



# CLUSTER REPORT

TAMPERE

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## ABSTRACT

This document gives an overview of Finnish and Tampere region ICT-cluster, its evolution, present situation and some insights to the cluster development activities and processes.

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## 1 EXECUTIVE SUMMARY

The Tampere Region, the second largest region by population in Finland, is a modern concentration of industry, commerce, services and education. During the last decade Finland has risen to join the group of leading producers and users of information and communications technologies (ICT). This has had a significant impact on the raising our competitive abilities from the early 1990's recession years. Finland is one of the world's recognised technology leaders. According to the World Economic Forum's Global Information Technology Report 2002-2003, Finland ranks first in the extent to which it is to prepared for participation in a networked world.

Information and communication technology is one of the strongest clusters in the Tampere Urban Region. The best known company in this cluster, Nokia, originates from a municipality of the same name, 15 minutes drive from Tampere city centre. Today the Nokia Corporation has many business units in the Tampere Urban Region, providing local employment for about 4 000 people. One of the largest Nokia Research Centres (NRC) is also located in Tampere. In addition to Nokia Tampere Region is a home for nearly 300 ICT companies, employing a total of 16 000 persons. In companies large and small, ICT operations focus on research and product development, design and content development.

Two universities and two polytechnics with strong ICT emphasis form a strong basis for top research and development together with source for competent employees. One precondition for the successful operation and growth of ICT sector in Tampere Region has been the strong public sector support, especially from the local government.

The ICT cluster is non-homogenous. It consists of several market leaders and dozens of SME's. Also Universities play active role in the cluster. Hermia has an active role in cluster development. The main tools of Hermia are development programmes. At the time Hermia has 3-4 major development programmes for ICT cluster.

The strengths of Hermia as a cluster manager are expertise in regional and national ICT-development with more than 10 years of experience, well-organised cluster activities; strategies and programs, joint projects and well networked management of the cluster and sub-clusters.

## 2 THE REGION

The Tampere Region in a nutshell comprises of:

- Population approx. 455 000 (population of Finland as a whole approx. 5.2 mill.)
- The second largest of Finland's regions
- Largest centre Tampere, with 305 303 inhabitants
- A white, snowy winter, green spring, full-bodied, warm summer and bright, plentiful autumn
- The region has an area of 14 292 km<sup>2</sup>, half the size of Belgium
- Land area 12 271.8 km<sup>2</sup>, lakes and waterways 2020.7 km<sup>2</sup>
- Comprises 33 municipalities and 6 sub regions
- GDP index in 2000 was 94.9 (EU 15 = 100), varies in the range 64.5 - 105.7 within the region
- Tampere is regarded as the most desirable place to live and study in Finland (Taloustutkimus Oy: Towns and cities: Mobility 2000)
- The innovative world of private enterprise

The diversity of enterprise structure and the sheer number of innovative companies make the region an attractive prospect for the location of new enterprises. Many of the companies located here are operating on a global scale. Active efforts are being made to develop and broaden the scope of business activities, and close collaboration with research institutions and the public sector is encouraged, which, among other things, helps to ensure a good operating environment.

The region has a total of more than 20 000 workplaces, with a third of the jobs being in manufacturing or constructional industries. The majority of the manufacturing industries are geared either directly or indirectly to exports.

The region has a number of high-quality market leaders in the field of machinery and automation, firms whose success is grounded in technological superiority and the ability to move with the times. The main branches of industry are wood processing, metalworking, mechanical engineering and automation, while other growth sectors of importance for employment include information technology and health technology. The traditional, staple industries in the region are textiles, leather goods, rubber products and chemicals.

Percentage distribution of the population by occupation, 31.12.2000 (figures for the whole country in brackets)

Primary production 3.3% (4.7%)

Manufacturing 32.8% (26.8%)

Services 62.0% (66.6%)

Others 1.9% (1.9%)

The Tampere Region accounts for 8.6% of Finland's gross domestic product (Source: Statistics Finland, April 2002)

### Largest companies (in terms of employment) in the Tampere Region in 2002

Company	Branche of industry	Location
Nokia	electronics	Tampere
UPM-Kymmene	wood processing	Juupajoki, Parkano, Tampere, Valkeakoski
Finland Post	transport and logistics	Tampere (throughout the region)
Metso	metalworking	Tampere, Valkeakoski
Metsäliitto	wood processing	Hämeenkyrö, Mänttä, Tampere
Saarioinen	food processing	Sahalahti, Tampere, Valkeakoski
Valtra	metalworking	Nokia, Tampere
Nokian Tyres	rubber and plastics	Nokia
VR (Finnish Railways)	transport and logistics	Tampere
Pirkanmaan Osuuskauppa	cooperative retailers	Tampere

Source: Tampere Chamber of Commerce

## 2.1 SCIENCE AND LEARNING

The scientific and technological community and the business sphere extend their influence over everything that takes place in the Tampere Region, and further afield. The region has a higher level of education than the average for the whole country, and the main groups of migrants to the area are those either possessing or aspiring to a high level of education. Social and health services, child care, opportunities for study and recreation and everyday welfare are all important considerations when choosing where to live.

