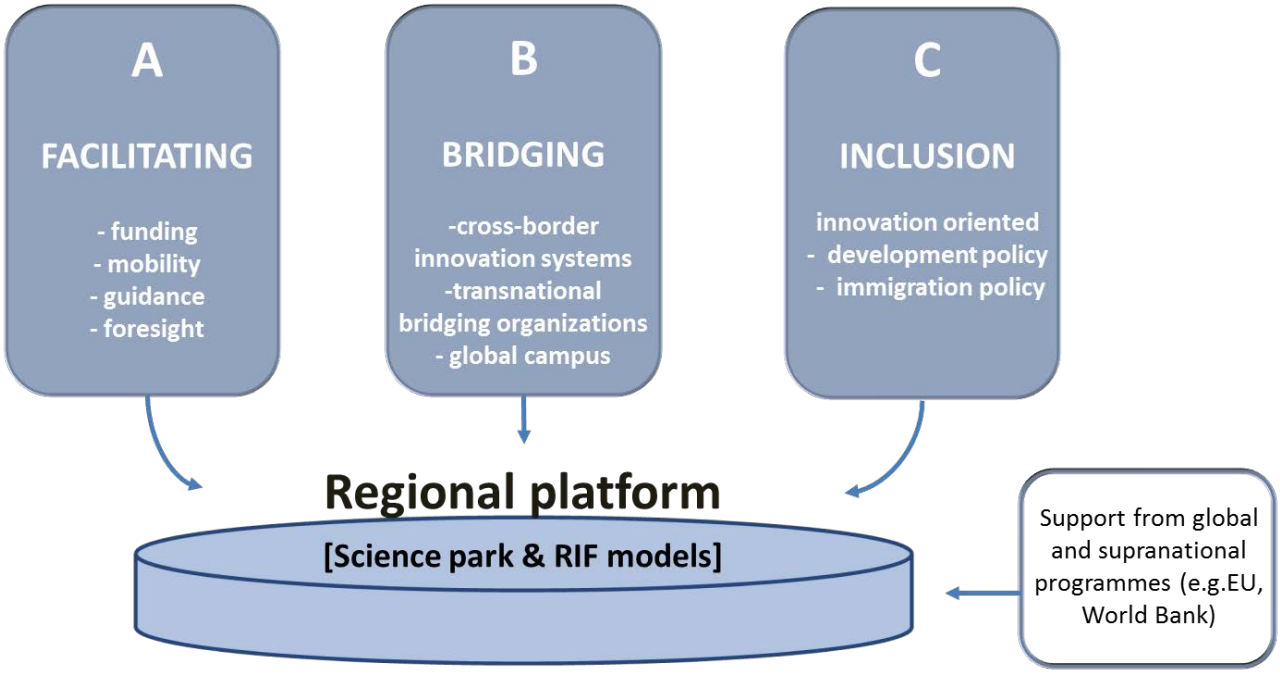

Figure 7. ABC of governing the channels and platforms: a framework for internationally oriented innovation policy planning

The main focus in Finland has been on the policies characteristic of the facilitating model, but we suggest that it would be possible to take a step further and emphasize the bridging and inclusive policy models as well as RIFs, on which this report provides some tentative views. We have here attempted to show how it may be possible to reframe the internationally oriented innovation

policy planning both conceptually and with practical examples. The approach outlined here would support a future in which the globalization of Finnish innovation activities could be based on a unique innovation culture and practices nurtured by the regional innovation factories and linked transnationally through various innovation communities with the support of the facilitating, bridging and inclusive policy measures.

References

Aaltonen, S., Heinonen J., Nummela N. and Paavilainen-Mäntymäki E. (2010). Pihtiputaalta Pekingiin – Purjeilla vai Moottorilla? Synergia-analyysi kansainvälistymisen tukipalveluista TEM-konsernissa. Työ- ja elinkeinoministeriön julkaisuja, Innovaatio 67/2010.

Amiedu (2008). Monivoima-palvelukonsepti. Esite.

Archibugi, D., Howells, J. and Michie, J. (Eds.) (1999). *Innovation Policy in a Global Economy*. Cambridge University Press, Cambridge.

Archibugi, D. and Iammarino, S. (2001). **The globalization of technology and national policies.** In Archibugi, D. and Lundvall, B.-Å. (Eds.) *The Globalizing Learning Economy*. Oxford University Press, Oxford, UK, pp. 111–126.

