

Development Process of the ICT Cluster in the Jyväskylä Urban Region

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Abstract

The present study is based on the assumption that the dynamics of development processes, the question of *how* things are achieved, may for its part explain differences in success among otherwise similar regions. Attention is thus focused on the analysis of development processes, on how new development ideas come into being and develop, how processes are led and how strategies are created. The question “how” cannot be satisfactorily answered by general observations, such as wide participation or innovative actions, for example. To gain insights into development processes, it is necessary to go deeper, beyond these generalities.

This article analyses policy processes and their management in the development of the ICT (information and communication technology) cluster in Jyväskylä, one of the fastest growing urban regions in Finland. This analysis has two aims: first, to find messages for more dynamic and creative policy processes and regional policy. Second, it aims to examine the role of networks and network management in urban competitiveness.

Introduction

Along with the debate on globalisation, recent decades have also witnessed intensified discussion on the rise of the importance of regions and on tightening competition between them. Increasing emphasis has been placed on the concept that the competitiveness of enterprises is influenced by the environment that a region can offer them (see e.g. Begg 1999; Saxenian 1996). Regions, particularly urban regions, have encountered completely new development challenges on moving from a space of places to a space of flows (Castells 1996). In their development work, urban regions have been compelled to take into account the economic logic based on global information and expertise. They have had to contemplate means of attracting various flows of information, technology and investment and to consider how appealing they are as operational environments for businesses and as living environments for individuals. In regional development activities, growing emphasis is

placed on the region's ability to strengthen its own competitive position and create competitive advantage from local conditions.

An increasing number of recent studies analyse regional success factors and compare the competitiveness of various regions. Regional competitiveness² is frequently defined through economic factors with direct bearing on the competitiveness of enterprises. Studies on regional success factors conducted in recent decades have also directed attention towards social capital (Putnam 1993), institutional "thickness" (Amin & Thrift 1995) or innovative milieus (e.g. Camagni 1991), for example.

In comparative regional studies, competitiveness is usually defined on the basis of the context and the variables used in the research. Thus, the rank order of urban regions may vary a great deal. Many comparisons are based on statistical examination, whereby the "soft" factors of competitiveness, such as operating culture and functionality of networks, are excluded from the investigation. Another weakness of statistical comparisons is that they are based on past development; therefore, it is difficult to elicit the future development potential of a region by examining statistics. Moreover, the measure of competitiveness frequently includes factors that can be considered to be the result of competitiveness rather than contributors to it (Huovari et al. 2001, 8).

If urban competitiveness is analysed from the perspectives of changes caused by comprehensive development work in urban regions and by the information society, the basic elements³ of urban competitiveness can be considered to be the region's infrastructure, enterprises, human resources, quality of living environment, institutions

² Generally, regional competitiveness can be defined as a region's ability to attract and maintain activity that increases economic well-being. The term is ambiguous; definitions vary from study to study. The critique focuses on whether the term is totally devoid of meaning or whether it is possible to speak of the competitiveness of a geographical area. According to Krugman, regional competitiveness refers only to the competitive ability of companies. The concept has also been perceived as pejorative because it connotes a competitive set-up, confrontation instead of co-operation (Huovari et al. 2001, 1). Despite such criticism, the term regional competitiveness may be considered useful if we interpret it as based on the development of the region's own functions and on the enhancement of its own well-being, and thereby, secondarily, on its success in interregional competition. The present study argues that regional competitiveness is composed of many factors other than merely the competitiveness of companies; consequently, we use the term to describe the influence of various factors. Research on regional competitiveness also helps the actors involved in development processes to analyse their own work.

³ This is a rough division at a general level, not an exhaustive list.

and functioning development network, membership in the networks, the image of the region and the creative tension linked to development activity at the core of development (Linnamaa 1999; Sotarauta & Mustikkamäki 2001; on creative tension, see also Chapter 5.1 below). These basic elements can be further divided into structural and dynamic factors of competitiveness. Structural factors determine the conditions for development work. Dynamic elements relate to interaction among actors and their ability to learn new things and create innovations through cooperation and networks. Factors of dynamic competitiveness are quite difficult to maintain and imitate; it can therefore be assumed that they have an influence on whether or not one region has a competitive advantage⁴ over other regions (Linnamaa 1999).

The present study is based on the assumption that the dynamics of development processes, the question of *how* things are achieved, may for its part explain differences in success among otherwise similar regions. Attention is focused on the analysis of development processes, how new development ideas come into being and develop, how processes are led and strategies are created. The question “how” cannot be satisfactorily answered by general observations such as wide participation or innovative actions, for example. To gain insights into development processes, it is necessary to go deeper, beyond these generalities.

⁴ According to Barney & Hesterly (1996, 134), an actor has a competitive advantage when the resources are 1) valuable in enabling actors to exploit environmental opportunities and neutralise threats; 2) rare among the actor’s present or potential competitors; 3) costly to imitate; and 4) without close strategic substitutes.

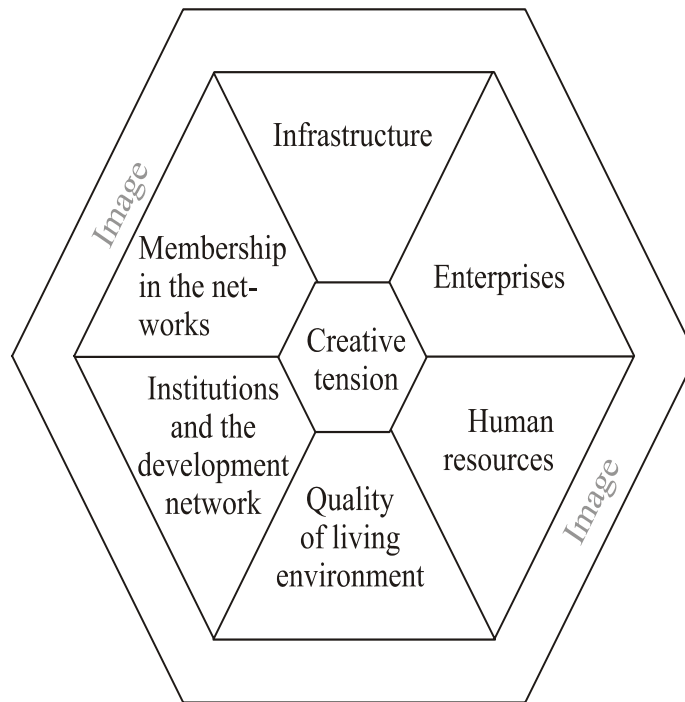


Figure 1. Basic elements of urban competitiveness

This article analyses policy processes and their management in the development of the ICT (information and communication technology) cluster in Jyväskylä, one of the fastest growing urban regions in Finland. Through analysis, it aims first to find messages for more dynamic and creative policy processes and regional policy. Second, it aims to examine the role of networks and network management in urban competitiveness.

Vartiainen (1998) divides Finnish regional policy into the three following phases: industrialising regional development policy, planning of regional policy and programme-based regional development. However, the desire for the next phase is in the air already. This coming phase may be founded on process-based and network-like development: on starting up and managing processes and activating the foremost experts in each phenomenon for development work from their own particular points of departure. This process-based approach would also stress the development of local operational environments as magnets for various flows, and the dynamics of various processes (Linnamaa & Sotarauta 2000, 31).

The present study analyses the development of the Jyväskylä urban region from a process-based standpoint. This region was selected for case study because its development since the second half of the 1990s has been positive and because its development measures have been deemed successful. (See e.g. Alueellinen kehitys ja aluepolitiikka Suomessa 2000, 188 – 189; Elo ja elinvoimaa Jyväskylässä 2001.) The competitiveness of the Jyväskylä urban region is not evaluated; our starting point is the assumption that positive outcomes have been achieved in the region. The focus of this study lies on the question of how this development has been brought about in the region.

In this study, the case is looked into from the perspectives of regional development work and the organisations participating in it. Thus, different factors will probably be emphasised in the region's development than would have been in a study where the same phenomenon is contemplated from the perspectives of enterprises, innovation systems or technology research, for example.

Empirical data were gathered by using two methods. Firstly, various written documents such as strategic plans, memoranda, evaluations and overviews were analysed. Secondly, and more importantly, theme interviews were conducted. The interviewees (see Appendix) represent different viewpoints regarding the development of the Jyväskylä urban region. In all, 25 interviews were conducted in the spring and early summer of 2001, and the interviewees were selected using the "snowball" method⁵. However, the first interviewees were chosen on the basis of the document analysis. Direct quotations excerpted from the interviews are presented in indented quotations below. Any data that could identify respondents have been removed. The transcribed data do not include all commentaries *verbatim*. Omitted passages (e.g. departures from the main theme) are indicated by three full stops in the quotation.

This article is organised as follows. After the introductory chapter, Chapter 2 presents the theoretical framework of the study. Chapter 3 describes the Jyväskylä urban region and its ICT cluster and Chapter 4 the ICT-led development process and the most important turning points in that process. Principal phenomena on the process are reviewed in Chapter 5 and the future opportunities and threats in Chapter 6. Finally,

⁵ Interviewees suggest other people to be interviewed. In this case, these were mainly actors who play a central role in the development process of the ICT cluster in the Jyväskylä urban region. Some interviewees had not been involved in the process directly but had followed it closely. Among the selected interviewees were also some who had criticised the development work.

the concluding chapter considers what messages the development process of the Jyväskylä urban region can contribute to an outline of process-based regional development.

Theoretical framework and key concepts

This study focuses on analysis of the dynamics of development processes, especially how development work is done. Our assumption is that analysing processes helps demonstrate why one region's competitiveness differs from another's. *Process* refers to a series of interconnected measures and events. Thus, a process is sustained activity and/or a series of changes occurring over time. In regional development, a process is composed of the measures and reactions of interest groups exerting influence over strategic change and events external to the development network.

The research method is to track the development process and to identify the main turning points in the process and central phenomena at such turning points. The *turning point in a development process* refers to the point at which the past experiences and future expectations of several actors culminate. It is assumed that the turning point at least partially excludes certain future alternatives and opens up others.

What underlies the tracking of processes is the view that both the development of the region and the development activity are always at least to some extent *path-dependent*; that is, previous paths, network connections, learning processes and the subjective modelling of historically transmitted matters affect present and future events in many ways (see e.g. North 1993). Path dependence affects the forms of development and the institutional, structural, social as well as economic characteristics of the region.