The Tampere Region now has the second greatest concentration of educational institutions in the country: with two universities, various research institutes, three polytechnics, a number of vocational schools for different trades and professions and some forty upper secondary schools. The teaching provided at the comprehensive school level already takes account of the challenges posed by the information society and the expansion in international relations.

- The University of Tampere
- Tampere University of Technology
- Tampere Polytechnic
- Pirkanmaa Polytechnic
- The Northern Pirkanmaa Institute of Education

## 2.2 EMPHASIS ON RESEARCH AND DEVELOPMENT

The Tampere Region is the principal centre for research and development in the country after the Helsinki conurbation, accounting for 13-15% of national spending on both private and public-sector R&D. The diversified scientific and technological community and its associated network of educational establishments assure the region's industries and other employers of a continuous supply of highly trained personnel, and new levels of expertise are constantly being created through cooperation and networking between companies, universities, researchers, investors and development companies in the region. The universities and colleges are international in character, which is a more important dimension than ever with regard to future success, and this orientation is to be seen both in the projects that they undertake and the student and researcher exchanges in which they participate. At the end of their higher education courses, students usually complete their final dissertations in industry.

There are nowadays a large number of units and companies functioning in conjunction with the universities that are engaged in technology transfer, company development, incubator and centre of expertise activities. The Tampere region centre of expertise programme is designed to bring to the fore the expertise that the people of the region possess, strengthen it and market it in an international context. This means encouraging cooperation not only among companies but also between companies and educational institutions, and acting as a focal point for international contacts.

The companies responsible for implementing the centre of expertise programme are Tampere Technology Centre (machine construction, automation and information and communications technology), Finn-Medi Research (health technology), Oy Media Tampere Ltd (the digital media, content industry and communications) and Professia Oy (expert services). Research is carried out at the various departments of Tampere University of Technology, the University of Tampere, the Technical Research Centre of Finland (VTT) and the research departments of an increasing number of private companies in the region, the largest of which is that attached to Nokia.

## 3 ICT SECTOR

### 3.1 OVERVIEW OF THE NATIONAL ICT SECTOR (FACTS & FIGURES)

#### 3.1.1 General characteristics

During the last decade Finland has risen to join the group of leading producers and users of information and communications technologies (ICT). This has had a significant impact on the raising our competitive abilities from the early 1990's recession years. Finland is one of the world's recognised technology leaders. According to the World Economic Forum's Global Information Technology Report 2002-2003, Finland ranks first in the extent to which it is prepared for participation in a networked world.

Finland's economy is largely dependent on its information and communications technology sector, mainly due to the growth of the world's leading mobile telephone handset producer, Nokia, and related companies. Nokia is the world's leading mobile phone supplier and a leading supplier of mobile, fixed and IP networks as well as multimedia terminals. Finland is also home to many niche leaders in related fields such as mobile commerce, wireless equipment and data security. Approximately two-thirds of Finnish software companies develop and produce ICT software. ICT sector in Finland is high specialized in production, exports and R&D, but less in use.

The co-operation between companies, research institutes and the education sector is unique. Some basic and far-reaching features within the Finnish ICT sector are easily pinpointed: solid technological infrastructure, open competition, widely shared common vision and co-operation in the development of ICT and information society, government's active role, technology-oriented citizens with high quality education and top calibre skills and knowledge-based technology centres being near universities, e.g. Helsinki metropolitan area and cities like Tampere, Oulu, Jyväskylä and Turku, all promoting intense networking activities. Finland has for a long time strongly invested in its education system, and strived to create links between the education sector and the development of the ICT. The extent to which information technology has penetrated Finnish society is impressive numerically and it has been demonstrably beneficial for job creation and general prosperity.

#### 3.1.2 Import and Export

ICT products play a significant role in Finland's economic performance, also as measured by foreign trade. The contribution of the ICT sector, especially the communications sector, to the economic growth in Finland has been remarkable since the beginning of the 1990s. Because of ICT cluster exports, Finland's high-tech foreign trade runs more of a surplus than any other EU country besides Ireland. In the early '90s this trade still showed a bigger-than-average deficit.

At the moment, ICT related products comprise almost 1/3 of Finland's exports. High technology exports have tripled in five years; in industrial productivity Finland has caught up with the United States, which sets the standard for the rest of the world. More than half of the growth in productivity is explained through high technology. Approximately 10 per cent of the Finnish GNP already comes from the fields of information and communication technologies.



Year 2001 marked a turning point, as the volumes and the proportion dropped from 25 to 22 per cent. Despite the downward trend, ICT still had the highest proportion of total exports in Finland. The largest product groups in ICT imports are telecommunication equipment, electronic components and computers.

