

The Finnish Innovation System: National and Sub-national Innovation Policies

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1. Introduction

National systems of innovation can be defined as 'that set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process' (Metcalf, 1995:462). Universities, governments and industry constitute the 'triple helix' of relevant relations (Leydesdorff and Meyer, 2003). In fact, within this context, the linkages and the quality of interaction are fundamental for the outcomes (Lundvall and Borrás, 2005).

In light of this, the choice of focussing on Finland stems from the willingness to understand how these interactions operate within an innovation system that is believed to be strongly successful. The aim of this research is to explore some aspects that makes Finland a relevant example by following a double trajectory: firstly, by providing a picture of the national innovation policies, highlighting those typical of the Finnish experience; secondly, by going more in depth with the analysis of the regional policies of innovation. In doing so, the innovative region of Tampere is taken as a relevant example, also because of its membership in the District of Creativity Network.

The remainder of the paper is structured as follows: Section 2 provides a general overview on Finland, mainly concerning some recent economic indicators. Section 3 and Section 4 respectively analyse the Finnish innovation system and Finnish innovation policies. Section 5 focuses on the region of Tampere as a relevant case for the screening of the regional innovation policies. Finally, Section 6 discusses the key findings.

2. General Overview

Finland, officially the **Republic of Finland**, is a Nordic country situated in the *Fennoscandian* region of Northern Europe. It has a surface area of 338,000km² and 5.4 million inhabitants (2010) (<http://www.dfat.gov.au/>). Table 1 provides some information on Finland's statistical profile.

| <i>Recent economic indicators:</i> | 2006 | 2007 | 2008 | 2009 | 2010(a) | 2011(b) |
|--|--------|--------|--------|--------|---------|---------|
| GDP (US\$bn) (current prices): | 208.1 | 246.5 | 273.2 | 241.3 | 239.2 | 270.6 |
| GDP PPP (US\$bn) (c): | 172.5 | 187.0 | 193.1 | 179.0 | 187.7 | 198.4 |
| GDP per capita (US\$): | 39,444 | 46,502 | 51,297 | 45,096 | 44,496 | 50,090 |
| GDP per capita PPP (US\$) (c): | 32,697 | 35,284 | 36,245 | 33,456 | 34,918 | 36,723 |
| Real GDP growth (% change yoy): | 4.4 | 5.3 | 1.0 | -8.2 | 3.6 | 3.5 |
| Current account balance (US\$m): | 8,786 | 10,486 | 7,756 | 5,601 | 7,396 | 6,736 |
| Current account balance (% GDP): | 4.2 | 4.3 | 2.8 | 2.3 | 3.1 | 2.5 |
| Goods & services exports (% GDP): | 45.7 | 46.1 | 47.1 | 37.7 | 39.7 | 43.3 |
| Inflation (% change yoy): | 1.3 | 1.6 | 3.9 | 1.6 | 1.7 | 3.1 |

Table 1 – FINLAND Fact Sheet (source: <http://dfat.gov.au/geo/fs/finl.pdf>)

According to the OECD's Economic Survey of Finland 2012, the Finnish economy has still not recovered from the sharp 2008-09 recession and GDP remains about 3 per cent below its mid-2008 level. After a long period of strong growth, Finland's productivity performance has recently deteriorated, reflecting a weak performance in information and communication technologies, but also weakness in the public sector, as reported in OECD's Economic Survey. The GDP per capita gap compared with the best performing countries narrowed from the mid-1990s until 2008, but widened again during the crisis. The gap mainly reflects a labour productivity shortfall.

Therefore, structural reforms aimed at increasing productivity need to be given higher priority. With regard to R&D, the OECD says that Government spending should mainly focus on funding research in academic environments and should be distributed in such a way as to reward academic quality. Figure 1 shows recent macroeconomic performance in comparison with other countries.

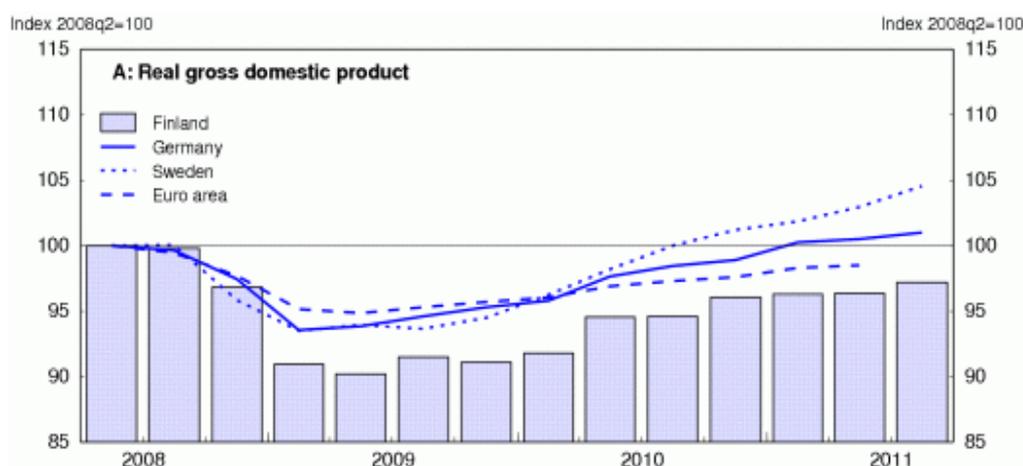


Figure 1 – Recent Macroeconomic Development (source: http://www.oecd.org/document/8/0,3746,en_33873108_33873360_49514888_1_1_1_1,00.html).

3. Innovation System

The Finnish innovation system encapsulates an extensive network of producers and users of new information, knowledge and know-how. At the core of the innovation system are education, research and product development, and knowledge-intensive business and industry. Figure 2 shows how Finland's national innovation system is structured.