In spite of path dependence, successful regions are still considered to be examples of development. However, direct copying is seldom successful, since using different action models as examples calls for analysis and interpretation of the models and learning based on this, i.e., learning in which action models are filtered and shaped according to the region's own points of departure.

Particularly in the 1990s, strategic planning and network-like co-operation of several actors gained popularity in Finnish regional development policy. The present study therefore employs theories of policy networks and network management in support of the analysis of development processes because they provide tools for organising and understanding the phenomena occurring in a network-like manner.

Policy network is used to indicate patterns of relations between interdependent public, semi-public and private actors involved in

processes of public policy-making in a certain policy field (Kickert 1997 et al). As Kenis and Schneider state, policy networks are mechanisms of political resource mobilisation in situations in which the capacity for decision-making, programme formulation and implementation is widely distributed or dispersed among private and public actors. A policy network can be described by its actors and their linkages as well as by its boundary (Kenis & Schneider 1991, 41).

Operating in a world of shared power in which governance is the effect of actors on one another and themselves, the achievement of successful policy processes requires management suitable for the networks. In connection with policy networks, *network management* refers to an activity that seeks to promote the process of interaction, to serve as a mediator for interaction among various actors and to direct activities towards searching for a goal. In principle, every actor involved in a policy network can perform a management role (Kickert et al. 1997). According to Klijn and Teisman, network management may address perceptions, actors and institutions and the relations among them (Klijn & Teisman 1997).

Regarding actors' *perceptions*, the similarities and differences in actors' values, goals and perspectives are examined in relation to the matter at hand. Generally, *institutions* can be interpreted as a framework for actions and choices. In regional economy research, special importance is attached to informal institutions and regularly recurring behaviour generated by culture – habits, customs and routines. These are considered to reduce uncertainty and facilitate interaction (see e.g. Maskell 1996; Morgan 1997). On the other hand, formal institutions are also significant for development activities: Formal institutions come into being when it is judged necessary to create a new mode of operation, which is presented in the form of a law, statute or written contract, or is realised through some specific organisation (Linnamaa 1999). The present study scrutinizes the effects of both formal and informal institutions on the development process and its turning points.

Actors participating in development work constitute a third major focus group in tracking the development process. Attention is paid to which actors played a decisive role at which turning point (including who took the initiative, who led the process and whether the achievement of the turning point was backed by individual actors or by some group). At the same time, attention is also paid to those who were not involved.

The analysis also focuses on external and internal drivers of change that for their part contributed to the shaping of the development. The driver of change is not merely an organisation or institution; it may be,

for example, a value, a trend or a widely held opinion. What is essential is that it exercises great influence over the strategies of various actors. In some cases, the driver of change may be a single actor who is significant enough to direct the course of development. A new institution may also be seen as an internal or external driver of change.

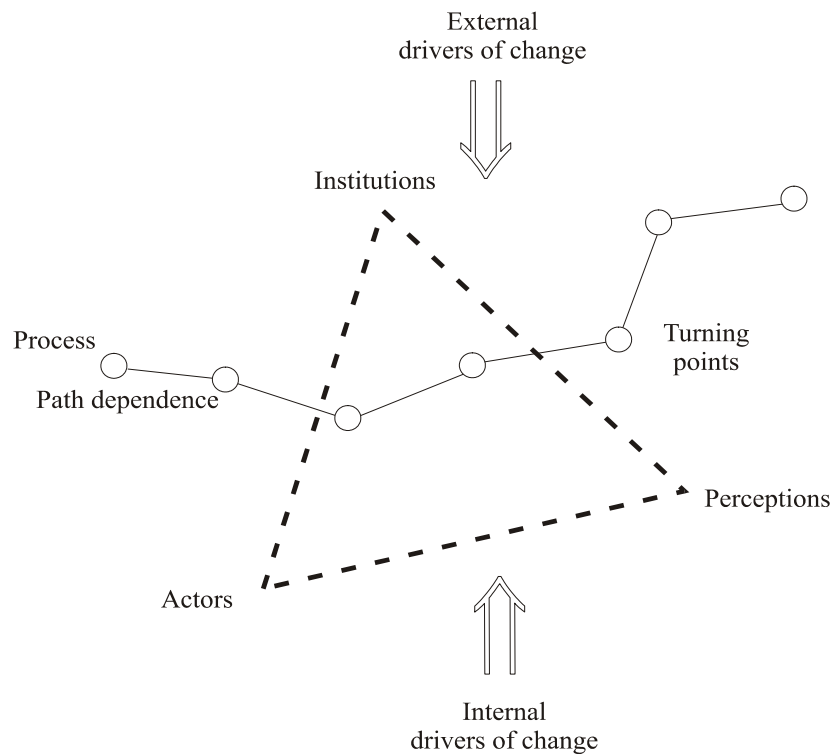


Figure 2. The framework of the study

This study looks into the development process of an ICT cluster. According to Kautonen and Tiainen, *cluster* refers to a concentration of enterprises developing and using similar products and technologies, thereby enabling the potential of synergy for innovations. A cluster is a network composed of economic actors in which interaction is intense and sustained. It may be regional or it may take shape without a clear geographical accumulation. The cluster perspective focuses on production processes in which several different fields of operation may be combined (Kautonen & Tiainen 2000, 7). The present research applies the cluster definition quite loosely and does not analyse the extent to

which the ICT agglomeration in the Jyväskylä urban region fulfils cluster criteria. The term cluster is employed because it is used in the development work of the Jyväskylä urban region, because ICT companies (including companies that apply local ICT expertise and organisations that support the operational preconditions for such companies) operate in the region, and because the development of the conglomeration is based on co-operation among the organisations mentioned.

Case area

Jyväskylä urban region in general

Jyväskylä is located in the lake district of Central Finland, about 250 kilometres from Helsinki. It is often called the “Athens of Finland” because of its cultural and sports facilities and its long traditions in education⁶. The Jyväskylä urban region has about 135,000 inhabitants and it covers the City of Jyväskylä, the Rural Municipality of Jyväskylä, Laukaa and Muurame (Figure 3). Jyväskylä is the biggest city in Central Finland (a region with about 264,000 inhabitants). Its most important industrial branches are the metal industry, paper manufacture and paper machinery, wood processing and fast-growing information and communications technology. A total of 73 % of jobs are in the service sector in Jyväskylä.

In the 1980s, Jyväskylä was one of the most prosperous cities in Finland; it enjoyed a rich tradition in industry, administration and education. The severe economic recession that ravaged Finland in the 1990s hit Jyväskylä harder than many other urban regions. In the early 1990s, many enterprises in the Jyväskylä region went bankrupt or downsized their activities. Job losses totalled 9,000, more than one-fifth of the total number of jobs. The simultaneous balancing out of the public economy weakened the economies of the municipalities in the urban region, because Jyväskylä, as a city of educational institutions and the centre of provincial government, was heavily dependent on public services. During the recession, unemployment peaked at more than 20%⁷, and has been very slow to improve.

⁶ Hence, the educational level of the inhabitants of Jyväskylä is high; in 1999, about 68% of all inhabitants over 15 years of age had graduated from educational institutions (nationwide about 59 %). Of those, 30 % had university-level education (nationwide about 23 %). (Statistics Finland.)

⁷The unemployment rate in Jyväskylä peaked at 25.4 % in 1994. The unemployment rate for the urban region as a whole at the same time was 24 %. Unemployment has fallen very slowly since the recession, despite the rapid

In the mid 1990s, the mood in Jyväskylä was still one of “a great future behind us.” On the other hand, in the recovery period after the recession, the Jyväskylä urban region has risen relatively quickly to join the most rapidly expanding urban regions. Since the end of the 1990s, it has been considered as one of the few Finnish growth centres alongside the urban regions of Oulu, Tampere, Turku and Helsinki (Huovari et al. 2001).

The development of the Jyväskylä urban region has gained considerable positive publicity in recent years. The region received national recognition for the development of its image and for its business strategy and in various surveys, it has been at the top of the list for its pleasantness as a place of residence (Eloa ja elinvoimaa Jyväskylässä 2001). Change in development has been particularly rapid, which has aroused general interest in the reasons for the change.

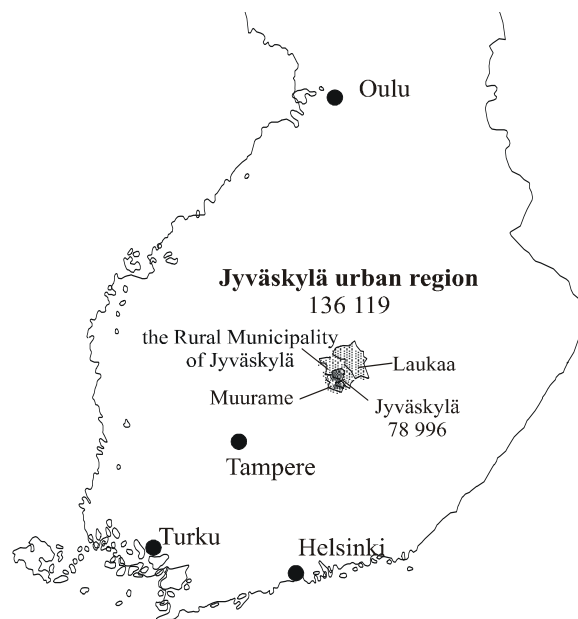


Figure 3. Jyväskylä urban region (population on 31 December 2000)

economic development; in March 2001, the unemployment rate was 16 %. (Statistics of the Ministry of Labour).

Description of the ICT cluster in the Jyväskylä urban region

ICT⁸ has become a cornerstone of the local economy in the Jyväskylä urban region in the 1990s. ICT businesses in the whole of Central Finland currently employ over 5,000 professionals (including ICT professionals in education and research in the field). The number of employees in the ICT industry of Central Finland is expected to more than double in the next ten years, reaching 10,000 by 2010 or perhaps by 2006 (Nukari & Neittaanmäki 2001, 1).

ICT is not a clear-cut concept. This study principally uses the term ICT because it describes development in the Jyväskylä urban region better than the term IT. In practice, the terms ICT and IT are commonly used also to refer to the application of ICT. In Jyväskylä, the rise in the influence of ICT has also been perceptible in other fields: the traditionally strong industries in Jyväskylä (metal industry, paper manufacturing and paper machinery) have been quick to apply ICT. In connection with an examination of the development process of the Jyväskylä urban region, it might make better sense to speak of the information industry⁹ or of the development of operational preconditions for expertise-intensive entrepreneurship. However, the term ICT will be used, since the aim of the study is not to analyse the cluster itself but rather the development process in which the core phenomenon is referred to by the terms ICT and IT¹⁰.