#### Export in the ICT sector (million Euros)

Year	1999	2000	2001	2002	2003
Export – ICT sector	8,000	11,500	9,900	9,700	9,300
Share of Total Exports	22%	25%	22%	22%	21%

#### Import in the ICT Sector (million Euros)

Year	1999	2000	2001	2002	2003
Import ICT Sector	5,300	6,900	6,300	5,700	5,300
Share of Total Imports	17%	19%	17%	-	-

### 3.1.3 Business structure

In the ICT service sector several hundred enterprises exist. The majority are small (< 50 employees) ones. Strong polarisation characterises the Finnish ICT industry. There are only a few large players and plenty of small companies. The number of medium-sized companies is low.

Nokia is, of course, the major player in the ICT cluster. But it is not alone. Altogether there are some 3000 small and medium-sized companies in the cluster. Some 300 of these are direct first-tier suppliers to Nokia, known as the Nokia network.

The expansion in the number of new ICT companies has not, however, solved the problem of too little enterprise. The number of enterprises in relation to the size of the Finnish economy has remained small. It is true that new companies were formed in the ICT field but the growth of small and medium-sized enterprise in other fields has weakened.

ICT is rarely working alone, but used almost with everything. The most digital fields in Finland are the financial sector, transport, and communications.

The productivity of the Finnish industry is excellent in electronics, as well as in several major fields of our traditional industry, like the forest industry within which ICT has enabled a wide scale transition from traditional process industry operational models to technology driven expert organizations generating added value. The productivity in services however is not equally high. One reason for that is that the application of ICT in services is not yet adequately realized.

ICT expertise has been leveraged to enhance the quality and cost-effectiveness of hospital care and medical services generally. Finnish health care companies have invested heavily in R&D and are very actively pushing developments forward in these areas. Close co-operation between universities and companies is vital.

In construction sector ICT is used to manage the whole life cycle of a building. The software can simplify evaluation of environmental impact and property management. It can also simulate the performance of the building and calculate costs over its entire life span.

In Finland, every second of the work force is having information handling tasks in their daily work in some extent. Finns lead the ranking list of mobile phone users with Swedish people. Finns are said to take most frequently access to internet in Europe. The number of users has grown among all age groups, however, the use among those over 50 years of age has increased the most.

Internet has gradually become more and more used in both the public and private sectors. The information technology has already moved beyond business and industry to schools, libraries and hospital. It now plays a big part at home too. Two thirds of Finns use computer technology in their workplace and one in three uses Internet services. It is quite common to make payments through bank computer connections or to shop on-line. Finnish banks have been offering computer-based services to their customers for 25 years. Today, over 80 per cent of all payment transactions are made electronically online. The Government assists the private sector by promoting competition and market liberalisation and by eliminating barriers that limit the use of ICT.

#### 3.1.4 Employment

ICT-producing industries have made significant contributions to labour productivity growth in Finland. ICT sector employs in Finland a larger portion of the total labour force than in any other country, especially in the development and manufacture of services provided by the field.

In 1999, the information sector accounted for 6,5 per cent of all private and public sector employment. It also accounted for good 17 per cent of the expansion in the employed labour force in 1996-1999. More than one third of all new jobs in manufacturing involve production of goods in the information sector, which thus occupied a particularly prominent role in overall employment.

The ICT manufacturing is of major economic importance, as it accounted for about 10 per cent of whole manufacturing employment. Employment in the ICT manufacturing industry concentrates strongly in the manufacture of telecommunications equipment. ICT-consulting services is the largest ICT-services sub-sector. Telecommunications is the second largest sub-sector.

The persons employed in the ICT sector are generally younger than those employed by the private sector as whole.

#### 3.1.5 Trends in the near future

Most decisive for the future competitiveness of Finland will be how effectively ICT can be adapted to various fields. Finland has advanced far as a producer and user of communications technology. In applications of information technology, though, Finland is clearly behind the United States, for instance.

As a result of technological development, media, IT and telecommunications are merging into one sector, partly controlled by large multinational companies. In this story, the role of Finland will be specialization and networking of companies, and alliances with domestic and international partners. In the future, the role of the fields of

information and communication technologies in the Finnish GNP will increase significantly, as they are likely to develop faster than other fields.

The challenge is to master technology and in teleoperations to grow to a global size. Challenge is to raise the level of ICT use and the benefits to be derived from it. In the near future information and communications technologies will become a more concrete part of every day life. Competitive information society needs a full range of services directed to both citizens as well as to companies. In the development of public sector services is a key element. A big challenge for Finland is to learn to apply information technology in the service sector in areas like retailing and health care. The most important communications technology areas for Finland are seen to be smart human environments, interoperability, and mobility in future networks, micromechanical radio frequency systems, and service architectures. Research and development activities are essential for the success in coming years.

### 3.2 OVERVIEW OF THE REGIONAL ICT SECTOR (FACTS & FIGURES)

Information and communication technology is one of the strongest clusters in the Tampere Urban Region. The best known company in this cluster, Nokia, originates from a municipality of the same name, 15 minutes drive from Tampere city centre. Today the Nokia Corporation has many business units in the Tampere Urban Region, providing local employment for about 4 000 people. One of the largest Nokia Research Centers (NRC) is also located in Tampere. In addition to Nokia Tampere Region is a home for nearly 300 ICT companies, employing a total of 16 000 persons. In companies large and small, ICT operations focus on research and product development, design and content development.