Barnard, H. and Chaminade, C. (2011). *Global Innovation Networks: Towards a Taxonomy*. CIRCLE, University of Lund, Paper no. 2011/04 (www.circle.lu.se/?wpfb_dl=29).

Chesbrough, H.W. (2003). *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Harvard Business School Press, Boston (MA).

COFISA (2010). *Enhancing Innovation in South Africa: The COFISA Experience.* Department of Science and Technology. Government of South Africa (www.cofisa.org.za).

Creandum Ltd. (2012). Creandum Nordic exit analysis. Slideshare, available at http://www.slideshare.net/d_blomquist/2012-02-creandum-nordic-exit-analysis, accessed 5.12.2012.

Demos Helsinki (2010). *Talsinki/Hellinna. Kaksoiskaupunki*. (Euregio report).

Economist (2012). The lure of Chilecon Valley. Oct 13th 2012.

Evidence Network (2010). An Assessment of the Impact of UCLA's Global Access Program (GAP) on Finnish Companies supported by Tekes 2004-2009. Available at http://www.theevidencenetwork.com/media/2873/tekes-gap%20final%20report%20master.pdf, accessed 3.3.2012.

Facebook (2012). Visualizing Friendships. Available at https://www.facebook.com/note.php?note_id=469716398919, accessed 19.10.2012.

Forbes (2012). Eight Reasons Startup Incubators are Better than Business School. *Forbes*, 1/2012.

Fromholm-Eisebith, M. (2006). Effectively linking international, national and regional innovation systems; Insights from India and Indonesia. In Lundvall, B-Å., Intarakumerd, P. and Vang, J. (Eds.) *Asia's Innovation Systems in Transition*. Edward Elgar, Cheltenham, UK, pp. 75–99.

GE (2012). *Global Innovation Barometer*. Global research report, January 2013.

Globelics (2012). Learning, innovation and inclusive development. New perspectives on economic development strategy and development aid. In Johnson, B. and Andersen, A.D. (Eds.) *GLOBELICS Thematic Report 2011/12*. Alborg University Press.

Hakala, J., Peltonen, P., Keinälä, S. and Backman, H. (2012). *Esitys: Team Finland – strategia ulkomaisten investointien edistämiseksi*. MEE Publications, Innovation 39/2012.

Halme, K., Lemola, T., Kanninen, S., Autio, E., Arnold, E. and Deuten, J. (2004). Competitiveness through internationalization. Evaluation of means and mechanisms in technology programs. *Technology Program Report 10/2004*. Tekes, Helsinki.

Halme, K. (2005). Teknologiakeskusten toiminnalliset ja rakenteelliset haasteet. In Koskenlinna, M., Smedlund A., Ståhle, P., Köppä, L., Niinikoski, M.-L., Valovirta, V., Halme, K., Saapunki J. and Leskinen J. (Eds.) Välittäjäorganisaatiot – moniottelijat innovaatioita edistämässä. *Technology Review*, 168/2005. Tekes, Helsinki, pp. 73–98.

Hausmann, R., Hidalgo, C.A., Bustos, S., Coscia, M., Chung S., Jimenez J., Simoes, A. and Yıldırım, M.A. (2012). The Atlas of economic complexity: mapping paths to prosperity. Harvard University & MIT, available at http://atlas.media.mit.edu/media/atlas/pdf/HarvardMIT_AtlasOfEconomicComplexity_Part_I.pdf, accessed 4.5.2012.

Hargadon, A. and Sutton, R.I. (2000). Building an innovation factory. *Harvard Business Review*, May–June, pp. 157–167.

Hautala, J. (2011). *Academic Knowledge Creation as a Spatio-Temporal Process. The Case of International Research Groups in Finland*. Acta Universitatis Ouluensis A584. University of Oulu.

Henton, D. (2011). Key note presentation. In *Triple Helix IX International Conference, "Silicon Valley: Global Model or Unique Anomaly?"*, Stanford University, California, 11–14 July 2011.

Himanen, P. (Ed.) (2004). Globaali tietoyhteiskunta. Kehityssuuntia Piilaksosta Singaporeen. *Teknologia katsaus*, 155/2004. Tekes.