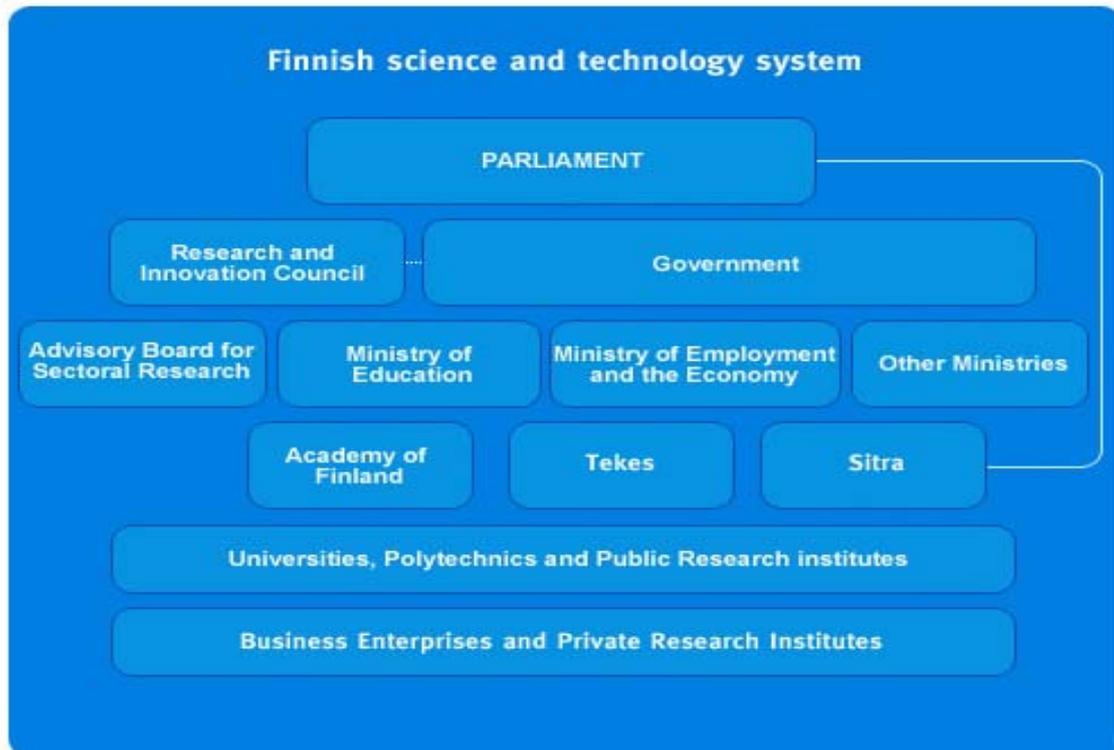


Figure 2 – Finnish Innovation System (source: <http://www.research.fi/en/innovationsystem>)

In Finland the formulation of national science, technology and innovation policies has been assigned to an expert body, the Research and Innovation Council (formerly known as Science and Technology Council), which is chaired by the Prime Minister. The Council advises the Government and its Ministries on important matters concerning research, technology, innovation and their utilisation and evaluation. It is responsible for the strategic development and coordination of the Finnish science and technology policy as well as the national innovation system as a whole.

The foremost organisations responsible for science and technology policies are the Ministry of Education and the Ministry of Employment and the Economy. The Ministry of Education manages matters relating to education and training, science policy, universities and polytechnics, and the Academy of Finland. The Ministry of Employment and the Economy is in charge of matters pertaining to industrial and technology policies, the Finnish Funding Agency for Technology and Innovation (Tekes), and the VTT Technical Research Centre of Finland. Nearly 80 per cent of the government R&D funding is channelled through these two ministries. Besides them, there is the Advisory Board for Sectoral Research, a government level forum through which Finland's ministries jointly determine horizontal research topics. Led

by the Ministry of Education, the board also discusses development needs related to research sectors in Finland.

Besides this, the Finnish Innovation System is characterized by the following institutions:

- **Sitra, the Finnish Innovation Fund:** founded in 1967 as a part of the Bank of Finland. Sitra is currently an independent public foundation which operates directly under the supervision of the Finnish Parliament, aimed at promoting the economic prosperity and the future success of Finland.
- **Foundation for Finnish Inventions:** since 1971, this foundation has screened and evaluated inventions and innovative ideas generated by private people and start-up companies, and helped to develop them into businesses.
- **Learned Societies:** these are organizations promoting an academic discipline/profession, such as the Actuarial Society of Finland, the Finnish Association of Graduate Engineers, Finnish Association of Architects, etc.
- **CSC- the Finnish IT Center for Science:** administered by the Ministry of Education and Culture, CSC provides IT support and resources for academia, research institutes and companies.
- **Tekes - the Finnish Funding Agency for Technology and Innovation:** this is the most important publicly-funded expert organisation for financing research, development and innovation in Finland. Tekes offers R&D funding and expert services and creates networks between companies and researchers.
- **VTT Technical Research Center of Finland:** this is a globally networked multi-technological contract research organisation. VTT provides high-end technology solutions and innovation services.

Moreover, the producers of new knowledge include universities and polytechnics, research institutes and business enterprises:

- **Universities, University Networks and Polytechnics:** There are 16 universities in the Ministry of Education and Culture sector; two of them are foundation universities¹ and the rest are public corporations. University networks are mostly cooperative bodies for research and education units working in the same field. There are such networks, for instance, in the fields of communication, health sciences and women studies. There are 25 polytechnics in the Ministry of Education and Culture sector: four are run by local authorities, seven by municipal education consortia and 14 by private organisations. In addition there is the Åland University of Applied Sciences in the self-governing Province of Åland and a Police College subordinate to the Ministry of the Interior (www.minedu.fi).
- **State Research Institutes:** Research institutes in the public sector have an important role not only in the higher education sector, but also in the

¹ Aalto University and Tampere University of Technology.

innovation system as developers of knowledge-based society. On average, 52 per cent of the research institutes' financing comes from the state budget. The share of external funding is an estimate based on the institutes' target outcomes. In terms of research volume, the largest institutes are VTT² in the Ministry of Employment and the Economy sector, the Forest Research Institute, MTT Agrifood Research in the Ministry of Agriculture and Forestry sector, and the National Institute for Health and Welfare in the Ministry of Social Affairs and Health sector (www.minedu.fi).

- **Business enterprises:** Finland has a highly industrialised, largely free-market economy. Trade is important, with exports accounting for over one-third of GDP in recent years. Finland is strongly competitive in manufacturing - principally in wood, metals, engineering, telecommunications, and electronics industries. Finland excels in high-tech exports such as mobile phones. With the exception of timber and several minerals, Finland depends on imports of raw materials, energy, and some components for manufactured goods. Due to the climate, agricultural development is limited to maintaining self-sufficiency in basic products. Forestry, an important export earner, provides a secondary occupation for the rural population (www.cia.gov).

GDP – Composition by sector:

Agriculture: 3%

Industry: 29.2%

Services: 67.8% (2011 est.)

Labor force:

2.682 million (2011 est.)

Country comparison to the world: 107

Labor force by occupation:

Agriculture and forestry: 4.4%

Industry: 15.5%

Construction: 7.1%

Commerce: 21.3%

Finance, insurance and business services: 13.3%

Transport & communication: 9.9%

Public services: 28.5%

Agriculture – Products:

Barley, wheat, sugar beet, potatoes, dairy cattle, fish

Industries:

Metals and metal products, electronics, machinery and scientific instruments, shipbuilding, pulp and paper, foodstuffs, chemicals, textiles, clothing

Table 2 – Facts on Finland's economic profile (source: <https://www.cia.gov/library/publications/the-world-factbook/geos/fi.html>) Last update April 2012

² As mentioned above, the VTT Technical Research Center of Finland is a globally networked multitechnological contract research organization. VTT provides high-end technology solutions and innovation services.