“If you look at this as if you were an engineer, I wouldn’t be too keen on saying that the whole thing is about ICT or IT. You could just about say that everything and anything is ICT, even a grocery shop, if you think that all application is ICT... but what matters here is that new knowledge and new technology are being used.”

⁸ The problem encountered when surveying the development of the field is that “official” classifications are not directly appropriate. The OECD considers that ICT subsumes many internationally classified ISIC sub-fields under the heading of electronic products and optical equipment and also the sales and hiring of technology. In addition to these fields, the definition includes telecommunications and data processing. In practice, not even the OECD can adhere systematically to its definition (Tietoyhteiskunta-asiain neuvottelukunnan... 2001, 11).

⁹ The information industry includes the electric and electronics industry, telecommunications, information technology, software production and contents production (Visioista osaamistarpeisiin... 2000, 3).

¹⁰ The term IT is used in the article when referring to strategy and to other documents in which it appears and also when an interviewee uses it.

From the perspective of the development of the Jyväskylä urban region, what is emphasised is ICT in a broad sense and as a development factor that has an influence on several industrial branches. The ICT cluster can be considered as a leader in the development of this region in recent years. ICT has been concentrated in the Jyväskylä urban region, but the electronics industry in particular is also represented elsewhere in Central Finland.

The Jyväskylä urban region has become one of the four information technology growth centres in Finland. In training volume in the field, Jyväskylä comes fourth after Helsinki, Tampere and Oulu (Jyväskylän seudun osaamiskeskusohjelma 1999 – 2006, 22).

“Now we’ve got about five thousand jobs in that cluster, and the target is that at the end of this term, we should have 8,000. That may not say a great deal in absolute terms. Of course if you compare this to Oulu and Tampere and the metropolitan area, we’re not in among the biggest just yet. Another yardstick is in the area of Central Finland: at the moment our most important industry is paper or wood in which there are 8,000 jobs. Now ICT is catching up in the number of jobs, so that in 2006 or 2010, depending on how it goes, this will be the biggest or one of the two biggest industries. Out of the entire Finnish ICT cluster, we will not be the biggest branch. We might be around the fifth place or somewhere.”

ICT companies in Central Finland focus on software, data communications, digital media, utilisation of network technologies and industrial automation. The firms in the cluster can be divided into service providers, equipment producers and adapters. The foundation of the ICT cluster in Central Finland is partly created by the computer centres of state administration. The most important units of the public sector services in the cluster are the Computer Centre of Social Insurance Institution of Finland, the ADP Agency of the Finnish Defence Forces, and the Computer Centre of Finnish Tax Administration.

Among the biggest companies in the region are two units of Nokia, the Yomi Group, Sonera, Sanmina, Enermet and TietoEnator. The best-known company internationally in Jyväskylä is Nokia, which began operations in Jyväskylä in 1998 and now employs nearly 500 people. Nokia’s units in Jyväskylä include Nokia Mobile Phones and Nokia Networks. Most technology companies, like Nokia, are located by Lake Jyväsjärvi, in the centre of Jyväskylä.

The rapid increase in the number of jobs in the ICT cluster largely results from increased educational opportunities provided by both the University of Jyväskylä and the Jyväskylä Polytechnic. The number of

students admitted to educational institutions is now three to four times greater than in the mid-1990s (Nukari & Neittaanmäki 2001, 1).

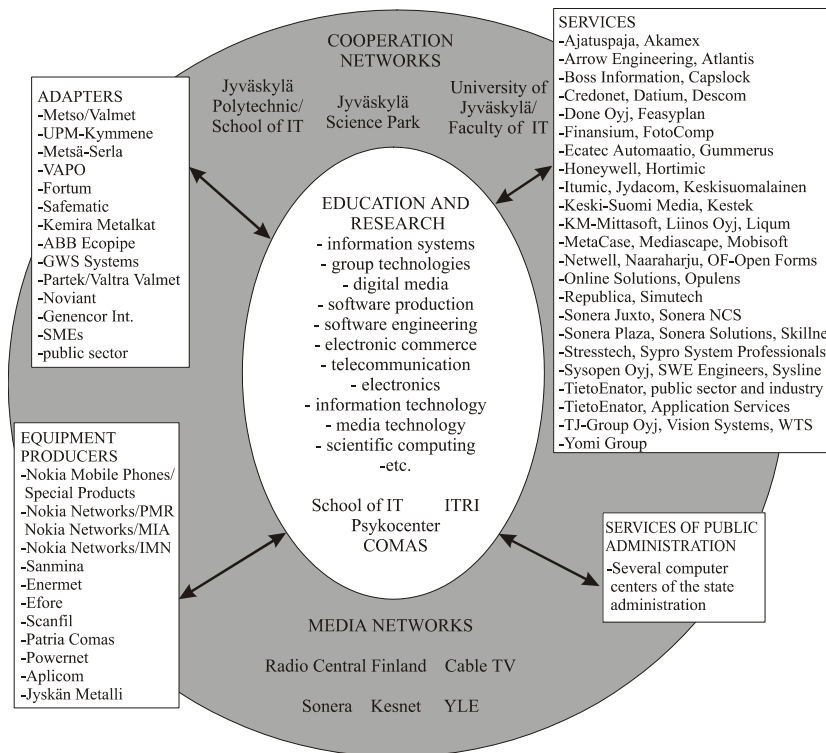


Figure 4. ICT cluster in Central Finland (Nukari & Neittaanmäki 2001)

University of Jyväskylä – One clear strength of the Jyväskylä urban region is its multi-faculty university with over 13,000 students. The Faculty of Information Technology was established in 1998 with about 1,400 students, and there are plans to increase this number to about 2000 students by the year 2006. Other faculties are Humanities, Education, Sport and Health Sciences, Mathematics and Science, Business and Economics and Social Sciences. The University of Jyväskylä also has the *Computing and Mathematical Sciences Graduate School (COMAS)* with nearly 100 post-graduate students. *The Information Technology Research Institute (ITRI)* with about 50 researchers focuses on business-driven research and development services in the field of IT.

Education in ICT has developed rapidly in Jyväskylä. The investments are not yet nationally acknowledged compared to those of

the universities of technology, for example. The University of Jyväskylä has traditionally been oriented towards the humanities and wants to develop expertise in ICT in this context by building a profile for the development of human-centred information technology through interdisciplinary projects, by combining information technology with expertise in psychology, social sciences, sport and health sciences, education and the humanities (Agora, Human-Centered...2001, 4).

Agora, The Human-Centered Information Technology Research Center of the University was started in 2000. The Agora Building, in which the Research Center is located, is the first privately financed public building project in Finland. In addition to the Faculty of Information Technology, there are also expertise-intensive enterprises in Agora. Moreover, the centre serves research laboratories, multi-disciplinary research projects including the Psykocenter¹¹, which belongs to the Finnish Centre of Excellence Programme of the Academy of Finland¹², and other research units concerned with human development. In its first phase, Agora provides jobs for 500 people, of whom 300 are employed by the University and 200 by companies.

Agora strives to seek new modes of operation so that its reputation as a research and development centre operating under a new concept will distinguish it from other universities offering education in the field of ICT and will attract gifted students. There is also a research programme being developed especially for Agora (Agora, Human-Centered... 2001, 4; 7).

Jyväskylä Polytechnic, School of Information Technology – The Polytechnic with approximately 6,300 students is one of the most

¹¹ Psykocenter is a multidisciplinary consortium of about 20 research groups, which share an interest in the research of human growth, learning and development through the life span, and in the development of human-centred IT.

¹² The Academy of Finland is an expert organisation on research funding. The Academy's aim is to promote scientific research through long-term, quality-based research funding, science and science-policy expertise and through efforts to strengthen the position of science and scientific research. According to the Academy of Finland, a centre of excellence is a research unit or researcher training unit that comprises one or several high-standard research teams with shared, clearly defined research goals, and that has attained, or has good potential for reaching, the international forefront in its field. The Academy funds the centres of excellence in research together with universities, the National Technology Agency *Tekes*, ministries, business enterprises and foundations. Twenty-six new centres of excellence started at the beginning of 2000 and they are receiving funding for a six-year term (Centres of Excellence in Research 2001).

multidisciplinary polytechnics in Finland. In 1999, it established its School of Information Technology, where core areas of expertise are automation, electronics, programming, software engineering and data network technology. The School of Information Technology is the first unit providing training for engineers to receive the ISO9001 Quality Certificate. The total number of students in ICT-related fields exceeds 1,000 in Jyväskylä Polytechnic.

Jyväskylä Science Park Ltd. – The business idea of Jyväskylä Science Park Ltd is to develop and support companies that deal with new knowledge and technologies. The Science Park in particular aims to promote the commercial exploitation of research results and the development of small and medium-sized enterprises. Incubation activities in the Science Park have a ten-year history, during which some 120 companies have been incubated. Three-fourths of the companies work in the ICT industry.

The Science Park co-ordinates development programmes that have as their objective to produce information as a basis for new business operations and to support the development of research environments. These development programmes are also a means of encouraging the initiation of a project combining several areas of expertise. The Centre of Expertise Programme¹³ is an example of these development programmes. The focus in the programme is on management of paper manufacturing, energy and environmental technology and information technology. In connection with ICT, the science park also co-ordinates a development programme in the field of electronics.

The Jyväskylä Science Park administers the regional capital fund *Midinvest Ltd.*, which makes its own capital minority investments. Its premises and related services are the responsibility of the affiliate *JSP*

¹³ The Centre of Expertise Programme was launched in 1994 as part of a new programme-based regional development policy. The Decree on Regional Development (1315/93) stipulates that the “aim of such centres is to improve the preconditions for the establishment and development of entrepreneurship which requires high expertise and is internationally competitive. The programme supports regional specialisation and division of labour among centres”. The programme was implemented in Finland in eleven centres in the period 1994–1998. On the basis of positive experiences of the first period, the Council of State expanded the programme by nominating new areas of expertise and new centres to implement a second national programme. For the period 1999 – 2006, a total of fourteen centres of expertise and two net expertise centres have been named. The centres of expertise are funded by ministries, regional councils, city administrations and municipalities and also by the private sector. When Finland joined the EU, the centres of expertise were able to apply for EU funding.

Facilities Ltd., which supplies them for enterprises. In 2000, the Science Park housed about 110 enterprises.