Two universities and two polytechnics with strong ICT emphasis form a strong basis for top research and development together with source for competent employees.

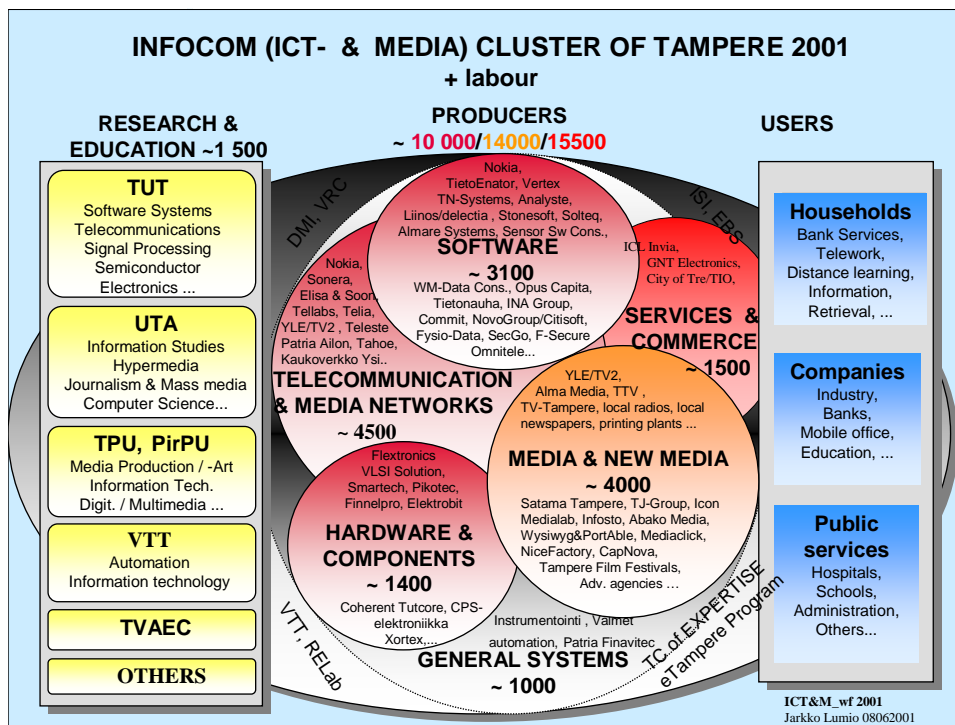


Figure 1: Tampere Region ICT cluster

Almost all technological competencies in ICT (hardware and electronics, software, signal processing, content etc...) also via universities and flagships like Nokia et al...are present:

- Digital signal processing
- Telecommunications
  - Broadband data transfer, wireless and optical telecommunication
- Electronics
  - Optoelectronics, microelectronics, semiconductors
- Software development
  - Open source software, embedded software, adaptive software components
- Human computer interaction
  - Virtual reality, user interfaces, information perception, new mobile services, mobile and other digital games, cross media applications

## 4 ICT CLUSTER

### 4.1 EVOLUTION OF THE ICT CLUSTER

#### The chronological IT history of Tampere

- 1957 The automation of the telephone operators in the Tampere region begins, Television test transmissions begin in Tampere
- 1959 TPO (The Tampere Telephone Ltd.) begins to charge telephone bills by using the punc-card machine, as does the town with electric bills
- 1960 YKK starts in Tampere
- 1961 Tampere founds a computation centre operating on punch-card machines
- 1964 The last manual switchboard of TPO is closed down  
Commercial data transmission begins in Finland and also in Tampere  
Invoicing cooperation between TPO and the Town of Tampere begins
- 1965 The first professor of computer science in the Nordic countries, Reino Kurki-Suonio, begins his work  
Higher education of technology begins at the Tampere University  
The second national TV channel, TV2, begins its emissions
- 1966 The first computer of Tampere, IBM 360/20
- 1967 Finland's first switchboard where push-button phones were used
- 1969 ARP begins in Finland
- 1970 Information network between the universities in Finland
- 1971 TUT independent
- 1972 Oy Softplan Ab is founded. Tampere Information network is founded
- 1974 The Technical Research Centre of Finland (VTT) starts in Tampere
- 1980 Reijo Kurki-Suonio becomes the professor of IT, IT can be taken as major at the university
- 1982 TPO gets its first digital switchboard in Nalkala, Tampere  
First Hi-Tech fair,  
NMT-system is introduced in Finland  
Tampere Information Network is founded
- 1984 Datanom courses begin in the vocational education institutes  
IT Research centre is founded
- 1985 Softplan is awarded with the Quality Association of Finland's Quality Award  
Commercial radio stations start
- 1986 NMT 900-network is introduced in Finland  
Softplan merges with Nokia
- 1987 New telecommunication law is introduced in Finland
- 1988 [Nokia Cellular Systems Oy starts also in Tampere](#)
- 1989 [Nokia expands its business in Tampere](#)
- 1990 [Tampere Technology Centre is founded \(Ancestor of Technology Centre Hermia\)](#)
- 1991 [GSM is introduced in Finland](#)  
First GSM phone call is made in Tampere