3.1 Public and Private R&D Expenditure

Expenditure on research and development (R&D) is a key indicator of government and private sector efforts to obtain competitive advantage in science and technology. The main aggregate used for international comparisons is gross domestic expenditure on R&D (GERD)³. In 2007, research and development amounted to 2.3% of GDP for the OECD as a whole. Finland, together with Japan, Korea and Sweden, was the only OECD country in which the R&D:GDP ratio exceeded 3%, well above the OECD average. Table 3 shows GERD per country since 1997 to 2010.

Gross domestic expenditure on R&D

As a percentage of GDP

| | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|--------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Australia | .. | 1.43 | .. | 1.47 | .. | 1.64 | .. | 1.72 | .. | 2.00 | .. | 2.21 | .. | .. |
| Austria | 1.70 | 1.78 | 1.90 | 1.94 | 2.07 | 2.14 | 2.26 | 2.26 | 2.48 | 2.46 | 2.52 | 2.67 | 2.75 | 2.75 |
| Belgium | 1.83 | 1.86 | 1.94 | 1.97 | 2.07 | 1.94 | 1.88 | 1.86 | 1.83 | 1.86 | 1.90 | 1.96 | 1.96 | .. |
| Canada | 1.66 | 1.76 | 1.80 | 1.91 | 2.09 | 2.04 | 2.04 | 2.07 | 2.04 | 2.00 | 1.96 | 1.87 | 1.92 | 1.80 |
| Chile | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 0.33 | 0.39 | .. | .. |
| Czech Republic | 1.08 | 1.15 | 1.14 | 1.21 | 1.20 | 1.20 | 1.25 | 1.25 | 1.41 | 1.55 | 1.54 | 1.47 | 1.53 | .. |
| Denmark | 1.92 | 2.04 | 2.18 | .. | 2.39 | 2.51 | 2.50 | 2.40 | 2.46 | 2.48 | 2.58 | 2.87 | 3.02 | .. |
| Estonia | .. | 0.57 | 0.68 | 0.60 | 0.70 | 0.72 | 0.77 | 0.85 | 0.93 | 1.13 | 1.10 | 1.29 | 1.42 | 1.44 |
| Finland | 2.71 | 2.88 | 3.17 | 3.35 | 3.32 | 3.37 | 3.44 | 3.45 | 3.48 | 3.48 | 3.47 | 3.72 | 3.96 | 3.84 |
| France | 2.19 | 2.14 | 2.16 | 2.15 | 2.20 | 2.23 | 2.17 | 2.15 | 2.10 | 2.10 | 2.07 | 2.11 | 2.21 | .. |
| Germany | 2.24 | 2.27 | 2.40 | 2.45 | 2.46 | 2.49 | 2.52 | 2.49 | 2.49 | 2.53 | 2.53 | 2.68 | 2.78 | .. |
| Greece | 0.45 | .. | 0.60 | .. | 0.58 | .. | 0.57 | 0.55 | 0.59 | 0.58 | 0.59 | .. | .. | .. |
| Hungary | 0.70 | 0.66 | 0.67 | 0.79 | 0.92 | 1.00 | 0.93 | 0.87 | 0.95 | 1.00 | 0.97 | 1.00 | 1.15 | .. |
| Iceland | 1.83 | 2.00 | 2.30 | 2.67 | 2.95 | 2.95 | 2.82 | .. | 2.77 | 2.99 | 2.68 | 2.64 | .. | .. |
| Ireland | 1.27 | 1.24 | 1.18 | 1.12 | 1.10 | 1.10 | 1.17 | 1.23 | 1.25 | 1.25 | 1.29 | 1.45 | 1.79 | .. |
| Israel | 2.97 | 3.08 | 3.52 | 4.27 | 4.55 | 4.56 | 4.28 | 4.28 | 4.41 | 4.43 | 4.76 | 4.68 | 4.28 | 4.25 |
| Italy | 1.03 | 1.05 | 1.02 | 1.05 | 1.09 | 1.13 | 1.11 | 1.10 | 1.09 | 1.13 | 1.18 | 1.23 | 1.27 | .. |
| Japan | 2.87 | 3.00 | 3.02 | 3.04 | 3.12 | 3.17 | 3.20 | 3.17 | 3.32 | 3.40 | 3.44 | 3.44 | 3.33 | .. |
| Korea | 2.41 | 2.26 | 2.17 | 2.30 | 2.47 | 2.40 | 2.49 | 2.68 | 2.79 | 3.01 | 3.21 | 3.36 | .. | .. |
| Luxembourg | .. | .. | .. | 1.65 | .. | .. | 1.65 | 1.63 | 1.56 | 1.66 | 1.58 | 1.56 | 1.68 | .. |
| Mexico | 0.31 | 0.34 | 0.39 | 0.34 | 0.36 | 0.40 | 0.40 | 0.40 | 0.41 | 0.39 | 0.37 | .. | .. | .. |
| Netherlands | 1.99 | 1.90 | 1.98 | 1.94 | 1.93 | 1.88 | 1.92 | 1.93 | 1.90 | 1.88 | 1.81 | 1.76 | 1.82 | .. |
| New Zealand | 1.08 | .. | 0.98 | .. | 1.12 | .. | 1.17 | .. | 1.14 | .. | 1.17 | .. | .. | .. |
| Norway | 1.63 | .. | 1.64 | .. | 1.59 | 1.66 | 1.71 | 1.59 | 1.52 | 1.52 | 1.62 | 1.61 | 1.76 | .. |
| Poland | 0.65 | 0.67 | 0.69 | 0.64 | 0.62 | 0.56 | 0.54 | 0.56 | 0.57 | 0.56 | 0.57 | 0.60 | 0.68 | .. |
| Portugal | 0.57 | 0.63 | 0.69 | 0.73 | 0.77 | 0.73 | 0.71 | 0.75 | 0.78 | 0.99 | 1.17 | 1.50 | 1.66 | .. |
| Slovak Republic | 1.08 | 0.78 | 0.66 | 0.65 | 0.63 | 0.57 | 0.57 | 0.51 | 0.51 | 0.49 | 0.46 | 0.47 | 0.48 | .. |
| Slovenia | 1.28 | 1.34 | 1.37 | 1.39 | 1.50 | 1.47 | 1.27 | 1.40 | 1.44 | 1.56 | 1.45 | 1.65 | 1.86 | .. |
| Spain | 0.80 | 0.87 | 0.86 | 0.91 | 0.91 | 0.99 | 1.05 | 1.06 | 1.12 | 1.20 | 1.27 | 1.35 | 1.38 | .. |
| Sweden | 3.47 | .. | 3.58 | .. | 4.13 | .. | 3.80 | 3.58 | 3.56 | 3.68 | 3.40 | 3.70 | 3.62 | .. |
| Switzerland | .. | .. | .. | 2.53 | .. | .. | .. | 2.90 | .. | .. | .. | 3.00 | .. | .. |
| Turkey | 0.37 | 0.37 | 0.47 | 0.48 | 0.54 | 0.53 | 0.48 | 0.52 | 0.59 | 0.58 | 0.72 | 0.73 | 0.85 | .. |
| United Kingdom | 1.77 | 1.76 | 1.82 | 1.81 | 1.79 | 1.79 | 1.75 | 1.68 | 1.73 | 1.75 | 1.78 | 1.77 | 1.85 | 1.82 |
| United States | 2.57 | 2.60 | 2.64 | 2.71 | 2.72 | 2.62 | 2.61 | 2.54 | 2.57 | 2.61 | 2.67 | 2.79 | .. | .. |
| EU27 total | 1.66 | 1.67 | 1.72 | 1.74 | 1.76 | 1.77 | 1.76 | 1.73 | 1.74 | 1.77 | 1.77 | 1.84 | 1.90 | .. |
| OECD total | 2.10 | 2.12 | 2.16 | 2.20 | 2.24 | 2.21 | 2.21 | 2.18 | 2.21 | 2.24 | 2.27 | 2.33 | .. | .. |
| China | 0.64 | 0.65 | 0.76 | 0.90 | 0.95 | 1.07 | 1.13 | 1.23 | 1.32 | 1.39 | 1.40 | 1.47 | 1.70 | .. |
| Russian Federation | 1.04 | 0.95 | 1.00 | 1.05 | 1.18 | 1.25 | 1.29 | 1.15 | 1.07 | 1.07 | 1.12 | 1.04 | 1.24 | .. |
| South Africa | 0.60 | .. | .. | .. | 0.73 | .. | 0.79 | 0.85 | 0.90 | 0.93 | 0.92 | 0.93 | .. | .. |