Jyväskylä Regional Development Company – Known as Jykes Ltd., this company is owned by four municipalities and is responsible for the business policy of the municipalities in the Jyväskylä urban region. Jykes Ltd. is also an important developer¹⁴ of the ICT cluster. The municipalities' financing for Jyväskylä Science Park (among others) is channelled through Jykes. All in all, the owner municipalities financed development activities through Jykes to a total of FIM 38 million in 2000 (Jykesin vuosi 2000).

Development process

The development process of the ICT cluster in the Jyväskylä urban region can be divided into three stages:

1. Seeds of the development, no conscious strategic planning; from the 1960s to the mid-1980s
2. Strengthening of the foundation of technological know-how; from the mid-1980s to the mid-1990s
3. Systematic development of the ICT cluster, emphasis on programmes; from the mid-1990s and onwards.

First stage: Seeds of the development, no conscious strategic planning

Although the actual growth of the ICT cluster in the Jyväskylä urban region occurred in the 1990s, the origins of this development can be traced back much farther. The first development phase, in which the foundation of the cluster was taking shape, took place in the period 1960–1985. In the 1960s, the development of Jyväskylä was characterised by the consolidation of the city's position as an administrative and educational centre. The Province of Central Finland was established in 1960, thereby increasing the number of administrative jobs in Jyväskylä. The founding and expansion of the University of Jyväskylä reinforced this development.

The roots of the University of Jyväskylä go back to the 1800s, with the first teacher training college in Finland established in Jyväskylä in 1863 and transformed into the Jyväskylä Institute of Pedagogics in 1934.

¹⁴ The focus in this chapter is on the firms and on the developers referred to as specialised developers of the ICT cluster. Developers referred to as general developers whose duty it is to develop the whole region but who have an important role in the cluster, such as the City of Jyväskylä, other municipalities of the urban region and the regional council, have not been presented here.

In 1958, the institute established a Faculty of Philosophy and professorial posts in the humanities, and in 1965, a Department for Mathematics and Natural Sciences. With funding from the Jyväskylä Commercial Association, teaching in economic sciences began in 1966, by which time the institute had become the University of Jyväskylä (Kangas 1992). At the end of the 1960s, the Jyväskylä Commercial Association endowed the University of Jyväskylä with a professorial post in computer science. The key figure in this donation was the industrialist Eero Fredrikson, a manufacturer of hats. Computer science has been offered as a subject for study since 1968.

“They caught on to computer science; that was in the 60s when the Association donated the professorship... but it’s hard to say whether it was good luck or good management that the Commercial Association had the sense to take hold of it... Since then, of course, capacity in the field got bigger.”

In the 1960s and 1970s, the management of the city’s economic development policy was very much in the hands of officials. The then left-wing-dominated City Councils and the leading officials on the one hand, and the predominantly right wing business people, on the other did not easily find a common line. In the 1970s, the negative atmosphere that entrepreneurs experienced caused firms to move away to neighbouring municipalities (Ojala 1997, 108 – 110).

In the 1960s and 1970s, business life in the City of Jyväskylä was essentially dominated by large-scale industry. In addition, there were many small family businesses but an almost total lack of SMEs. The increase in unemployment in the 1970s had the effect of activating economic policy, although at that time the role of traditional large-scale industry was still emphasised. At the end of the 1970s, a price had to be paid for the major role that large industrial enterprises had played when Jyväskylä drifted into a very deep structural change¹⁵ (Ojala 1997).

At the turn of the 1970s and 1980s, the most significant element in local economic development policy was the reaction to measures of regional policy by central government. Central government endeavoured

¹⁵ The international energy crisis of the mid-1970s caused a worldwide economic recession that was also reflected in Finland. Compared with the rest of Finland, there were many large state-owned industries in Jyväskylä. The state-owned industries reorganised their activities a few years later than other firms. Hence, although the structural change began in Jyväskylä at the end of the 1970s, the largest cuts occurred at the beginning of the 1980s. During the period 1980–1984, the number of industrial jobs dropped from 10,000 to 8,000 (Jokinen 1997, 128 – 129).

to decentralise its functions and these endeavours employed economic development officials of the City of Jyväskylä. Eventually some computer units of the state administration were decentralised to Jyväskylä (Ojala 1997, 110). These relocations of high-technology units served to increase the number of actors involved in ICT, thereby laying a foundation for subsequent development. The state units for their part created an ICT-related culture in the area.

During the first stage of the development of the ICT cluster, it can be said that:

- There was no conscious strategic plan for the development of the cluster (or what later became known as a cluster), nor could anyone yet foresee the opportunities presented by ICT.
- The development measures were isolated, lacking co-ordination and they were reactions to (institutional) policy changes occurring at the level of central government.
- The institutional (educational) framework of the development of the ICT cluster began to take shape with the foundation and growth of the University, the establishment of a professorial post in computer science and the beginning of education in the field.
- The stage was characterised by different interpretations among those in business life and the city's elected and professional officials as to how the development of economic policy was to be handled.
- There were no clear managers of the development process as a whole.

Second stage: Strengthening the foundation of technological know-how and expanding co-operation

The second stage of the development process began in the mid-1980s and was characterised by efforts to raise the technological level and increase co-operation in development issues.

An institutional change in the economic development policy of the City of Jyväskylä came about in 1983: its implementation was incorporated and Jyväskylän Teollisuuskiinteistöt Oy (Jyväskylä Industrial Real Estates Ltd.) was founded. This company was established in order to facilitate more flexible co-operation between entrepreneurs and the city authorities. In the 1980s, the views of entrepreneurs and political decision-makers did indeed approach each other in the economic development policy of the City of Jyväskylä. In 1987, the name of

Teollisuuskiinteistöt Oy was changed into Jyvässeudun Kehitysyhtiö Oy (Jyväskylä Urban Region Development Company Ltd.), and in addition to the City of Jyväskylä, the Rural Municipality of Jyväskylä also became a shareholder. The Technology Centre Tietotaajama Oy was also founded in 1987, its name later being changed to Jyväskylä Science Park Ltd. (Ojala 1997, 112 – 113).

Until 1987, Tietotaajama Ltd. functioned as a Tietotaajama Project. The initiative for establishing the science park activity was taken by Professor Eero Peltola, an expert in computer science at the University of Jyväskylä. The time was right for the proposal, as Jyväskylä was undergoing a structural change in basic industry and the need to diversify its economic structure was obvious. On the basis of the proposal, Mayor¹⁶ Lovén convened representatives of the University, business life and the city authorities in an unofficial group to generate ideas for the start-up and content of the Tietotaajama Project. The idea behind this project was to create linkages between enterprises and research activity. The key focal area of the project was information technology; therefore, Jussi Nukari, who had studied computer science at the University of Jyväskylä, was appointed to lead the project.

“There was a professor of computer science at the University, Eero Peltola. In '84 he wrote to Jaakko Lovén, who at the time was Mayor of Jyväskylä, saying that elsewhere in the world a lot of science parks had been set up, and that they seemed to be places of future growth. In a letter a couple of pages long Peltola proposed that it would be worthwhile for Jyväskylä to investigate the prospects of founding a place like that. In the 1980s there had been a slump in industry in Jyväskylä ... and in that sense they had a positive attitude toward everything connected to the future and job creation.”

On 1 April 1985, Tietotaajama operations began under Jyväskylän Teollisuuskiinteistöt Oy, as one of the earliest technology centre initiatives in Finland. In the mid-1980s, there were very few subjects offered at the University of Jyväskylä to support technological development or enterprises in the field. This scarcity of activities affected the Tietotaajama Project; in the late 1980s, the project was still seeking its identity and funding was being sought from various sources. In the early stages of the project, city officials and political decision-makers occupied a pivotal role. To obtain funding, considerable networking was undertaken and many negotiations were held to investigate thoroughly the wisdom of investing in the project.

¹⁶ Mayor is not an elected office in Finland; he/she is a municipal official.

In the 1980s, co-operation of the unofficial small group around local technology policy intensified. In those days, the Technology Centre was searching for a focus and credibility for its activities. For that reason, the centre started a sauna club that used to meet to brainstorm about solution models for the lack of higher technical education in the region. In these discussions, it was deemed impossible to have a university of technology or a technical faculty for the University. To compensate for these deficiencies, an applied natural science programme was delineated. The lack of technical education was not only an issue for this small unofficial group, but was a subject of regular debate in official forums and in various development seminars.

“For the development of education, we came to the decision that there was no possibility of founding a technical faculty as there was formidable opposition to this among all those who already had one. That was the reality, as it were. So we decided on setting up a programme for applied natural sciences.... It was a sort of substitute.”

“Then at the end of the ‘80s, we were mapping out new paths to get to this point quite nicely in the mid-‘90s. They did those fashionable SWOT analyses at all the development seminars as they also did elsewhere in Finland, and there was always the same result in that one square. Things were otherwise OK, but we lacked a technical faculty at the university level, and we started thinking that something should be done about it.”

The plans for a degree programme in applied natural sciences progressed through official channels as follows. First, in 1985, in a report on the development of co-operation between the University and its operational environment, the work group appointed by the Rector of the University of Jyväskylä proposed that education in technical and applied natural sciences should commence. The report was based on a needs analysis of business life. Sitra¹⁷ granted funding for the year 1988 for the planning of educational options. The Ministry of Education also held a positive attitude toward the proposal by the University of Jyväskylä for the commencement of education in applied natural sciences and the first tenured post was established in 1988 (Asplund et al. 1988, 8). Pekka Neittaanmäki, Professor of Information Technology, was one of the principal actors in the ideation and promotion of the degree programme.

Education in applied natural sciences began in 1989 in applied computer science, applied physics and applied chemistry. Moreover, the programme entailed the beginning of co-operation with the Helsinki University of Technology in the training of Masters of Science in paper

¹⁷ The Finnish National Fund for Research and Development.

manufacturing technology and environmental and energy technology. The overall costs of the programme up to the year 1994 amounted to more than FIM 25 million, including 21 tenured posts and other jobs. The costs were met by an internal transfer of University funds, endowments (including gifts from local municipalities and businesses) and allocations from the state budget (Asplund et al. 1988, 8; Tanskanen 1989).

A team spirit evolved among those engaged in ideation and fundraising for the development programme in applied natural sciences, and later the members of the sauna club in particular came to exert influence in other aspects of the Jyväskylä urban region development strategies. Furthermore, the programme provoked a discussion process in the University on the need to develop applied research.

“It was one of those practical assignments on how to modify a humanistic university to meet the needs of the present day or how to expand it. A good and large university, but still with certain shortcomings – the connection to business life was non-existent.... It was a very significant practice stage and then the areas of strength began to emerge.”