- Art and Media school is founded
- Nokia Data is sold to ICL
- 1992 NordData 92-Fair in Tampere
- Hypermedia laboratory of Tampere is founded
- Sansibar is founded
- 1993 Nokia Mobile Phones wireless data unit in Tampere
- 1994 IT Research Centre changes its name to DMI
- Open competition between different telephone companies in Finland is allowed
- Nokia Mobile Phones Tampere-unit introduces a digital data transfercard for the GSM-phones
- 1995 TV Tampere begins its emissions
- 1996 [Nokia 9000 communicator is introduced](#)
- 1997 TeamWareOffice is founded
- TPO phone network is digitalised
- Tampere multimedia award
- 1998 TPO becomes a corporation
- Tampere is the first town to open a netshop in Finland
- Nokia Wireless Business Communications is founded
- 2000 eTampere Programme is announced

In the 90's Tampere has become one of the IT centres in Finland, together with Helsinki, Oulu and Espoo. The amount of work opportunities and new posts has risen and the development in the field has been faster than anywhere else.

In 1994 started the Tampere Region Centre of Expertise-programme that was a part of national Centre of Expertise-programme. It was created to improve placement and development of internationally competitive entrepreneurs that needed strong expertise. The Pirkanmaa-alliance and The City of Tampere were the sponsors of the programme and it was carried out by Tampere Centre of Technology Ltd. In The Tampere Region Centre of Expertise-programme information technology is one of the three fields, the others being mechanical engineering and automation and health care technology. Jobs in the field increased from 3000 in 1994 to 6700 in 1997. The Centre of Expertise-programme also led to an increase in the electronic printed circuit development capacity in the region.

The information technology's input in the industrial structure of Tampere in the late 1990's has been significant. Although mechanical engineering was the most important field of technology, measured both by the number of jobs and the volume, has the IT-field been remarkable as it grew the most and brought a new development cluster to the region. Information technology has clearly been the most innovative technology field in Tampere in the 90's. In proportion to the turnover, most money was used in R&D in IT. The amount also increased clearly the most in IT-business. Its part of the turnover was one-fifth in 1995.

The strength of the Tampere region is that the city has considerable expertise in communication technology development and production and also in research and education related to it. Companies applying information technology have thousands of jobs. The biggest producers of information technology in 1998 were ICL Data,

Nokia Mobile Phones, Nokia Telecommunications, Tampere Telephone Ltd and Sonera. Top products developed in Tampere include the Nokia Communicator and the TeamWareOffice-programme.

## ICT Looking for New Growth through Wireless Applications

The information and communications technology of the Tampere Region has a strong emphasis on design, research and product development. Over a third of all degrees achieved in information and electronic technology in Finland are from Tampere University of Technology. The strong ICT expertise provides significant support to the development of the other fields of expertise in the region. The most significant characteristics of ICT expertise in the Tampere Region include the embedded systems of industrial machines and close cooperation with companies in the content production field.

The several years of strong growth in the field are partially due to the training of skilled labour and the removal of other bottlenecks of growth and development. The Pro-IT project combined the adult education in IT of the leading institutes of higher education in the Tampere Region and over 100 companies participated in the training. The Optoelectronics Research Centre ORC, Digital Media Institute DMI, Data Network Institute and the sub-programmes of the e-Tampere programme are the best examples of specialised forums and institutions that serve to promote the expertise of basic and applied research in the field and to create better requisites for the development of business activities.

In the field of traditional information technology, the position of large, leading companies has strengthened and, coincidentally, the importance of small and medium sized companies has decreased. In the future, small and medium sized ICT companies can find business potential in new applications and the implementation of ICT into other fields of business. For example, new opportunities are emerging in wireless applications, gaming, open source software and ubiquitous computing.

## 4.2 STATUS QUO

### 4.2.1 Clusters Structure & Competitive Position

The regional cluster comprises of around 300 companies and several research and other supporting bodies ( see table 1 below) . The cluster can be divided also in to sub-clusters according to the cluster activities: ubiquitous computing and printable electronics (UBIQ -cluster programme), gaming and cross-media (Neogames) and open source software and content (COSS, Centre for Open Source Software). Leading Companies in sub-clusters include the following companies:

**Ubiquitous computing:** NOKIA Mobile Phones, Nokia Networks, Fujitsu, TeliaSonera, ELISA, Electrobit, Perlos, UPM-Kymmene and TietoEnator;

**Neogames:** NOKIA, ALMA Media, YLE, VEIKKAUS, Universomo, Second Brain, Remedy, Bugbear Entertainment, Digital Chocolate, Housemarque, Mr. Goddliving,;