Hjelt, M., den Hertog, P., te Velde, R., Syrjänen, M. and Ahonen, P.-P. (2008). Major challenges for the governance of national research and innovation policies in small European countries. *Tekes Review*, 236/2008. Tekes, Helsinki.

Hörup, S., Bonnafous-Boucher, M., Hasse, C., Lotz, M. and Möller, K. (2012). *Employee-Driven Innovation. A New Approach*. Palgrave: London.

Huttunen, H.-P. and Äärilä, S. (Eds.) (2011). *Avoin Suomi – kuka vastaa? Työperustaisesta maahanmuutosta*. ESR/ELY.

IBM (2012). Made in IBM Labs: IBM Opens "Innovation Factory" Using Collaboration to Accelerate Innovation of New Products, Services. Press release, available at http://www-03.ibm.com/press/us/en/pressrelease/21294.wss, accessed 12.1.2013.

IDRC (2012) Innovating for Development. Canada's contribution. Annual Report 2011-2012. Available at http://www.idrc.ca/EN/AboutUs/Accountability/Documents/IDRC-AR-web-ENG.pdf, accessed 11.12.2012

Izsak, K. and Griniece, E. (2012). *Innovation Policy in 2012. Challenges, Trends and Responses*. Produced under the Specific Contract for the Integration of the INNO Policy TrendChart with ERAWATCH (2011–2012) Technopolis Group, December 2012.

Jensen, M., Johnson, B., Lorenz, E. and Lundvall, B.-A. (2007). Forms of knowledge and modes of innovation. *Research Policy*, 36, pp. 680–693.

Kaplan, S. (2012). *The Business Model Innovation Factory*. John Wiley et Sons: Hoboken, New Jersey.

Koria, M., Berg, P., Välikangas, L., Pollari, T., Lempiälä, T. and Nordlund, H. (2010). *International Development Cooperation & Innovation Promotion*. A discussion paper for the Ministry of Foreign Affairs, Finland. Aalto University, School of Science and Technology, BIT Research Centre. Report series 2010/1.

Laasonen, V., Ranta, T. and Uitto, A. (2012). *Public Innovation Services in the Regions of Finland*. Report on innovation, internationalization and business services. Ministry of Employment and the Economy. Innovation 45/2012.

Lave, J. and Wenger, E. (1991). Situated Learning: Legitimate Peripheral Participation. Cambridge: Cambridge University Press.

Lemola, T. (2009). *Innovaation uudet haasteet ja haastajat*. WSOY, Helsinki.

Lippitz, M., Wolcott, R.C. and Andersen, J.B. (2013). *Innovation Communities: Trust, Mutual Learning and Action*. Nordic innovation report 2012/22.

Lundqvist, K.-J. and Trippl, M. (2009). *Towards Cross-Border Innovation Spaces: A Theoretical Analysis and Empirical Comparison of the ™Resund Region and the Centrope Area*. Institute for the Environment and Regional Development. SRE-Discussion 2009/05.

Lundquist, K.-J. and Trippl, M. (2011). Policy options for constructing cross-border innovation systems. Paper prepared for the *6th International Seminar on Regional Innovation Policies*, Lund, Sweden, 13–14 October 2011 (Draft version).

Lundvall, B.-Å., Joseph, K.J. and Chaminade, C. (2010). *Handbook of Innovation Systems and Developing Countries: Building Domestic Capabilities in a Global Setting*. Edward Elgar, London.

Lundvall, B.A. and Lorenz, E. (2011). Modes of innovation and knowledge taxonomies in the learning economy. Paper presented at the *CAS workshop on Innovation in Firms*, Oslo, 30 October–1 November 2011.

Lundvall, B-Å. (2012). The Danish Model and the Globalizing Learning Economy : Lessons for Developing Countries. In Lundvall, B-Å. & Fosu, A.K. (Eds.) Development Successes : Historical Accounts from More Developed Countries. Oxford University Press: Oxford.

Lynn, L.H., Reddy, M. and Aram, J.D. (1996). Linking technology and institutions: The innovation community framework. *Research Policy*, 25 (1), pp. 91–106.

Matikainen, J. (2012). Uusi Tehdas / New Factory – yhteenveto 2012. PowerPoint –tiedosto.