Towards the end of the 1980s, awareness of the importance of technological expertise for the competitiveness of enterprises was already on the increase in the province of Central Finland. Development plans with an emphasis on the development of R&D activities for the province were drawn up under the leadership of the provincial governor Kalevi Kivistö. There was also an industrial committee in the province with a technology division under it, which included a considerable number of representatives from various companies.

In 1989, the technology policy programme of the province of Central Finland came out with the aim of making research and development in Central Finland more intensive. The programme was drawn up at the request of the Ministry of the Interior¹⁸. It stressed raising the level of technological expertise and intensifying co-operation between research institutes and institutions of education (Keski-Suomen läänin teknologiapoliittinen... 1989).

“It may well have also been the provincial government of Central Finland which rose to prominence, and at that stage pushed development issues along.... Here in the provincial government, Kalevi Kivistö was governor, and he had, how shall I put it, a very positive understanding of these things. Then they founded the technology division in the provincial government with the captains of industry taking part in it.”

¹⁸ The Ministry of the Interior in its communication of January 8, 1998, exhorted the provincial governments to prepare regional technology policy programmes.

Thus, co-operation on development issues increased on the whole at the end of the 1980s. Co-operation among the municipalities of the urban region was problematic, however. At the turn of the 1980s and 1990s, co-operation was inhibited by the issue of the consolidation of municipalities that concerned the City of Jyväskylä and the Rural Municipality of Jyväskylä. Several attempts were made to accomplish this consolidation (see Puustinen 1998). One decisive factor in improving the atmosphere for co-operation was the fact that the mayors of the City of Jyväskylä and the Rural Municipality of Jyväskylä changed in the mid-1990s.

The new mayors stressed that co-operation was to be built up between independent municipalities with no attempt at consolidation. Another significant reason for improvement in co-operation was the economic recession at the beginning of the 1990s. A state of crisis made it necessary to set up co-operation on a new footing so that all municipalities in the region could feel like equal partners in co-operation. Therefore, it was decided to build up co-operation on local economic development policy. Since 1996, municipal funding has been channelled into the strategy work in economic development policy and development projects through Jykes Oy (Jyväskylä Regional Development Company Ltd.), which was much better financed than the economic development policy companies preceding it (Ojala 1997, 113). Co-operation between municipalities has facilitated the development processes of the urban region more extensively, since time and energy have not been wasted on bickering between municipalities.

The second stage of the development of the ICT cluster was characterised by:

- Strengthening the foundation of technological know-how by increasing education based on applied expertise and by introducing a technology policy programme.
- Gaining a more strategic grip on the development work than was possible in the first stage of the process.
- Strengthening the institutional framework of the ICT cluster development (the foundations of the economic development policy company and the technology centre, the widening of education).
- Intensifying co-operation between the City of Jyväskylä, the University of Jyväskylä and business life and a more widespread consensus regarding the focal areas for urban development work than during the first stage.

- Emphasising the central role of the university in ideation of the development entities.
- Seizing new opportunities and picking up on weak signals (the idea of the science park, consciousness of the significance of technological know-how for the competitiveness of companies).

Third stage: Systematic development of the ICT cluster and emphasis on programmes

The third stage can be described as the systematic development of the ICT cluster and the emphasis on a programme-based approach in the development work. This stage started in the mid-1990s.

Centre of expertise programme work

The preparation of the centre of expertise programme¹⁹ in 1993 and its implementation in 1994–1998 played a decisive role in creating ICT-led development. First, the preparatory process of the programme increased co-operation among actors and enhanced credibility for the model of doing things together. An action model for the organisation of co-operation evolved in the Jyväskylä urban region; it was not handed down as a ministerial requirement. The concept of a centre of expertise cultivated by the Ministry of the Interior, however, gave co-operation an official role and clear objectives. Second, the work done in the centre of expertise programme served as the first accommodation phase for programme-based regional development; there was a chance to ‘practise’ before Finland became a member of the EU. Third, work done in the programme aroused interest in strategic development of the field of ICT. Fourth, the programme work supported the strengthening of Jyväskylä Science Park, playing a crucial role in the preparation of the programme, and later serving as its co-ordinator.

“At the time there was quite a wide planning network. This centre of expertise programme was indeed taken seriously in Jyväskylä. We thought that although initially it would not bring in a great deal of cash, it would bring credibility to co-operation, this network co-operation.”

“The centre of expertise programme fostered the development of a way of handling things, including managing people in such planning. As a result, when the Science Park was running it, we had a steering group for the whole thing and also groups of experts for the various sub-fields with representatives of companies, service-users, the University and the media, and it produced a forum of interaction. It certainly helped. Somehow

¹⁹ See Chapter 3.2.

we've succeeded in forming a group for equal discussion and planning that we didn't have in the early '90s, including people with a different cultural basis, business people, academic and scientific people... who come to sit around the same table, put on their thinking caps and decide what should be done."

In 1994, ICT was not yet actually included in the Jyväskylä region's centre of expertise programme, since there was still very little enterprise or education in the field. The areas of expertise were paper manufacturing, energy and environmental technology. In addition to the above and as a fourth area, however, an attempt was made in the programme to increase research in the University's areas of strength that support the other three areas of expertise, especially the utilisation and development of IT. Finally, IT was included in the programme in 1996.

In the new programme period 1999–2006, the Jyväskylä region is a centre of expertise for management of paper manufacturing, information technology and energy and environmental technology. Application of the action model used in the first period is continuing in the current period. The co-operation among Finnish centres of expertise focused on ICT has been significant for programme work in Jyväskylä region. The internationalisation of software firms has been a special area of co-operation.

EU Objective 2 Programme work

When Finland joined the EU, the areas in Central Finland coming under Objective 2 included the Jyväskylä sub-region as well as the towns of Äänekoski and Suolahti in the Äänekoski sub-region. The main objective of the programme was to strengthen expertise. One of its most significant projects was the creation of a Master's programme in re-orientation training in IT at the University of Jyväskylä. The costs of the project for the period 1996–1999 amounted to approximately FIM 100 million. This re-orientation training programme has been continued in the new Objective 2 Programme period 2000–2006²⁰. Applicants for re-orientation training must have sufficient higher education appropriate to the training and also basic studies in IT disciplines. In 2001, 195 students were accepted, 70 of whom were financed by the Ministry of Education. The remaining 125 were financed by EU structural funds.

In the debate as to how the money should be used, training in ICT became the focal point because ICT was perceived to be a growing field

²⁰ In the Objective 2 Programme of Central Finland 2000–2006, the emphasis is on strengthening existing expertise; the programme seeks to implement regional specialisation by means of investment and education.

and educational investments in ICT would be reflected rapidly in the operations of enterprises. The University of Jyväskylä and in particular Professors Kalle Lyytinen and Pekka Neittaanmäki played a decisive role in the ideation of re-orientation training .

The first Objective 2 Programme was drawn up by a fairly small group of actors who wanted to reach the implementation stage fast. Re-orientation training was a novel and extensive project and, in order to ensure that its implementation was indeed feasible, the actors in the Jyväskylä region were compelled to seek a commitment from the state government. Consequently, the Minister of Education Olli-Pekka Heinonen and the Director General of the Ministry of Education Vilho Hirvi gave the project the go-ahead.

“That’s where the initiatives came from and when they were made, the programmes of that time were carried out by quite a small group. Now it seems like there are legions of people. So then they got the Minister of Education, Olli-Pekka Heinonen, enthusiastic about it and it went on its way. It was a good window of opportunity for the programme. And it somehow suited Heinonen. Then Ville Hirvi, who died recently, he was director general at the time, and we had really good channels to bulldoze it through... because there is always a need for some national funding. And then Pekka Kettunen, the Mayor of Jyväskylä, got the city officials in on it and a few other municipalities and some companies.”

The re-orientation training programme at the University of Jyväskylä started up some two years earlier than the National Information Industry Programme of the Ministry of Education. The objective of this programme was to expand the education and research being carried out in the polytechnics and universities that was needed by the information industry. Thus, in investments in education, Jyväskylä was ahead of other Finnish urban regions.

“Then they decided on the Master’s degree programme. They decided that they should have re-orientation training, specially geared toward people who’ve already studied something lower down. And now this Master’s level education model has spread to many fields. We should be seeing some results in a short time. The idea is not to go in for basic education with EU money... The starting point is the question of how we can get Finnish marks to flow in from abroad, and what we can realistically do. So that’s the analysis in the background.”

Strengthening institutions of education: Faculty of Information Technology; the School of Information Technology

On 1 September 1998, the Faculty of Information Technology was established at the University of Jyväskylä. This faculty brings together

teaching in ICT from economics and business administration and the Faculty of Mathematics and Natural Sciences. Under the new Decree and Act²¹ on Universities, it became possible for the university itself to make the decision to establish new faculties and the University of Jyväskylä was quick to take advantage of this change in the act. Opposition to the move within the University came from, among others, the student union, which opposed it because of fears that other disciplines would lose funding and that the faculty would be too small an entity. However, it also enjoyed support. Enquiries led to a relatively widespread recognition of the view that other fields would lose nothing through investment in ICT and that ICT might afford openings for co-operation with other fields. The City of Jyväskylä and Jyväskylä Science Park were active in promoting the establishment of the faculty.

The Faculty of Information Technology tries to pursue a new phenomenon-based, flexible action model in order to be able to anticipate rapid changes in the field. Moreover, the existence of a faculty in the field emphasises versatility and breadth of teaching and contributes to an enhanced image.

Education has been further strengthened by the establishment of the School of Information Technology at the Jyväskylä Polytechnic in 1999, which was also planned in co-operation with various actors.

Transfer of Nokia to Jyväskylä 1998

The transfer of Nokia in 1998 to Jyväskylä, in the vicinity of the University and Jyväskylä Science Park, had a significant effect on the Jyväskylä urban region, as did the Faculty of Information Technology. In Finland, the presence of a “Nokia location” is considered to be a sign of a dynamic and growing centre. The transfer of the Nokia research and development unit from Äänekoski to Jyväskylä was interpreted by the public as a clear indication that the Jyväskylä urban region could offer a competitive environment of expertise-intensive entrepreneurship.

“It was seen as a clear signal when Nokia came to Jyväskylä. This seems to have been the turning point, after which we started seeing papers being written about how well things are going there.”

Many factors have been evinced as reasons for the locating of Nokia to Jyväskylä right from personal networks. However, the most significant reasons may be considered to be that the Jyväskylä urban region could offer a competitive operational environment: ICT experts are trained in the region and the region offers employees a pleasant living

²¹ This legislation (645/1997) on the universities came into force 1 August 1998.

environment. The issue of premises was resolved in a manner that was satisfactory to Nokia and an increasing number of Nokia's co-operation partners reside in the urban region.