**COSS:** NOKIA, IBM, Novell, Flander, Gofore, Nomovok, SysOpen Digia, Nixu

300 companies and 16,000 employees		Total Number
ICT companies	Applications	100
	Content	60
	Core Services	60
	Supporting Services	40
	Infrastructure	40
	Other (please specify)	
Knowledge Centres	Research Institutes	6
	Universities, Colleges	5
	Other (please specify)	
	Technology Centres	3
Other Members	Incubators	2
	Public Authorities	4
	Chamber of commerce	1
	Other (please specify)	
TOTAL		321

The supporting cluster network comprises of several research bodies:

- Tampere University of Technology
  - several units and departments
  - Digital Media Institute (DMI)
  - Optoelectronics Research Centre (ORC)
- University of Tampere
  - Department of Information technology
  - Hypermedia Laboratory
  - Tampere University Computer Human Interaction (TAUCHI)
- Technical Research Centre of Finland VTT
  - Intelligent products and services, wireless automation, mobility information applications, human interaction technologies, advanced and electronic materials
- Nokia Research Center
  - Technology platforms (e.g. smart phones), Multimedia (e.g. video phones), Enterprise Solutions (e.g. Nokia Communicator), Networks (e.g. network control systems), Nokia Research Center (e.g. wireless multimedia and usability)



Technology Centre Hermia has had the role of cluster manager for nearly 10 years. The understanding of the needs of the local ICT cluster has gained significantly during last 2-3 years.

The structure of ICT-cluster has a strong linkage and relation to the regions overall business structure. The cluster could be depicted to be structured to two leading business fields: a) Telecom related business b) partners and subcontractors for large industrial companies primarily in the field of machinery and automation. There is also some companies in the field of software products (B2B products) and consulting and project companies.

These world-class domestic markets have been very good in the sense of competitive advantage. Companies must be able to deal with global competition. Also the research in some areas has given competence to the industry. Especially telecom related ICT has gained a lot of competitiveness from the research.

One interesting, but not so pleasing feature is, that although having these world-class customers in Tampere region, the ICT cluster itself didn't yet profit from the situation. It seems to be, that this far the companies have more or less competing to each other inside the cluster. The ICT cluster companies didn't utilise this advantage in internationalisation. It seems that they are more or less happy with the situation. It could be also said, that they are afraid of internationalisation. This is going to be a major challenge to the cluster. If they do not use their globally known reference cases in internationalisation and get more businesses from outside the region and Finland, they are going to be dependent on their local customers.

#### 4.2.2 Factor Conditions

Most ICT companies are located in the city centre of Tampere. Other major location is Technology Centre Hermia, 7km from Centre. Nokia is located in both locations. The local ICT infrastructure is on moderate level; 3G and Wifi networks do not cover the area fully.

The area has nowadays quite good connections to other areas and also to other countries (with direct flights to 4 international destinations). Companies use quite heavily also the train connection to Helsinki (around 1hour and 45 minutes).

Human resources have been quite well available - compared to other regions in Finland. The two universities and also polytechnic have been able to a) attract students b) educate them enough well for the needs of the industry. Several studies in row has shown that students appreciate tampere as the most attractive region to study in Finland; so the companies have also quite qualified labour force at their disposal. Nokia has of course been blessing in many ways: the company attracts also highly qualified students and workers from abroad and other companies also benefit from that international influence. Besides the students the region has gained recognitions to be the most convenient and attractive town to work and live in Finland.

#### 4.2.3 Firms' Strategies, Structures and Rivalries

The cluster is structured in SMEs and corporate size companies. Nokia with its several units in the region has the leading role in many cluster activities; i.e. it is partner or leader in 80% of the joint projects and initiatives. There

are only few medium sized companies that employ more than 100 employees. The companies are quite well networked together. Main co-operation areas include the following (table below):

The members of the cluster interlinked through:

- |  |  |
|--|--|
| <input checked="" type="checkbox"/> <u>Joint projects</u>        | <input checked="" type="checkbox"/> other (please specify) |
| <input checked="" type="checkbox"/> <u>Periodic meetings</u>     | content oriented events                                    |
| <input type="checkbox"/> Joint presentations at trade shows      |  |
| <input type="checkbox"/> Formal knowledge exchange               |  |
| <input checked="" type="checkbox"/> <u>Informal interactions</u> |  |
|  |  |

What are the main areas of co-operation within the cluster?

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> <u>Information and communication</u> | <input type="checkbox"/> Other (please specify) |
| <input checked="" type="checkbox"/> <u>Training</u>                      | Some export activities in Neogames              |
| <input type="checkbox"/> Standardisation                                 |   |
| <input checked="" type="checkbox"/> <u>Research &amp; development</u>    |   |
| <input type="checkbox"/> Export/ Internationalisation                    |   |
| <input checked="" type="checkbox"/> <u>Marketing &amp; PR</u>            |   |
|  |   |

The companies are primarily collaborators, but in the field of sub-contacting – mainly to Nokia - the competition is fierce and still increasing also by the presence of for example Indian companies. Yet small companies tend to seek for partnerships to serve big clients and to speed up to the time to market. The following table illustrates the competitive situation:

How would you describe and rate the relationships among the members of the cluster?