Table 3 – GERD per country from 1997 to 2010

(source: <http://www.oecd-ilibrary.org/docserver/download/fulltext/3011041ec068.pdf?expires=1337672867&id=id&accname=freeContent&checksum=CE>

[DA6B5F7A570480FF77A3AAAF25F55E](http://www.oecd-ilibrary.org/docserver/download/fulltext/3011041ec068.pdf?expires=1337672867&id=id&accname=freeContent&checksum=CE)).

Table 4 shows the gross domestic expenditure on R&D by source of funds, 2005 and 2009 (% of total gross expenditure on R&D).

It is evident that business enterprises have a strong role in fostering and supporting Finnish innovation systems. This is consistent with the new policy related to the

³ This consists of the total expenditure (current and capital) on R&D by all resident companies, research institutes, university and government laboratories, etc. It excludes R&D expenditures financed by domestic firms but performed abroad. GERD is expressed as a share of GDP.

development of funding which is part of the 'Research and Innovation Policy Guidelines for 2011-2015', according to which the national objective is to maintain GERD at 4 per cent in the 2010s. In this context, public investment is expected to be 1.2 per cent of GDP. Hence, the contribution of the private sector should be at a minimum of 2/3⁴.

| | Business enterprises | | Government | | Abroad | |
|--------------------------|----------------------|------|------------|------|--------|------|
| | 2005 | 2009 | 2005 | 2009 | 2005 | 2009 |
| EU-27 | 54.1 | 54.1 | 34.5 | 34.9 | 9.0 | 8.4 |
| Euro area (EA-17) | 56.1 | 55.7 | 35.4 | 35.4 | 7.0 | 7.0 |
| Belgium | 59.7 | 58.6 | 24.7 | 25.3 | 12.4 | 12.1 |
| Bulgaria | 27.8 | 30.2 | 63.9 | 60.5 | 7.6 | 8.4 |
| Czech Republic | 53.2 | 44.6 | 40.9 | 43.9 | 4.9 | 10.4 |
| Denmark (1) | 59.5 | 60.2 | 27.6 | 27.8 | 10.1 | 8.8 |
| Germany | 67.6 | 66.1 | 28.4 | 29.7 | 3.7 | 3.8 |
| Estonia | 38.5 | 38.5 | 43.5 | 48.8 | 17.1 | 11.3 |
| Ireland | 57.4 | 51.2 | 32.0 | 31.3 | 8.6 | 15.6 |
| Greece | 31.1 | . | 46.8 | . | 19.0 | . |
| Spain | 46.3 | 43.4 | 43.0 | 47.1 | 5.7 | 5.5 |
| France | 51.9 | 52.4 | 38.6 | 38.6 | 7.5 | 6.9 |
| Italy | 39.7 | 44.2 | 50.7 | 42.1 | 8.0 | 9.4 |
| Cyprus | 16.8 | 15.7 | 67.0 | 69.0 | 10.9 | 12.1 |
| Latvia | 34.3 | 36.9 | 46.0 | 44.7 | 18.5 | 15.4 |
| Lithuania | 20.8 | 21.0 | 62.7 | 53.9 | 10.5 | 13.1 |
| Luxembourg | 79.7 | 70.3 | 16.6 | 24.3 | 3.6 | 5.4 |
| Hungary | 39.4 | 46.4 | 49.4 | 42.0 | 10.7 | 10.9 |
| Malta | 46.8 | 51.6 | 25.9 | 30.0 | 26.9 | 18.4 |
| Netherlands | 46.3 | 45.1 | 38.8 | 40.9 | 12.0 | 10.8 |
| Austria | 45.6 | 47.1 | 35.9 | 34.9 | 18.0 | 16.8 |
| Poland | 33.4 | 27.1 | 57.7 | 60.4 | 5.7 | 5.5 |
| Portugal | 36.3 | 44.0 | 55.2 | 45.3 | 4.7 | 4.1 |
| Romania | 37.2 | 34.8 | 53.5 | 54.9 | 5.3 | 8.3 |
| Slovenia (2) | 51.8 | 50.0 | 37.2 | 35.7 | 7.3 | 6.0 |
| Slovakia | 36.6 | 35.1 | 57.0 | 50.6 | 6.0 | 12.8 |
| Finland (3) | 66.9 | 68.1 | 25.7 | 24.0 | 6.3 | 6.6 |
| Sweden (4) | 63.9 | 58.8 | 24.5 | 27.5 | 8.1 | 16.4 |
| United Kingdom | 42.1 | 44.5 | 32.7 | 32.6 | 19.3 | 16.6 |
| Iceland | 48.0 | 48.5 | 40.5 | 41.4 | 11.2 | 9.9 |
| Norway | 46.8 | 43.6 | 43.6 | 46.8 | 8.1 | 8.2 |
| Croatia | 34.3 | 39.8 | 58.1 | 51.2 | 2.6 | 7.0 |
| Turkey (5) | 43.3 | 41.0 | 50.1 | 34.0 | 0.8 | 1.1 |
| Japan (2)(6) | 76.1 | 78.2 | 16.8 | 15.6 | 0.3 | 0.4 |
| United States (6) | 64.3 | 67.3 | 30.2 | 27.1 | . | . |

(1) Break in series, 2007.

(2) Break in series, 2008.