“Stories about personal connections, about people being on the same course, or who knew somebody, they're like legends... But it was education and there are operational prerequisites and here in the city, there is the infrastructure. Nokia started to have subcontractor companies in the region... They operate very pragmatically and where it's worthwhile to operate. This personal lobbying was actually of very little significance. If it hadn't been for those big investments in education and the systematic approach, we wouldn't have attracted them here. Other places have tried it as well.”

Strategy work of the City of Jyväskylä

The development of ICT was also affected by a change in direction in the City of Jyväskylä's own strategic work. The reforms in strategy begun by the City of Jyväskylä in 1995 could be encapsulated in the phrase “Jyväskylä the Capable, a city of the new wave”. Its strategic objectives are connected to the development of vitality and improving the unity of the urban region. Investment in the development of business life has been accompanied by the development of services, education, culture and the quality of the living environment in general.

“Back in '95 we had the image of a dying place, with everybody going out of here on a one-way ticket and nothing coming in. The intellectual atmosphere was pretty grim at the time. In our own work in the city, we thought that now something must be done. We wanted to think of an inspiring motto, and after a time, we came up with “New Wave Jyväskylä”, meaning a new way of doing things, doors open outwards... calling to mind the image of an innovative city of the future.”

The strategic thinking of the city has sought to break free from conventional, rigid planning and to implement strategies in a flexible manner. There has been a conscious quest for creativity and innovation through the interfaces of different areas of expertise and by making co-operation among different people possible. On the one hand, the city's strategy work is based on the close co-operation of a core group of senior officials in land use, economy and strategic planning that the mayor has gathered around him. The elected officials have participated in strategy work much less than the core group.

On the other hand, extensive co-operation in the strategy work of the City of Jyväskylä has been sought via the Jyväskylä Forum started in 1995. People from different fields have been invited to this Forum, which addresses issues with long-term effects on the Jyväskylä urban region,

issues that would otherwise be trampled underfoot by everyday development routines.

“Since ’96 there have been about 4 to 6 sessions. And there the discussion goes above the ordinary day-to-day issues to a very conceptual and visionary level, and you can hone in on very tricky themes. Nobody represents any particular interest group, just themselves as individuals. The idea is to question matters and unravel tangled questions. They’ve got very broad participation. There’s been a former provincial governor running it, at one point it was the Rector of the University and then workers from the street mission or representatives of the association of the unemployed, the Lutheran church and from one extreme to the other.”

In February 1999, the city programme originating in the ideas of the Jyväskylä Forum and entitled “From Felt to Particle Accelerator – the shore of Lake Jyväsjärvi from the back yard to a façade” was completed. Jyväsjärvi is a lake in the centre of the city that from the 1970s was used for dumping waste from the plywood factory and from households located on its shore. Since then, the lake has been improved to the extent that its water had become fit for swimming by the late 1990s. The plywood factory stopped production and on the site of the former dump there is a park, a bathing beach and University buildings. Under the city programme, construction investments have been realised on the shores of the lake and physical settings have been created for the projects mentioned in the centre of expertise and Objective 2 Programmes. The shoreline zone includes the University of Jyväskylä, Jyväskylä Science Park, the premises of ICT companies, exhibitions and congresses, etc. In addition, high-quality housing has also been constructed near the shore.

“The next step was really taken in ’99 when they made this city programme to turn the lake shore into a façade. In the beginning they were saying that we could provide jobs for 6,000 experts on the shore of the lake in the centre of town. But the development has accelerated more than was believed in the plan and now they’re talking about 10,000 jobs. It’s gone a lot faster than we ourselves expected, thanks to both skill and beginner’s luck. And it’s specifically IT-oriented to a great extent.”

“The city programme went very well indeed. In a way it was the formulating of those viable economic policy strategies into city planning. In a way it was a sub-programme to the centre of expertise programme and the rest.”

The completing of the Agora Building

The development of the ICT cluster has aimed at activities that transcend borders. The clearest evidence of this is Agora, the Human-Centered Technology Research Centre, which was completed on the shore of Lake

Jyväsjärvi in August 2000. The Agora concept was also conceived as a co-operation between several actors.²²

“And then in our home base here on the lake shore came the Agora, the human technology research centre. The psychological expertise that is strong in Jyväskylä, with a centre of excellence of the Academy in psychology, as well as IT technology were put into the same building along with companies, too: probably 500 people in all work in the building.”

The third stage of the development of the ICT cluster in the Jyväskylä urban region can be characterised by:

- Systematic development of the ICT cluster; ICT has become a spearhead of the development of urban competitiveness.
- Emphasis on a programmatic approach in the development work.
- Fast and unconventional utilisation of new funding sources, seizing new opportunities.
- Increased strategic thinking and planning of the development work in general, compared to the earlier stages.
- Increasing investments in development work (investments far exceeding what they had earlier been).
- Close co-operation among actors, especially among the university, the city and the science park; new modes of co-operation.
- Strengthening of the education related to ICT (the programme of re-orientation training) and strengthening institutions of education (Faculty of Information Technology, School of Information Technology).

²² For more on Agora, see Chapter 3.2.

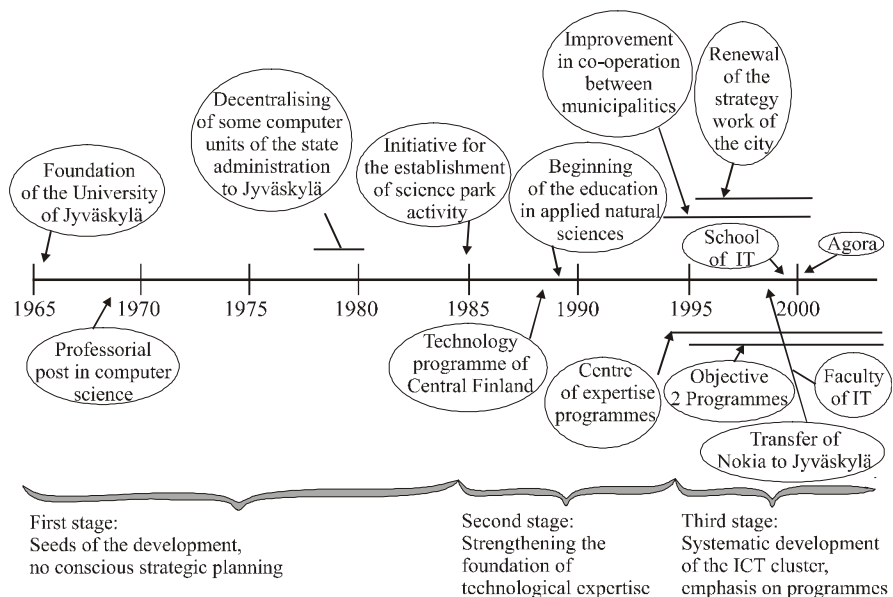


Figure 5. Development process of the ICT cluster in the Jyväskylä urban region and its central turning points.

Principal phenomena

Crisis generates creative tension

According to Sotarauta, creative tension can be found in the core of development. It can make people genuinely inspired to do development work and thereby create a competitive advantage for the region. Sotarauta defines the state of creative tension as an essential state for the development of regional competitiveness. It can be characterised by excitement and uncertainty about the consequences of future events and measures. The dominating thought and/or action patterns are questioned simultaneously by forces that are in mutual opposition or sufficiently different from one another. Creative tension may result in unprecedented, original products or in processes, thoughts and action models, etc. Creative tension may come into being spontaneously or as a result of leadership²³ (Sotarauta 2001).

²³ Creative tension refers neither to a state of harmony nor to a state of conflict; it is a state somewhere between these dimensions. Creative tension may result in something new; if the tension is disruptive, there can be the seeds of conflicts.

In the development of the ICT cluster in the Jyväskylä region, phases can be distinguished in which the urban region went into a state of crisis. This state of crisis can be considered as a significant catalyst in the mobilisation of the development process and as a generator of creative tension. The situation that resulted in the finding of resources for establishing the degree programme in applied natural sciences can be considered to have been a slight, gradual crisis. The actors of the urban region started to become aware of an ongoing structural change in economic life. General recognition of the increased importance of knowledge and expertise increased. As a result, people began to consider how the lack of higher education in technology, known to be a major bottleneck in the development of the urban region, could be alleviated.

An even more obvious realisation resulting from the crisis can be located towards the end of the severe economic recession that ravaged all of Finland in the early 1990s. The effects of the recession gave rise to the feeling that something had to be done in a different way from before if the negative developmental direction of the region was to be reversed. The gravity of the situation and the need for speedy measures were widely acknowledged. At the same time, it was noted that change could be accomplished through close co-operation among the various groups of actors and in various themes; resources were known to be limited and it was seen as pointless to waste these on rivalry and overlap.

Moreover, the recession created a need to intensify municipal co-operation. Another reason for such intensification was the crisis developing in relations relating to co-operation in the context of the debate on consolidating the two municipalities. Going into crisis made it necessary to rebuild co-operation completely, thereby making all municipalities in the region feel that they were being treated equally in co-operation.

“One background factor was surely the fact that the recession dealt us such a blow. It was like a state of terror, what’s going to happen to us... The drop in activity around Jyväskylä was notable. The centre of expertise programme really came at the right moment. It made it possible to rally the troops. Added to that was the fact that the municipalities in the Jyväskylä urban region got their co-operation up and running and got Jykes back on its feet. This meant that the development funding of the municipalities was in one lump. When EU funding came along, we could combine the funds and mobilise them on a greater scale. There was no need to have a whip-round for it.”

“Here the recession taught a lesson the hard way. It showed us once and for all that you can’t get by alone. We’re not sufficiently clever, big or rich for that and we don’t have the resources to manage alone. But the

recession was so hard on us that we just had to do something to survive. And why not think about it and do it together?"

The crisis alone was not enough to precipitate development. It was necessary to bring the development need to the fore and to manage change. The management of change of the 1980s was connected to the activities of the group that arrived at the development programme in applied natural sciences. In the process of bringing the development need for co-operation among municipalities to the fore, a decisive role was played by the new leaders of the city and the rural region, Pekka Kettunen and Tarmo Pipatti. Several actors played a part in refining the approach to development towards the end of the recession, namely people from city organisations, the University, the Regional Council and the Science Park, for example.