- |   | major | minor |
|---|-------|-------|
| <input checked="" type="checkbox"/> Competitors           |       | X     |
| <input checked="" type="checkbox"/> Partner               | X     |       |
| <input checked="" type="checkbox"/> Client/Subcontractor  |       | X     |
| <input checked="" type="checkbox"/> Collaborative Network | X     |       |
| <input type="checkbox"/> Others, please specify           |       |       |

#### 4.2.4 Strength & Weaknesses

The local cluster-approach has pointed out some strength in intensified networking and co-operation actions:

- “authorised” co-operation platform and umbrella helping in financing and in publicity
- framework for smaller company to acquire larger identity and credibility
- strong co-operation with research units and companies leads to joint R&D -projects
- world-class research in digital signal processing electronics, telecommunication, lasers and optoelectronics offers huge possibilities for co-operation
- flagship companies on several business fields
- joint resource allocation
- national and international focus in several competence/categories; more resources to carry out activities

Some “typical” weaknesses and obstacles for more effective cluster cohesion could be identified:

- human hesitation in joining joint activities, fear of other stealing ideas etc.
- lack of knowledge management and joint activity vision and strategies toward outside the company
- scarce resources in fostering cluster activities
- defending own realm especially in research community
- too low objectives; we should strive for being among the European and world leaders in the selected fields

### 4.3 ORGANISATIONAL FRAMEWORK & CLUSTER MANAGEMENT

Technology Centre Hermia has the role of cluster development. The role of cluster management is highly strategic. Hermia’s role is to strengthen the cluster by giving new business visions and tools for the companies to develop their business to new areas. Hermia’s cluster programmes have highly national focus. Cluster programmes are structured as shown in the figure.



## Cluster management – development program

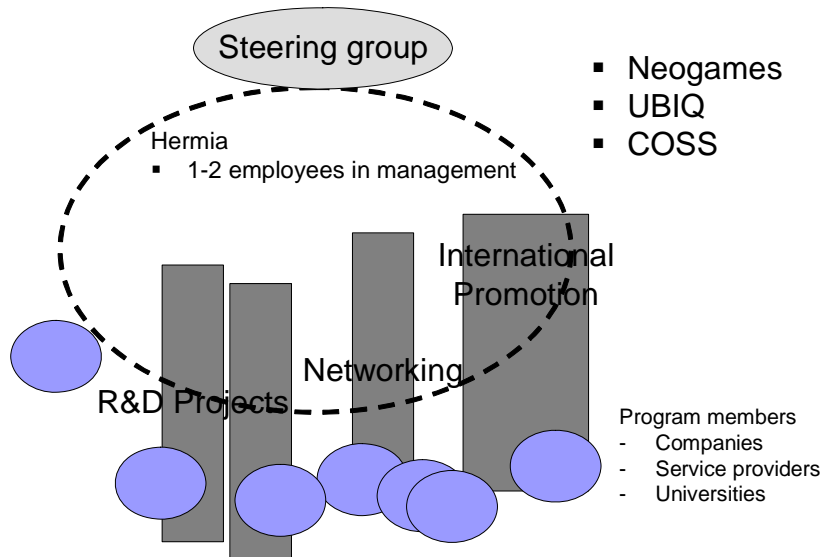


Figure 2: Structure of development programme; the key tool in cluster management

Hermia has at the moment three main development programmes for ICT cluster; Neogames with 100 members, COSS (70 members) and UBIQ (25 members, started 4/06). Programmes have typically members from key industrial companies, university laboratories and SME's. These clusters are not only local but also national leaders in these business fields. There is also an important development programme for optoelectronics and laser companies called LCC Finland and Vicinics focusing on electronics. The cluster activities are financed by member fees and with project-based financing.

Steering group has advisory role and it focuses mainly on the strategic issues and financing. It consist of 10-12 members from key companies and 2-3 research instate representatives. Hermia has 1-2 two employees working for each development programme, altogether close to 10.

Hermia is conducting the cluster management on the regional level also by running national centre of expertise programme on ICT. This activity covers all the ICT-companies in the region. The Centre of Expertise Programme is a special programme that in accordance with the Regional Development Act aims to pool local, regional and national resources to utilise high-level expertise. The Centre of Expertise Programme provides support for regional strengths and specialisation as well as cooperation between the various centres of expertise. The programme concentrates on using the expertise in selected, internationally competitive fields and on the development of business activities. The Centre of Expertise Programme has created growth platforms that expedite the development of companies and support the creation and commercialisation of new business activities.