(3) Break in series abroad, 2005.

(4) Break in series, 2005.

(5) Break in series business enterprises and government, 2008.

(6) 2008 instead of 2009.

Source: Eurostat (tsiir030), OECD

Table 4 - Gross domestic expenditure on R & D by source of funds, 2005 and 2009 (% of total gross expenditure on R & D) (source: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/R_%26_D_expenditure).

Essentially, the basic principle is that business and innovation services are produced in the private sector. Public development measures should focus on correcting market failures and removing administrative and systems deficiencies relating to public actions. For example, while the public sector could arguably take greater risks in terms of start-up companies, it is not realistic to publicly fund and support companies over the entire life cycle from the start-up stage to internationalisation and growth. Therefore, incentives need to be created for private financiers (*Research and Innovation Policy Guidelines for 2011–2015*).

⁴ Refer to the 'Research and Innovation Policy Guidelines for 2011-2015'.
Prepared by Greater Europe Desk – Office of International Coordination (DPC) – June 2012

4. Innovation Policies

After the 2008 Global Financial Crisis (GFC), the Ministry of Education and the Ministry of the Economy and Employment commissioned an international evaluation and independent review of the Finnish national innovation system. In 2010, the Research and Innovation Council developed a policy report on Education, Research and Innovation (ERI) setting out the policy guidelines on the national measures and funding required during the government term 2011 – 2015. The aim was to implement innovation policies that improve the quality and effectiveness of Finnish ERI in order to promote prosperity and competitiveness.

Finland has decided to invest in knowledge and expertise as its strategy for success. Education, Research and Innovation (ERI) are the three pillars which underpin the Development Programme 2011-2015, and constitute the positive development of the economy, the sustainable reform of social structure and the well-being of citizens.

At a macro level, Finnish innovation policies play a key role in supporting the positive development of the economy. These policies are summarised in six key points (www.evaluation.fi):

1. broad-based innovation policy
2. demand-driven and user-driven innovation
3. globalisation of business activities
4. growth entrepreneurship and finance
5. geography of innovative activity
6. education, research, and the economy.

This highly-dynamic scenario is still changing and evolving to face Finland's challenges to competitiveness and well-being as it emerges through the unstable recession period that started in autumn 2008⁵. The policy approach required a set of reforms which also extends to social considerations. In reference to this, the report '*Better results, more value: A framework for analysing the societal impact of research and innovation*' (December 2011), identifies the different areas which will impact on societal challenges and opportunities:

- the economy and economic renewal
- the environment: wellbeing
- skills and culture.

Finland's key task is therefore aimed at strengthening its position among the top knowledge and competency-based countries. One way they are doing this is by increasing investments allocated to centres of strategic excellence in sectors that are pivotal to the development of the national economy, society and citizens' welfare.

With a view to raising the population's educational level, Finland starts focusing on human capital from a very early age, giving its young children a better start in education than most OECD countries. In 1963, the Finnish Parliament made the bold decision to choose public education as its best shot at economic recovery. Pasi Sahlber, author of the book *Finnish Lessons*, calls this the "Big Dream of Finnish Education": "It was simply the idea that *every child would have a very good public school. If we want to be competitive, we need to educate everybody. It all came out*

⁵ See the '*Research and Innovation Policy Guidelines for 2011-2015*'.
Prepared by Greater Europe Desk – Office of International Coordination (DPC) – June 2012

of a need to survive". Finland also invests in improving teachers' qualification and skills. A reform implemented in 1979 required that every teacher earn a fifth-year master's degree in theory and practice, at state expense. From then on, teachers were effectively granted equal status with doctors and lawyers. Improving the skills of staff teaching children under six, and attracting more young people to the profession, aims to help ensure the long-term success of the nation's early childhood education and childcare services. In 2000, the first results from the Programme for International Student Assessment (PISA)⁶ revealed Finnish youth to be the best young readers in the world. Three years later, they led in math. By 2006, Finland was first out of 57 countries in science. In the 2009 PISA scores released in 2010, the nation came second in science, third in reading and sixth in math among nearly half a million students worldwide.

Finland's schools are publicly funded. The people in the government agencies running them, from national departments to local authorities, are educators. Every school has the same national goals and draws from the same pool of university-trained educators (www.smithsonianmag.com).

Finland invests strongly in higher education specialisations. A research career system is implemented in an attractive manner that boosts and strengthens post-doctoral education. The quality of postgraduate education is high in international terms. Even the recruitment practices of higher education institutions and research institutes are designed to attract international students, researchers and experts. With regard to this latter point, according to the policy report '**Evaluation of the Finnish National Innovation System**', the success of the Finnish university reform depends on:

- a single European market for researcher and students
- a greater global approach (broader than EU)
- further bilateral agreements that will benefit Finland
- ERI investments that lead to higher quality education and research, successful innovations and new jobs, as well as growth enterprises.

Moreover, according to Finland's '*Research and Innovation Policy Guidelines for 2011–2015*', the development strategies are summed up in three main pillars:

- Operational priorities
- Structural reforms: supporting innovation environment
- Strengthening human resources.

In relation to the **operational priorities**, innovation policies highlight the following points:

- Strong scientific research and useful applications
- Growth entrepreneurship, support for businesses and innovations
- Services: services account for over two-thirds of gross domestic product. Private services cover almost three-quarters of all services. In order to improve productivity and quality, the service sector must increase research and innovation activities and internationalisation, as well as deepen the partnership between the public and private sectors.
- Demand- and user-orientation

⁶ PISA is an international standardized test given to 15-year-olds in more than 40 global venues
Prepared by Greater Europe Desk – Office of International Coordination (DPC) – June 2012

- Utilisation and application competencies: The research and innovation services of higher education institutions should be reorganised so that research results can be better exploited. Flows of knowledge and transfer of technology play a crucial role with regards to this.
- Evaluation: As R&D investment increases, it is important that the added value and appropriateness of support and policy measures can be proven.
- Wider openness (to you mean broader accessibility) toward the European Union.

In relation to **structural reforms**, the focus is on:

- Structures of higher education institutions: aiming to support higher education institutions' teaching and the quality of research, internationalisation, effectiveness and profile raising activities.
- Reforming the public research institute sector: importance to strengthening multidisciplinary, high-level and relevant research with respect to society.
- Research infrastructure
- Access to and use of public data: importance of creating a globally unique fund of knowledge for developing research and innovation and the information society.
- Attractive poles of excellence: importance of creating internationally competitive, high-profile, and attractive innovation environments.
- Strengthening the coherence of national and regional development measures in jointly agreed fields and sectors of the innovation system.

Finally, there is also reference to **strengthening human resources**, within the business environment as well, besides the considerations pertaining to education above, figure 3 provides a clear picture of how they plan to achieve this.