Investing in expertise as a central and consistent strategy

One explanatory factor for the development of the Jyväskylä urban region in the latter half of the 1990s is the series of successful strategic choices that were made. Investing in the development of expertise was one of the main pillars of the development work. Investments in development focused on diversifying the humanities-oriented University and on developing and expanding the disciplines taught at Jyväskylä Polytechnic. An emphasis on the importance of knowledge and expertise as a production factor through expertise alone was felt to be attracting money and investors in the region. In developing expertise, emphasis was also placed on developing competitiveness by transcending one's own borders in the creation of something new.

"There was a view that it was more worthwhile to invest in knowledge and expertise than in bridges and roads. When money was used in development programmes, especially EU regional development funds and ESF money, it has been deliberately put into projects between people's ears rather than under their feet."

The level of expertise has been reinforced in extensive co-operation and the municipalities and business life in the region have invested a great deal in the development of the University of Jyväskylä in particular. Furthermore, interest emerged within the University and in the University management for increased co-operation with other actors in the region, in contrast to the more community-oriented attitude that had prevailed since the 1980s. In the early 1980s, the view still persisted that co-operation between the University and business life was detrimental to the objectivity of science. The willingness of the universities to engage in co-operation with the surrounding region was enhanced not only by

changes in attitudes but also by the fact that in order to finance the new teaching and research activity, the universities were compelled to rely on external funding.

“Through this the University got more money, and if the University wanted to pursue this development, it had to accept money from sources other than the Ministry of Education. If it had clung to the old ways, it would have shriveled up due to economic reality.”

“All in all, attitudes changed in the University. Whereas earlier they thought that it was practically a sin for a doctor or professor to have contacts in the world of business, now it’s virtually the other way around, they are supposed to have them.”

It has also been crucial that in investing in expertise, the right “choice” was made; that is, to invest in the burgeoning ICT sector. Availability of skilled labour has been essential for this development. Thus, channelling investments into education supporting ICT development had rapid growth effects. Visible results after a very short time had the effect of increasing enthusiasm for development work.

“Of course the economic climate was favourable. At the same time as we so boldly invested, the general preconditions improved nationwide. And ICT grew exponentially worldwide, so luckily we had put a lot into this. That was a decisive help.”

Investing in expertise proved to be a strategic choice that fostered progress. Development of expertise in the long term was also crucial. In several development strategies concerning the Jyväskylä urban region, the development of expertise was a main strategic objective. The chain connecting the various development programmes was obvious; earlier programmes and the work accomplished on them served as a basis for subsequent programme work. (See also Haveri & Majoinen 1995, 73.) Furthermore, the ability to make bold strategic choices has been characteristic in the Jyväskylä urban region, as has the ability to invest properly in selected spearheads. Strategic choices gave rise to debate in the urban region and more widely in Central Finland as to whether the selected emphases were right for the development of the region and whether investment should have been made in several areas. However, the choices made had powerful supporters and these choices have been rigidly adhered to.

“But among those decision-makers, each one represents some sector, so each one thinks that the sector should be involved. Then the strategy becomes pretty boring and conventional, and any municipality could do the same; that is, they don’t dare to make choices. And it was making

these choices that caused the criticism. That such and such a sector is out is important for us. When you put these additional investments in the strategy, EU money and the rest, it doesn't stop you from putting in business-sourced money or something else into something else, too. But these spearheads, some say there should have been more of them, but that would have been a strategic mistake."

Innovativeness, rapid reaction, border-crossing and change management

The development measures in the Jyväskylä urban region have been innovative and characterised by a reform in modes of operation. The degree programme in applied natural sciences can be considered an innovative development entity, as can the re-orientation training programme implemented on EU Objective 2 funding, the city programme centred on the Jyväskylä development as well as the concept for the construction and implementation of Agora, etc. Since the 1990s in particular, there have been such innovative people in the Jyväskylä urban region, with the courage to create new openings and the enthusiasm to make something out of them, leaders of change making creative tension a reality in the region.

"I believe these were the people who achieved the success. And there were some strong visionaries who were also strong personalities, able to keep the wheel turned in the right direction. In fact, you couldn't say it was all easy going. There were distinct conflicts at various stages of the development."

Those mentioned in the interviews as leaders of change and innovation were Pekka Kettunen, Mayor of Jyväskylä and Professor Pekka Neittaanmäki, then Vice-Rector of the University. The latter is considered to be interested in regional development and its promotion, an individual who brought ICT-led development to the fore and who was a creator of new action models and development entities.

Pekka Kettunen, who became Mayor of Jyväskylä in the mid-1990s, was then seen to have served as an originator of creative tension in the development of the urban region and as a leader of change. Today he is still involved in the work of a great many development organisations and therefore has an overall view of development work and a great deal of influence. Kettunen's blunt manner, raising economic policy development above the other sub-fields of the city organisation, testing and breaking the limits of conventional action models and rapid promotion of large projects have aroused both favourable and resentful reactions.

“Even when talking about openness and transcending borders in politics, such as in process management, this concentration is a good thing. As I said before, Pekka Kettunen as mayor became the symbol of the rise of Jyväskylä... a lot of matters went through him. He is chairman of the polytechnic board, chair of the Science Park, member of the Jykes work group and has very close co-operation with certain organisations and key people in the University. So great amounts of information go through him. He is also one of the few people capable of envisaging larger entities splendidly. He has a view over the entire playing field.”

In addition to placing emphasis on innovation and creativity, the City of Jyväskylä has begun to highlight a thread running through its strategy work, namely that it is crucial to competitive advantage that the community has the ability to sense changes in society, even the faintest ones, and to get things right, make decisions faster than others when some new entity means a competitive advantage. The clearest example of rapid action and questioning and breaking the dominating action models in the Jyväskylä urban region is probably the idea for the re-orientation training programme and its implementation on EU Objective 2 funds. No prior experience existed in Finland for comparable projects. In the Jyväskylä urban region, action was swift and the education had already been started up when others were just thinking about what use the money could be put to.

“It didn’t exactly provoke opposition, as nobody really knew what to do; nor was there any competing project.... There were those with doubts and many said you can’t do that, but they thought it was a sensible thing to do and would promote change in the industrial structure. And why would anybody object to it? Generally the doubts were about what they would say in Brussels, but they don’t say anything there. It was regional will if you do no wrong.”

“What happened was that the fast ones ate up the slow ones... At the Ministry of Education, they have not learned how to do this, so it had to be taken care of right up at the ministerial level.... In just three weeks, the ad was in the paper and the money only came at the end of the year, six months later. They only fixed the preliminary strategy in May and student recruitment started within three weeks. That was fast. Only in August did the official EU papers go to Brussels. We took a little... risk.”

Networking: core group and wide participation

It was the slump of the 1970s and the gradually emerging structural change that woke people up to the need for co-operation in Jyväskylä. However, co-operation increased clearly only at the planning stage of the

degree programme in applied natural sciences. Another significant impetus for intensified co-operation was the slump of the 1990s.

The main features of regional co-operation were the close and unofficial co-operation of key persons, on the one hand and the broad participation of actors in various strategy processes²⁴ on the other. The roots of co-operation in the core group, which included heads of organisations especially from the City of Jyväskylä, Jykes, Jyväskylä Science Park, the Regional Council, the University of Jyväskylä and also from the business sector, go back to the 1970s when many of today's main actors in Jyväskylä got to know each other at University. On the other hand, a suitable number of new actors came onto the scene at the right time, free from old concepts and able to see the weaknesses of the models in use.

“In the early ‘70s we were all studying at the University of Jyväskylä, coming from different parts of Finland.... In this core group, we’ve known each other for 30 years... in a small town there were enough of these fellows, and even if we weren’t exactly pals, we knew each other from various connections. And since you know them you’ve done a lot of brainstorming together, voicing wild ideas, and the others understood what angle somebody introduced the ideas from.”

“Then new blood came along with the enthusiasm and courage to set out.... They didn’t have old baggage, and they came a bit from the outside, looked at things with new eyes and saw the opportunities. Not in the old rut.”

The co-operation of the core group has been both official and unofficial. The co-operation forums were those sauna evenings, unofficial brainstorming sessions and the boardroom discussions of various development organisations. One explanatory factor for the functionality of co-operation is the suitable size of the urban region: in a relatively small place it was easy to start and develop co-operation. On the other hand, the urban region was big enough to have expertise accumulating around different development themes.

“The mayor can invite people around some theme and it is discussed. But indeed they meet fairly regularly just because we have these key organisations and their boards meet once a month. And generally everybody tries to participate in them.”

Although the co-operation of the core group has had a positive effect on the development of the Jyväskylä urban region, such a limited

²⁴ See also Haveri & Majoinen (1995, 76)

group had its dangers: the real power over development work was in the hands of a few and the co-operation of a small group easily becomes locked in the prevailing thought and action models.

“Of course you can say that at some point it can become a burden that we are such a small group involved in everything.... Although there are a couple of hundred involved in the various decision-making organs and work groups and others, really the group that makes the strategic choices and decisions is much smaller, maybe twenty people. And then the real core, maybe about ten. It’s been a pretty good thing that these people are aware of the situation of the various organisations, and then in a way it’s easy to reconcile them and to avoid overlap but still direct operations so that they strengthen each other.”

“In strategy work, you don’t need large numbers of people, just the core group of the official body to streamline the strategy. Then you need a road show to sell it to the decision-makers. And that’s really how we did the city strategy; there was the core group and then we sold it through certain participation. The real process took place in a very small group.”

The development of the Jyväskylä urban region has been characterised not only by its strategic core development group but also by the fact that the participation of a wide range of actors in it in was well organised. However, new ideas came into being and were taken farther through the core group. Characteristic of the co-operation in the extended group as well as in the core group is the fact that several kinds of actors were involved. Extensive co-operation has been considered to be important; it has served to increase strategic awareness, to unify interpretations and to secure the commitment of participants to development work.

The Jyväskylä actors also emphasise the importance of functioning co-operation as a factor that enables the urban region to stand out from otherwise similar urban regions.

“In my opinion it is a very important matter that cannot be overemphasised. I have indeed seen that such expertise is in many places. And I would go as far as to say that there is high-level expertise in all our universities (in Finland), and undoubtedly IT expertise. But the ability to manage co-operation, to network, promote the same cause and so on, that’s one of the important success factors of the Jyväskylä urban region.”