Ministry of Education, Ministry of Employment and Economy (2009). *Evaluation of the Finnish National Innovation System*. Policy report (www.evaluation.fi). Taloustieto, Oy.

Ministry of Foreign Affairs (2012). Työpaikkoja yksityistä sektoria ja kauppaa kehittämällä. Kauppaa tukeva kehitysyhteistyö, Suomen toimintasuunnitelma 2012-2015. Ulkoministeriö, Helsinki.

OECD (2012). Peer Review of Finland's Development Policy and Development in 2012. OECD, Development Assistance Committee (DAC), available at http://formin.finland.fi/public/download.aspx?ID=104335&GUID={F3460DE9-5623-437F-82F8-B4B2A5B1BBA8}, accessed 18.12.2012.

OECD (2011). Measuring Innovation: A New Perspective. Online version, available at: http://www.oecd.org/site/innovationstrategy/measuringinnovationanewperspective-onlineversion.htm, accessed 12.3.2012.

Patent Pending (2012). *How Immigrants Are Reinventing the American Economy*. A report from the partnership for a new American economy, June 2012.

Perry, A. (2012). Africa rising. *The Times*, December 2012.

Prahalad, C.K. (2006). *The Fortune at the Bottom of the Pyramid. Eradicating Poverty through Profits.* Wharton, USA.

Raunio, M. (2005). *Aivovuodosta aivokiertoon. Huippuosaajat talouden voimavarana. Elinkeinoelämän valtuuskunta*. EVA-raportti.

Raunio, M., Korhonen, M. and Hoffman, D. (2010). *Kannattaako kansainvälistyä. Suomalaiset yliopistot kansainvälisinä akateemisina ympäristöinä*. Tasti-working papers 6/2010. University of Tampere, Finland.

Research and Innovation Council of Finland (2009). *Internationalization of Finnish Education, Research and Innovation*. Helsinki University Print: Helsinki.

Saad, M. and Zawdie, G. (Eds.) (2011). *Theory and Practice of the Triple Helix Systems in Developing Countries. Issues and Challenges.* Routledge Studies in Innovation, Organization and Technology. Routledge: NY.

Saxenian, A.-L. (2006). *New Argonauts. Regional Advantage in a Global Economy.* Cambridge, Harvard University Press.

Serger, S.S. and Wise, E. (2010). Internationalization of research and innovation – New policy developments. Paper presented in the *2nd Conference on Corporate R&D*, Concord, 3.-4. March 2010, Seville, Spain.

Shapira, P., Smits, R. and Kuhlmann, S. (2010). An outlook on innovation policy. Theory and practice. In Smits, R.E., Kuhlman, S. and Shapira, P. (Eds.) *The Theory and Practice of Innovation Policy. An International Research Handbook.* Edward Elgar, Cheltenham, UK, pp. 449–466.

Statistics Finland (2010). Maahanmuutossa suuria vuosivaihteluita. Tilastokeskus, Tieto & trendit 4-5/2010, pp. 30-36.

Trondsen, E. (2010). *Bridging Organizations in Silicon Valley; Description, Analysis and Recommendations*. Report for the Research Council of Norway. Strategic Business Insight (unpublished).

University World News (2011). South Korea: Global campus for foreign universities. 23 January 2011, Issue No 1. Available at http://www.universityworldnews.com/article.php?story=20110122084850765, accessed 11.10.2012.

Von Hippel, E. (2005). *Democratizing Innovation*. The MIT Press, Cambridge, Massachusetts.

Vuorensola, T., Kaukomaa, T., Torssonen, S., Puskala, J., Ollula, P. and Honkonen, J. (2012). *Näin tehtiin Iron Sky. Eli kuinka lakkasin olemasta huolissani ja opin rakastamaan internetiä*. Docendo Oy, Saarijärvi.

Valovirta, V., Loikkanen, T. and Saarinen, J. (2007). *FinChi-innovaatiokeskus. Toiminnan arviointi ja suositukset*. Ministry of Economy and Employment. KTM Julkaisuja 23, Teknologiaosasto.

Wadhwa, V. (2012). The face of success, part I: How the Indians conquered Silicon Valley. *Inc.* (www.inc.com), 13 January 2013.

Wenger, E. (2000). Communities of practice and social learning systems. *Organization*, 7 (2), pp. 225–246.

Wolverson, R. (2013). The dream factories. *TIME Magazine*, 25 March 2013.