Satisfying the need for skills in business requires the close participation of companies in research and education carried out in postgraduate education as well as in developing adult education. The availability of skills and mobility can be improved in many ways that are still underutilised in Finland, such as:

| | |
|--|--|
| <ul style="list-style-type: none"> • the long-term commitment of companies to the activities undertaken by universities and polytechnics and to educational cooperation • increasing the amount of education in HEIs given by those working in companies • a support programme for employing those who have graduated from a HEI in R&D work in (SME) enterprises • sabbaticals for researchers to work in companies | <ul style="list-style-type: none"> • tailored postgraduate and research programmes at HEIs and research institutes for those working in industry • Agreements by companies, universities, polytechnics and research institutes on fixed-term research exchanges, for example, measures aimed at employees in industry in public R&D organisations. |
|--|--|

Figure 3 – Strengthening human resources (source: *Research and Innovation Policy Guidelines for 2011–2015*)⁷

⁷ HEI: Higher Education Institutes

5. Regional Policies: Tampere⁸

Finland is a unitary country. There is only one level of sub-national government, made by 416 municipalities (kuntaa). Two territories have a specific status: the island province of Åland has an autonomous administration, and the region of Kainuu has been given the temporary statute of a self-governing region from 2005-2012 as part of a regional self-government experiment (OECD).

The Finnish municipalities are relatively autonomous in relation to the state. The building of the welfare policy has been based on the interplay between the state, the parliament issuing legislative decisions, and the municipalities implementing the programs (Kettunen, 2011). The relationship between the state and the municipalities has varied in terms of centralization/decentralization, and from the mid 90s the municipalities have enjoyed a significant degree of autonomy and fiscal independence. Within this context, the smallest municipalities have responded to the many state-demanded obligations by co-operating with other municipalities, and in some sectors, also with private enterprises.

Since 1994, the Centre of Expertise Programme (OSKE) has acted as the key instrument of growth-oriented regional development in Finland, based on competition between regions which enhances their level of specialisation and attractiveness. The programme is a tool for regional innovation, which contains ready-made operating models and networks for the national and international markets. The Centre of Expertise Programme is a fixed-term special programme coordinated by the Ministry of Employment and the Economy, in compliance with its *Regional Development Act*. It targets local, regional and national resources at the utilisation of top-level expertise. The programme supports regional strengths, the specialisation of regions and cooperation between centres of expertise and offers networks and services for companies, universities, universities of applied sciences and research institutions.

The innovation system approach has also been gaining momentum within the sphere of regional development. The network of Finnish universities and polytechnics, technology centres, the Centre of Expertise Programme, and other operations has developed innovation prerequisites in the regions to the extent that it is now possible to refer to the innovation systems of the regions and their development. Thus, the improvement of the regional innovation base as well as cooperation between business communities and education and research communities becomes pivotal: a Centre of Expertise Programme consisting of cluster-based networking is responsible for this. Besides the focus on technology, importance is given to stronger business management skills, the development of service innovations and growth entrepreneurship. The latter is especially important as Finland presents two key weaknesses: a somewhat gloomy entrepreneurial growth, and a lack of internationalisation. In reference to internationalisation, networking with leading countries and regions in the area of technology is important in terms of companies and the entire innovation system.

⁸ Population (2012-01-31) City 215,315; Rank 3rd largest in Finland. Area rank 180th largest in Finland. Region: Pirkanmaa.

With respect to regions and networks, the city of Tampere in Finland (third largest city in Finland) warrants special attention. Known for its bold initiatives in business



development, the city of Tampere, birthplace of Nokia, constitutes an excellent business landscape, formed by top expertise and three world class business clusters: ICT, bio sciences and health care technology, intelligent machines and automation. There are also innovative companies in many other business sectors. Moreover, creative economy and creative industries have been seen to include a huge growth potential. Tampere has also been successful

in transforming its traditional industry into a modern thriving business, through utilizing and combining different technologies in the product development in a new and innovative way.

Tampere's goal is to be a *"big city of smooth living, responsibly leading development"*. The vision of the Tampere City Strategy is called *"Tampere Flows"*, detailing strategic goals and aims for 2020 (www.tampere.fi).

The starting points of the strategy include:

- Promoting the wellbeing of the residents
- Customer-oriented service development
- Internationalisation and know-how
- Implementing the principles of sustainable development
- Regional co-operation
- Increasing productivity
- Continuous development of the operational model.

Tampere is an international growth centre characterised by expertise, creativity and an excellent service structure. In this context, the purpose of the reform of the **management model of the city of Tampere** is to help the local authorities rise to the challenges that will soon be testing the system of municipal management and services that include;

- an ongoing growth in service demand
- the ageing population
- the rapid retirement rate of municipal employees and
- a need to reassert the citizens' confidence in the political system.

The reform is based on developing municipal service production, improving efficiency and looking for new solutions, either by making better use of existing markets or by generating new ones (www.tampere.fi).

ICT is now one of the leading sectors of Tampere's economy, one precondition for its successful operation and growth in the Region has been the strong public sector support, especially from the local government. The €132million **eTampere Knowledge Society Programme** (www.etampere.fi) is one concrete example of the

public sector investments in the development of the ICT cluster in the region. More generally, a key building block of the Tampere approach to innovation has been the focus on major development programmes (five or more years in duration) and with a city investment of at least €1million per year, which are estimated to return between 15 and 40 times their investment. In addition to eTampere, other major programmes include (Winters, 2010):

- **Tampere Region Centre of Expertise Programme** - a key regional strategic development programme which aims to strengthen and renew the region's competitiveness and expertise. It focuses on clusters that are central and strategic to a region's development. The basic funding of the program consists of national and regional funding. The regional funding is supplied by the City of Tampere and municipalities in the Tampere Central Region in proportion to their number of inhabitants. The national funding share is channelled through the Council of Tampere Region. This basic funding (approximately €2m per year in total) constitutes only about a tenth of the programme's total volume, because the development projects launched through the programme are financed by private company funding and through public funding channels such as Tekes, European Union, and the Academy of Finland.
- **BioneXt Tampere** - a special programme aimed at developing the region's biotechnology sector and further developing co-operation between different fields of science and health care service providers, companies, and financiers. At the same time, it creates a new expertise basis that enables the reinforcement of competence-intensive industries in the Tampere region. The programme is jointly managed by the city of Tampere, local industries, and health care service providers
- **The Creative Tampere Programme (Luova Tampere)** - This is the largest regional creative economy development program in Finland. It aims to have more than 100 million impact on local economy between the years 2006-2012. The program was established to accelerate this growth by promoting interaction among representatives of different sectors in order to develop new creative concepts. The goal of the programme is to strengthen the cultural industry and to elevate it to one of the most significant trades in Tampere. The practical implementation of the programme is performed in three selected theme areas: the creative industries, innovations and entrepreneurship, and attractive city⁹.