Cluster activities are carried out in several ways:

The cluster management is responsible for (please select and rate):

	Rating			
	1	2	3	4
<input checked="" type="checkbox"/> <u>Cluster events, Workshops, Conferences</u>			X	
<input type="checkbox"/> Specific qualification offers (e.g. vocational training, certification)				
<input checked="" type="checkbox"/> <u>Fostering co-operation</u>				X
<input type="checkbox"/> Acquisition (e.g. supplementation of the value chain)				
<input checked="" type="checkbox"/> <u>Internationalisation</u>			X	
<input type="checkbox"/> Infrastructure (e.g. physical, R&D)				
<input checked="" type="checkbox"/> <u>Technology issues (e.g. R&amp;D projects, application centres)</u>			X	
<input checked="" type="checkbox"/> <u>Co-operations with knowledge centres (e.g. universities)</u>			X	
<input type="checkbox"/> Market issues (e.g. standardisation)				
<input checked="" type="checkbox"/> <u>Supportive lobbying &amp; government relations</u>			X	
<input checked="" type="checkbox"/> <u>Consulting of Start-ups</u>			X	
<input checked="" type="checkbox"/> <u>Positing of the cluster nationally and internationally</u>			X	
<input checked="" type="checkbox"/> <u>Monitoring of cluster management</u>			X	
<input checked="" type="checkbox"/> <u>Communication (Newsletters etc)</u>			X	

1=infrequent      2=forthcoming      3=periodical      4=daily

The main services offered include monthly newsletter, networking events and meetings, being contact point, training programmes in several issues and activating joint R&D projects. Below an example of the activities carried out in one of the cluster programmes (COSS):

## Creating a Sustainable and Internationally Competitive Open Source Business Ecosystem in Finland

- Providing business development and promoting services for Finnish OSS companies
- Improving ways of OSS utilisation in different industrial sectors and user groups
- Linking code and content creating communities with industry
- Organising development projects opening new possibilities for OSS-related businesses
- Facilitating collaboration between business, research and education
- Providing information and networking services supporting OSS business ecosystem
- Acting as an international contact point to Finnish OSS competence and industry



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The strengths of Hermia as a cluster manager are

- Expertise in regional and national ICT-development with more 10 years experience;
- Well-organised cluster activities; strategies and programs, joint projects;
- Well networked management of the cluster and sub-clusters.

The development of the volume of the cluster operations is depicted below:

What was the annual budget for cluster management for the last three years?

	Annual Budget		
	Total (Euro)	Personnel (Euro)	Share of Personnel Costs (%)
2003	700,000	400,000	57 %
2004	1,000,000	600,000	60 %
2005	1,200,000	800,000	66 %

## 5 POLICIES

The key policies in ICT sector are defined by several non-dependent organisations ie. Sitra, Tekes, different ministries, cities etc. Nowadays Hermia has taken a strong national role also in policymaking. Hermia is noticed by most of the governmental organisations as an advisor and/or expert to be consulted in policymaking.

National policies are defined by several non-dependent organisations:

### Tekes (National Technology Agency)

- Invests on internationally competitive technology fields (university research)
- Invests in companies, that have competitive technology vision and growth strategy
- runs dozens of high-tech programmes, close to 10 in ICT
- Is a strong policymaker through its funding and programmes

Tekes and Hermia do co-operation in all of the mentioned development programmes.

### Ministry of Interior Affairs

- is a key policy maker by defining the funding and technology focus for areas
- Tampere region “won” the area of ICT in the next programme season

Local policies are defined by the local cities and local office of three ministries (Te-Centrum)

### City of Tampere

- City of Tampere influences in the policies by several means
- Hermia is owned by the city
- City is also co-funding some of the programmes

### TE-Centrum

A strong policymaker by to means

- TE-Centrum defines aerial strategies for business development (all major business fields in area). These include software and electronics
- TE-Centrum is funding many of the development programmes of Hermia

So TE-Centrum is actually funding the cluster management

## 6 CONCLUSIONS

Cluster management's core competencies include:

### 1. Program preparation and Strategy skills

- systematic process to develop new programmes
- goals to serve companies
- vision on global development

### 2. Experience on Cluster Management Activities

- several years experience
- similar processes in basic services

### 3. Wide industrial and public network

- Flagship companies, universities, SME's
- Personal contacts

### 4. Expertise on ICT business

- several experienced individuals
- involvement of well-known professors/leaders in programmes

Some pitfalls could be identified:

- No clear , measurable gains for companies
- No measurement and data collection of the cluster
- no ability to communicate gains and value-added for the companies

The other regions could learn from the Tampere experience by considering the following points:

1. Tampere has succeed by a) recognising excellencies b) understanding the needs of these excellencies c) creating networks and services to help these excellencies;
2. As a cluster manager, you cannot create Excellency, but you can and should support it. A cluster should always be organised around excellence and serve this excellence to its critical goals. Even excellences have a lot of work to do and they need co-operation and support.
3. In some cases the know-how, knowledge and innovations has been in university (optoelectronics, signal processing), and in some cases it has been in industry (Nokia). The form of support and network is defined by the expertise itself but also the surrounding business and research community.



We suggest following topics for the cluster management workshops:

- dynamics of innovation and innovation systems nationally/regionally/locally
- creating tools to understand characteristics (strengths & weaknesses) of business and research community innovation cycle and networks
- How to finance development work; who is willing to pay?