The World Bank (2012).*The Transformational Use of Information and Communication Technologies in Africa*. The eTransform Africa report.

APPENDIX: Data gathering

1) Meetings and interviews to gather knowledge and test ideas with policy makers

USA:

Robert Forster, Director, Adjunct Professor, Global Access Program (GAP), School of Management, University of California, UCLA

Elwin V. Svenson, Executive Director of International Programs, School of Management, University of California, UCLA

Minh Lam, Senior Technology Adviser, Tekes

Thuong Tan, Manager, Innovation Collaborations, Tekes, Finnode USA, Santa Carla, California

Timo Korpela, General Manger, Multitouch Americas, Santa Carla, CA, USA

Eilif Trondsen, PhD, Learning, Innovation and Virtual Technologies, Strategic Business Insights (SRI/Stanford University), California, USA

Camilla Rygaard-Hjalsted, Excutive Director, PhD, Innovation Center Denmark, Silicon Valley, CA, USA

David L. Ferguson, Distinguished Professor, Chair, Department of Technology and Society, Stony Brooks State University of New York

Xintong Zhang, Program Assistant, ChinaSF, San Francisco Center for Economic Development

Ginny Fang, Executive Director, ChinaSF, San Francisco Center for Economic Development

Emilio Marinez de Velasco, PhD Candidate, Berkeley University CA (organizing innovation-related visits from Mexico to Silicon Valley)

Ebony Smallman, Program Assistant, ChinaSF, San Francisco Center for Economic Development

Ilari Lindy, Senior Advisor, The World Bank Institute, Washington, USA

CHINA:

Haiyan Wang, Research Professor, Deputy Director, S&T System and Management Institute, CASTED, Ministry of Science and Technology, Peking, China

Sari Arho-Havren, Director, Minstry of Foreign Affairs, Finnode China, Shanghai

FINLAND:

Toivo Utso, yritysneuvoja, YritysHelsingin yrityshautomo

Petri Räsänen, Innovaation Director, Tampere Regional Council

Tommi Rasila, Vice President, Chamber of Commerce, Helsinki

Anne-Mari Järvelin, Tredea, the Tampere Region Economic Development Agency/Ministry of Employment

Ville Kairamo, Director, Demola, New Factory (Hermia Ltd)

Tero Piispanen, Vice Chairman, HealthBIO cluster, Finland Turku Science Park, Turku

Miki Kuusi, Managing Director, Start-Up Sauna (Aalto Venture Garage), Espoo

Natalie Gaudet, Community and Communications, Start-Up Sauna (Aalto Venture Garage), Espoo

Antti Yli-Mutka, Captain, Start-Up Sauna (Aalto Venture Garge), Espoo

Andrius Pleckaitis, Innovation Manager, INFOBALT (Demola Vilnus), Lithunia

Patrik Laxell, Senior Consultant, Synocus Oy, Helsinki

Mervi Pitkänen, Program Director, Maritime Cluster Center of Expertise programme, Turku

Jukka Salminiitty, Director, FinnodeUSA

Jarkko Moilanen, Tech. Entrepreneur, Serial Community Founder, Tampere

Jussi Parviainen, Director, HUB Tampere

2) International innovation policy: round table in Tampere, September 2012

Tamo Lemola, Innovation Researcher, Consultant, Advisor

Christopher Palmberg, Chief Adviser, Innovation Research, Tekes

Ville Kairamo, Director, Demola, New Factory (Hermia Ltd)

Jarkko Moilanen, Tech. Entrepreneur, Serial Community Founder

Marja-Riitta Mattila-Nurmi, Manager, Regional Innovation, Tampere Regional Council

Petri Räsänen, Innovation Director, Tampere Regional Council

Anne-Mari Järvelin, Tredea, the Tampere Region Economic Development Agency/Ministry of Employment

Mika Raunio, Senior Researcher, TaSTI, University of Tampere

Mika Kautonen, Senior Researcher, TaSTI, University of Tampere

Nadja Nordling, Research Assistant, TaSTI, University of Tampere

3) Main articles and conference papers to gather knowledge and test ideas with the academic community