Moreover, Tampere hosts several profitable businesses such as Nokia, John Deere Forestry, Agco, NSG/Pilkington, Sandvik, Santen, Areva, Parker Hannifin, Gardner Denver, Conmed Linvatec and GE, as well as Metso Minerals, Metso Automation and Metso Power. This information suggests that a great boost to the Finnish economy stems from local and private activities. This element should be carefully taken into account when analysing Finland's innovation system as a whole. On this basis, the combination of the macro innovation strategy and the cluster initiatives may be a relevant example for understanding how to spur regional growth within dynamic and challenging contexts. Thus, Tampere becomes a good example of public and private efforts properly working together. Figure 4 shows Finland's and Tampere's trends of R&D expenditure from 2000 to 2009.

⁹ Refer to "Creative Tampere Program – Presentation, May 2011" (<http://www.slideshare.net/FlandersDC/reverse-mission-2011-report>)

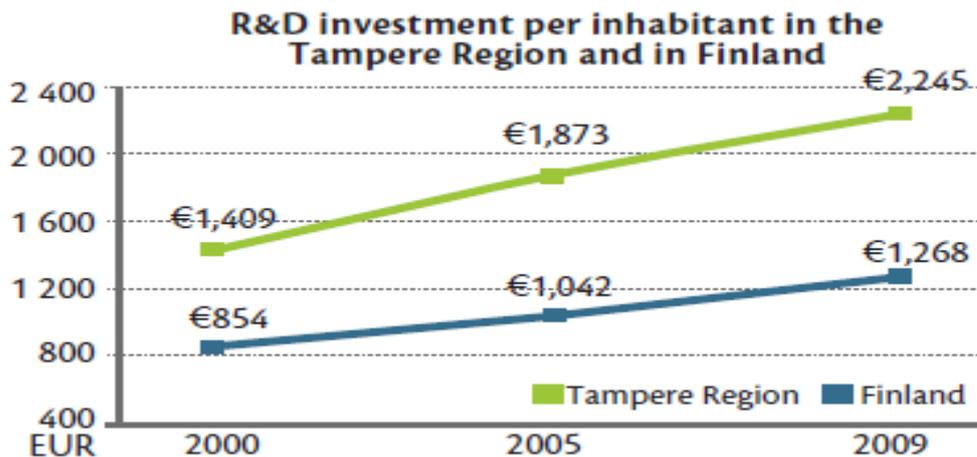


Figure 4 – R&D investment per inhabitant in the Tampere Region and in Finland (source: http://tredea-fi-bin.directo.fi/@Bin/1ebd3fb44d1586f9f9767144da250bff/1337828759/application/pdf/268929/Talouskatsaus_eng_netii.pdf).

Finally, despite an overall positive experience, especially coming from the period before the 2008 crisis, Finland is also registering a slow growth¹⁰ (OECD). Hence, focusing on a region such as Tampere may provide useful hints in understanding how to guide the innovation strategy for Finland. For example, Tampere is a member of the **District of Creativity (DC) Network**, founded in 2004 and which unites 14 of the most creative and innovative regions around the world. Their international orientation makes them a unique network of regions that put **creativity and innovation** high on their agendas (Annex 1). They believe that cross-border collaborations contribute to advancing a creative and entrepreneurial culture. Therefore the DC Network was formed to foster the **exchange of best practices and experiences in business, culture and education**. Tampere's integration within such an international scenario constitutes a great example for Finland as a whole, as the latter still tends to be very 'Finnish', both in terms of its innovation system and policy-making. In this respect, as highlighted in the *'Evaluation of the Finnish National Innovation System – Policy Report'* (2009), Finland should focus more on the European scenario, so to benefit from integrating into the single European Market for goods and services, as well as into the European Research and Higher Education Area.

Members of the *District of Creativity (DC) Network* span the globe and continue to grow. Current country members include: Baden-Württemberg (Germany), Catalonia (Spain), Central Denmark (Denmark), Flanders (Belgium), Karnataka (India), Lombardia (Italy), Oklahoma (USA), Nord-Pas de Calais (France), Qingdao (P.R. China), Rhône-Alpes (France), Rio de Janeiro (Brazil), Scotland (United Kingdom), Shanghai (P.R. China) and Tampere (Finland). In spite of the worldwide scope of this initiative, at the moment no Australian state is part of the DC Network. The DC Network highly focuses on creativity and innovation, along with a keen international orientation, and looks at cross-boarder collaboration as a way to advance a creative and entrepreneurial culture.

¹⁰ The Finnish economy has still not recovered from the sharp 2008-09 recession and GDP remains about 3% below its mid-2008 level.

6. Conclusions

The aim of this report was to discuss and explore the Finnish innovation system, and their current innovation policy whilst focusing on the region of Tampere in Finland as an example of a dynamic and innovative environment.

In the context of the '*Research and Innovation Policy Guidelines for 2011-2015*' Finland highly focuses on knowledge and expertise as key strategies for success. This is immediately clear when looking at education, which along with research and innovation constitutes one of the main pillars of Finland's success. In the so-called '*knowledge-based economy*', the adoption of this approach becomes essential to gain a competitive and leading position in the world economy. In fact, it is well understood that the creation and application of new knowledge is the primary factor that drives economic growth (Agrawal, 2001) and it is also commonly accepted that universities are an important source of new knowledge, especially in the areas of science and technology. Hence, investing in higher education is to be both cause and effect of the new and challenging role that these institutions have been playing in a growing number of industrial and developing economies: they have gradually switched from instruments devoted to the pursuit of knowledge for its own sake to strategic assets for knowledge-based economic development and change (Mowery and Sampat, 2005). In this context, universities have a critical role to play in the national system of innovation. Moreover, in spite of a still low openness toward the European Union, Finland has been able to benefit from the single European market for students and researchers.

Besides universities, the Government and the private sector complete the '*triple helix*' (Leydesdorff and Meyer, 2003) of relevant relations within the innovation system. In fact, the linkages and the quality of interaction are fundamental to the outcomes. Interventions aimed at strengthening inter-sectoral cooperation, the interplay between public and private sectors, and the technology flowing from university to industry, both at the national and local levels, are a sign that Finland is aware of the patterns for success.

In summary of this analysis, Finland seems to have good potential heading for further growth and in gaining competitiveness. Approaching knowledge and innovation as the drivers for success, combined with a careful focus on society and citizens' well-being, is a winning strategy for sustainable development, especially in the current challenging economic climate. Hence, some interesting strategies can be taken from the Finnish experience.

In the context of the seven priorities of the Government of South Australia, the Finnish example can be taken into account to find some interesting parallelisms particularly due to the approach towards a culture of innovation and sustainability.

In reference to the schooling system, the Finland model provides a significant example of the benefits of investing in childhood education, due to its successful experience highlighted so far. The Finnish approach embeds the idea of having a standard of excellent teaching all around the country, which is perfectly aligned with the priority of allowing every child to benefit from the same opportunities. In fact, Finland's attention towards the educational system does not only relate to higher

education. Raising the education level of the population is pursued from an early age. This investment is aimed at providing children with skilful and qualified teachers. As stressed in the report, improving the skills of staff teaching children under-six and attracting more young people to the profession aims to help ensure the long-term success of its early childhood education and childcare services.

A second important point concerns advanced manufacturing and knowledge-intensive businesses. As leading sectors of Finland's economy, they are spurred and fostered by a successful interplay of private and public initiatives, which is also a core aspect of Finland's innovation system. In fact, one more issue that has been highlighted concerns the predominant role of private funding over public funding relative to R&D. Private expenditure in R&D in Finland is estimated to be up to 2/3 of the whole. This notwithstanding, the private sector is not left alone: public interventions aim at spurring private initiatives and supporting them. A successful interplay of public and private initiatives is critical to create the right fertile environment for economic development. Moreover, a major focus on demand/user-driven innovation happens to be a winning strategy to approach.

Finally, with regards to regional development, this report discussed the City of Tampere, a clear example of a new emerging approach consisting of the evolution from creative industries to creative places. An interesting aspect is the cluster-based economy behind Tampere's leading experience. In particular, Tampere becomes a successful combination of regional, national and international development strategies. At the local level, Tampere has implemented a new reform of the management model of the city. It aims to help the local authorities rise to the challenges that will soon be testing the system of municipal management and services. These challenges include an ongoing growth in service demand, the ageing population, the rapid retirement rate of municipal employees and a need to reassert the citizens' confidence in the political system.

With regard to its expertise and creativity, Tampere can provide a significant example of international networking, due to its position in the District of Creativity (DC) Network. The latter unites 14 of the most creative and innovative regions around the world. Its international orientation makes it a unique network of regions that put creativity and innovation high on their agendas. The logic behind this is that cross-border collaborations contribute to advancing a creative and entrepreneurial culture. Therefore the DC Network fosters the exchange of best practices and experiences in business, culture and education.

In the light of this, it would be beneficial for the South Australian Government to look at the DC Network as a good opportunity to connect to innovative and creative regions spanning all over the world.

7. References

Evaluation of the Finnish National Innovation System. Policy Report. (www.evaluation.fi)
http://www.tem.fi/files/24928/InnoEvalFi_POLICY_Report_28_Oct_2009.pdf

Finland <http://en.wikipedia.org/wiki/Finland>

Finnish Innovation System <http://www.research.fi/en/innovationsystem>

Hancock, L. (2011). Why Are Finland's Schools Successful? *Smithsonian magazine*. September 2011.
<http://www.smithsonianmag.com/people-places/Why-Are-Finlands-Schools-Successful.html#ixzz1utaUHZz9>

Kettunen, P. (2011). The Finnish municipal reform: A success or a failure? *Paper presented at the EGPA conference, Bucharest 7-9. September 2011.*

Leydesdorff, L., and Meyer, M. (2003). *The Triple Helix of university-industry-government relations. Scientometrix*, 58(2): 191-203.

Lundvall, B., and Borrás, S. (2005). Science, technology, and innovation policy. In Fagerberg, J., Mowery, D.C., and Nelson, R.R. (Edited by) *The Oxford Handbook of Innovation*. Oxford University Press, pp. 599-631

Metcalfe, S. (1995). The economic foundation of technology policy: equilibrium and evolutionary perspectives. In Stoneman, P. (Edited by) *Handbook of the economics of innovation and technological change*. Basil Blackwell, Oxford, pp. 462-472.

OECD (2011). OECD REGIONAL OUTLOOK 2011: BUILDING RESILIENT REGIONS FOR STRONGER ECONOMIES – FINLAND.

OECD (2012). Economic Survey of Finland 2012 -
http://www.oecd.org/document/8/0,3746,en_33873108_33873360_49514888_1_1_1_1,00.html

Polytechnics

<http://www.minedu.fi/OPM/Koulutus/ammattikorkeakoulutus/ammattikorkeakoulut/?lang=en>

R&D expenditures

http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/R_%26_D_expenditure

Rivas, M. (2011). *From Creative Industries to the Creative Place*. Lead Expert Creative Clusters (http://urbact.eu/fileadmin/Projects/Creative_Clusters/documents_media/from_creative_industries_to_the_creative_place.pdf)

State Research Institutes

http://www.research.fi/en/research_environments/state_research_institutes

Tampere Flows City Strategy

<http://www.tampere.fi/material/attachments/o/5oFNHQIDo/tretoimiiesite2011eng.pdf>

The Research and Innovation Council of Finland (2010). Research and Innovation Policy Guidelines for 2011 – 2015.

Universities, University Centres and University Networks

<http://www.minedu.fi/OPM/Koulutus/yliopistokoulutus/yliopistot/?lang=en>

Winters, C. (2010). The role of universities in urban poles: a case study of Enschede, Netherlands
Lead Expert. RUN UP
(http://urbact.eu/fileadmin/Projects/RunUp/LE_Tampere_Report.pdf)

8. Annexes

Annex 1:

“District of Creativity – A worldwide Initiative”

Annex 1

District of Creativity – A worldwide Initiative

District of Creativity - A Worldwide Initiative

Founded in 2004, the District of Creativity (DC) Network unites **14** of the most creative and innovative regions around the world. Our international orientation makes us a unique network of regions that put **creativity and innovation** high on our agendas. We believe that cross-border collaborations contribute to advance a creative and entrepreneurial culture. Therefore the DC Network was formed to foster the **exchange of best practices and experiences in business, culture and education.**

From the USA to China and Scotland to India, the Districts of Creativity Network spans the globe and continues to grow. Current members include: Baden-Württemberg (Germany), Catalonia (Spain), Central Denmark (Denmark), Flanders (Belgium), Karnataka (India), Lombardia (Italy), Oklahoma (USA), Nord-Pas de Calais (France), Qingdao (P.R. China), Rhône-Alpes (France), Rio de Janeiro (Brazil), Scotland (United Kingdom), Shanghai (P.R. China) and Tampere (Finland).



Districts of Creativity Network

Creativity World Forum - The annual gathering of the DC network

During the annual **Creativity World Forum** government leaders, entrepreneurs, and knowledge institutions from the DC regions come together to **exchange ideas** about how to tackle economic challenges and make their regions hotbeds for innovation and creativity.

Ingredients include business, education and social networking and have featured **inspiring speakers** like John Cleese, Sir Ken Robinson (thought leader in creativity and human resources) and Tom Kelley (General Manager IDEO).

1st DC conference in Flanders, Belgium 2004

2nd DC conference in Maryland, USA 2005

3rd DC conference in Flanders, Belgium 2006

4th DC conference in Qingdao, China 2007

5th DC conference in Antwerp, Flanders, Belgium 2008 - www.creativityworldforum.be

6th DC conference in Baden-Württemberg, Germany 2009 - www.cwf2009.de

7th DC conference in Oklahoma, USA 2010

8th DC conference in Flanders, Belgium 2011