1. Raunio, M. and Kautonen, M. (2013). Internationalizing regional innovation factories: Enabling innovations beyond national innovation systems. Paper presented at the *Regional Studies 2013 International Conference*, 5–8 May 2013, Tampere, Finland.
2. Kautonen, M. (2013). Innovative clusters and globalization: A literature study. Paper presented at the *Regional Studies 2013 International Conference*, 5–8 May 2013, Tampere, Finland.
3. Kautonen, M. and Raunio, M. (2012). Trans-nationalization of innovation systems: A literature study. The *10th Globelics International Conference*, 9–11 November 2012, Hangzhou, China.
4. Kautonen, M. (2012). Clusters, innovation, and globalization: A study on the top 20 articles. *7th International Regional Innovation Policies Conference*, 11–13 October 2012, Porto, Portugal.
5. Kautonen, M. and Raunio, M. (forthcoming 2013). Trans-nationalizing innovation systems. New spatio-cognitive spaces and the role of higher education institutions. In Cai, Y. and Kohtamäki, V. (Eds.) Sino-Finland Higher Education Forum publication.
6. Raunio, M. and Kautonen, M. (2012). Evolving ex-ante policy models for trans-nationalizing innovation systems: Towards global innovation communities. The *10th Globelics International Conference*, 9–11 November 2012, Hangzhou, China.
7. Raunio, M. (2012). Towards inclusive innovation economy? Innovation nation building inclusive practices for immigrant labor. The *10th Globelics International Conference*, 9–11 November 2012, Hangzhou, China.
8. Raunio, M. and Nordling, N. (2012). Trans-nationalizing innovation systems: Literature study concerning the role of global innovation communities. A paper to be presented at the *7th International Seminar on Regional Innovation Policies "How Can Regions Enhance Europe's Innovation Union Agenda Commitments?"*, 11–13 October 2012, Porto, Portugal.
9. Kautonen, M. (2012). Cluster transformation, innovation, and globalization. A literature study. Special session on cluster transformation, *AAG Annual Meeting*, 23–28 February 2012, New York, USA.
10. Raunio, M. and Kautonen, M. (2012). Policies for trans-nationalizing innovation systems: Building channels and platforms for Finland. Special session on cluster transformation, *AAG Annual Meeting*, 23–28 February 2012, New York, USA.
11. Liu, J. (2012). Dynamics of technological innovation network and its impact on organisational learning and innovation performance. *Innovation and Development*, 2 (1).pp. 159-174.
12. Kautonen, M. and Raunio, M. (2011). Trans-nationalizing innovation systems: Defining, measuring and building framework for interconnected "silicon valleys". *Triple Helix Conference*, 11–14 July 2011, Stanford University, USA.
13. Kautonen, M. and Raunio, M. (2011). Trans-nationalizing innovation systems. *Sino-Finland Forum on Higher Education "Transformation of Higher Education in Innovation Systems"*, 19–20 September 2011, Tampere, Finland.
14. Raunio, M. and Kautonen, M. (2011). Trans-nationalizing innovation systems: System failures and policy perspective. *GLOBELICS 9th International Conference*, 15–17 November 2011, Buenos Aires, Argentina.

15. Raunio, M. and Kautonen, M. (2011). Policies of trans-nationalizing innovation systems: Emerging channels and platforms in the case of Finland. *6th International Seminar on Regional Innovation Policies: Constructing Sustainable Advantage for European Regions*, 13–14 October 2011, Lund, Sweden.
16. Kautonen, M. and Raunio, M. (2010). Channels and platforms for innovation and competence building. An emergent research agenda of trans-national innovation systems. *Making Innovation Work for Society: Linking, Leveraging, and Learning, 8th International Conference of Globelics*, 1–3 November 2010, Kuala Lumpur, Malaysia.

4) Student workshop in GLOBELICS ACADEMY

Student workshop: "Trans-nationalizing innovation systems", organized at the *7th International Ph.D. school on Innovation and Economic Development (GLOBELICS ACADEMY)*, May 2011, TaSTI/UTA. (www.globelicsacademy.net)

5) Indian report

Mani, S. (2012). Internationalization of innovation: A survey of public policies for its support in the Indian context. Case report for the project *Enabling Innovations beyond the National Innovation Systems (IBIS)* (TaSTI/University of Tampere), Centre for Development Studies, Kerala, India.

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ISBN 978-951-44-9239-6
ISSN 2323-6213
ISSN-L 2323-6213