Utilising image in development

The key actors in the development of the Jyväskylä urban region have sought further impetus for the development work in publicity, which has resulted in a great deal of positive reporting on the development of the region. Media interest has been increased by the speed of the post-

recession development of the Jyväskylä urban region, the variety and clarity of the focal points for development and of the projects in relation to other urban regions as well as the role played by development actors in bringing positive news to the fore. Positive news has made the region increasingly attractive in the eyes of companies, residents and investors alike. Mayor Pekka Kettunen's regular column on development work in the main newspaper of Central Finland, *Keskisuomalainen*, has been significant, as has his active contribution to other journals. These columns have not only opened discussion but also directed its course.

The image of the Jyväskylä urban region has also been strengthened in that its key actors have brought out positive aspects of its development activities in various forums. In the late 1990s, development activity of the urban region had assumed the position of a "prime example". Moreover, the good personal networks of the main actors have made the development measures achieved in the Jyväskylä urban region better known.

"Of course these people, since they have enormous networks all over Finland and also abroad, are PR for this region. When they say something has happened, they know and they were themselves involved in doing it, so they can tell people about it convincingly so that it's credible.... That's good for our image."

Thus, a good image has supported the development work. On the other hand, there is some fear in the region that the image is too good in relation to the reality; there are grounds for a good image but not perhaps quite to the extent that the media require. ICT is not the most significant employer in the region nor can the size of the concentration be compared with the major concentrations in Finland. The urban region continues to have a major employment problem and not all actors in development activity have committed themselves to the ICT-led development strategy.

"Sometimes it seems, at least recently, that there has been a great deal of talk about Jyväskylä, as if something really remarkable had been achieved here. So I think our situation has maybe been exaggerated a bit. We still have plenty to do and maybe we're just not that great."

New institutions from outside as enablers

The Jyväskylä urban region has been able to take quick advantage of both national and international changes. Reactions to new opportunities opening up in the region have been fast and unprejudiced. The choice of ICT as a focal point for development has been based on both the actors' own conception of ICT as a potential growth area and on the reaction to the focuses of national expertise in development finance. Action models

of programme-based regional policy have also affected the development of the Jyväskylä urban region. Programme work has made the development work even more networked and more strategic than before.

“At the beginning of the ‘90s, when Finland was heading towards a great recession, the strategy of the whole country was to invest in those fields.... Now it has turned out to be a success story. And Jyväskylä seized on this too.... IT was indeed a bold choice at the national level back at the beginning of the ‘90s.... And then political influence was exerted so that the Academy and Tekes²⁵ would opt that way and that in turn made Jyväskylä invest in it.”

“In the same connection, the EU programmes entered the game. And there was a new instrument to provide the impetus for development; it was possible to start up development projects.”

Institutional changes coming from outside the urban region have thus served as forces of renewal and opportunity for development work. Making the most of change, however, has required the actors in the urban region to seize opportunities as they open up.

Future opportunities and threats

In the development of ICT in the Jyväskylä urban region there are both future opportunities and threats. One opportunity in development is the potentially strong area comprising multidisciplinary and content production. A slowdown in the traditional electronics industry has been predicted, along with growing importance of the software and content industries, especially regarding the creation of new jobs. An increase is also predicted in human-centred ICT development. Areas of strength at the University of Jyväskylä include subjects related to ageing, disability and sport sciences, that, related to ICT, are believed to become future areas of expertise.

“Our ICT strategy is different from that of Tampere or Oulu, which are very engineer-biased. That’s where they make the gadgets. But our strength... is in something like third generation ICT.... And it reacts differently to economic conditions. If there is only research and development done here... that works pretty well, we are not tied to the mobile phone. Then this content production;... it doesn’t seem possible that content production could ever end, even if they can make mobile phones in Malaysia and China. It doesn’t worry us. That is to say, the job

²⁵*Tekes*, the National Technology Agency is the main financing organisation for applied and industrial R&D in Finland. The funds for financing are awarded from the state budget via the Ministry of Trade and Industry.

structure of Jyväskylä is very R&D-intensive. And that is much more faithful to the home region than production is.”

The suitable size of the Jyväskylä urban region can also be seen as a strength along with its reputation as a dynamic urban region. In attracting capable people, it helps that in various comparisons the city has been found to be a pleasant place to live and an alternative to the hectic Helsinki urban region (see e.g. Raunio 2001).

“We don’t have such great burdens. On the other hand there are surely several positive images. There is the natural environment, the city is not so big but still big enough to have certain services... so these together with the model of doing the newest things make it easy for people to come here and stay.”

A potential bottleneck in the ICT field is the slowing down of the rate of development, general downturn in the economy or even a new recession. A downturn in ICT development could have a very bad effect on the atmosphere of Jyväskylä as the development has just started. A recession could destroy faith in the future and make development actors excessively cautious in their investments.

Another bottleneck connected to ICT is the availability of capable people (if the downturn does not turn into a recession). The University should have some top international expertise in order to respond to the demands of global enterprises and to attract gifted students. One problem in attracting top researchers is the modest salary level compared to what the private sector can offer. In attracting foreign experts, another bottleneck is the high taxation in Finland. Further problems are caused by the fact that a considerable part of ICT education is financed by regional development funds²⁶, which are tied to the duration of the programme. In the future, it is not likely that the current levels of funding from the EU would be financed by the Ministry of Education. Thus, the temporary nature of certain teaching posts may dissuade experts from coming to the region.

“If we want ICT to stay here, to grow here, it means that not only must education be plentiful but also that the top should be really good. In that field you can clearly see that students go where the top is really special. Then the

²⁶ Itkonen et al. (2000, 63) also point out that it is not necessarily to the point that a university engaged in a national teaching task should implement a regional education project. Students come to the university from different parts of the country, and after graduating there is no guarantee that they will remain in the region. Thus there is no certainty about the efficacy of the re-orientation training programme.

companies go where... the competition for top talent is fierce. And the arrangements we have are such that they give no leeway. There is no leeway in the state salary system; they don't compete with companies. And they haven't got used to the idea that tailor-made solutions have to be created for these people."

Yet another potential bottleneck for the entire system is that relatively straightforward activities have their opponents. Some actors consider the selected strategies to be concentrated on too narrow an area and the investments committed to development by the City of Jyväskylä to be too large *vis à vis* the resources of the city. The Left Wing²⁷ in particular has been critical of the selected line and the big investments. It has been claimed that excessively large investments made too fast will soon have to be paid for by the residents. Moreover, they argue that the City of Jyväskylä is after all a municipal organisation for which fast decision-making on the lines of a company is not appropriate. Further criticism has been aroused by the fact that the expertise-oriented economic development policy has not been able to improve long-term unemployment in particular. Moreover, the city has a considerable debt, and as a result of population growth, housing production is inadequate and more resources than at present should go into developing services.

The Jyväskylä urban region has in its development work emphasised co-operation between those with concrete expertise and holders of official posts in the creation of new openings and their rapid implementation; elected officials have been neglected. The quest for speed in development activity had further led to the preference for a small inside group. Thus democracy and overall weighing up of matters may suffer. Some elected officials have criticised prevailing practices, and potentially, increasing criticism may weaken the co-operative atmosphere in the near future. Elected officials have raised the issue of their minor role in development work with increasing frequency. On the other hand, the members of the core development group think that the flexibility, speed and good outcomes of development work can be explained by the fact that development work in the region is no longer as political as it used to be.

"One thing is that the politics disappear from it all. There are different political views, but when you're doing this development work there's no politics in it at all. But it used to be political: who was allowed to do what,

²⁷ For a long time there has been a Left Wing majority in the city of Jyväskylä. The last two terms of the City Council, however, have had a Right Wing majority.

which of the politicians was allowed to be involved. When that ended, the development went forward.”

“There was always a certain tension with the political leadership. It somehow belongs to this time that these tasks become so complex and fast and difficult, that the role of professional management clearly rises. And then how to preserve confidence in the decision-makers is one of the more difficult problems in today’s management. And there they measure the powers of each party. So it didn’t happen without bruises.”

Perhaps elected officials should be more clearly included in the preparation stages and made more committed to them than they are at present, in order to make decision-making easier. The culture of debate should also be more open than at present, so that voices that are critical of the present line in development activities are heard and taken seriously. At the present moment, the existence of criticism is acknowledged but redirecting activities on the basis of it is not considered. Failure to listen is unlikely to cause problems as long as the development of the Jyväskylä urban region is positive, but if the direction changes, criticism will easily mount and it will be difficult to get approval for various development matters.

Messages for process-based regional development

As a future mode of action in regional development, Chapter 2 presented a process-based development that emphasises the initiation and management of processes in a network environment and the involvement of the best experts in the respective areas according to their own points of departure. In recent years, the Jyväskylä urban region has been considered one of the best examples of regional development in Finland. Thus, the assumption behind the present study is that indications of the future directions regional development will take would be more likely found in regions like the Jyväskylä urban region than elsewhere.

The development of the Jyväskylä urban region emphasises the development of regional competitiveness and network-like operation. “Soft” factors of competitiveness have played an important role in the development of the ICT cluster. ICT-led networking has been connected to the overall development of the region and the development has been path-dependent: although the deliberate development of the ICT cluster was begun only in the mid-1990s, the laying of the foundations for the development had already begun at the beginning of the 1960s. In the first phase of the development, conscious strategic planning for the development of the cluster had not yet occurred. From the 1980s to the mid-1990s, the development concentrated on strengthening the

technological knowledge base. Since the mid-1990s, the ICT cluster has been developed systematically. Increasing emphasis has been placed on drawing up and implementing various programmes as well as large development projects.

The main clear turning points in ICT-led development were first the professorial post in computer science donated in the late 1960s and the initiation of education in the field. The turning points of the 1980s were the inception of the science park activities through the Tietotaajama project, emphasising ICT, and the ideation and start-up of the degree programme in applied natural sciences. The 1990s saw several turning points, the more significant among them being the inception of the centre of expertise programme work, the ideation and implementation of re-orientation training under the EU Objective 2 and the transfer of Nokia to Jyväskylä. In the new millennium, the emphasis on multidisciplinary in ICT development is symbolised by the opening of the Agora Building.

Gradually occurring turning points include especially the changes in attitudes within the University of Jyväskylä in the 1980s that led to increased co-operation between the University and the surrounding area. Another important turning point was the transformation of the relations between the municipalities in the Jyväskylä urban region from friction to co-operation, while the changes in the strategy work of the City of Jyväskylä itself after the mid-1990s constitute a third gradually occurring turning point.

Examination of the process of ICT-led development shows that the main explanatory phenomena for the positive development of the Jyväskylä urban region after the middle of the 1990s were, first, a right strategic choice, namely investing in the strengthening of expertise and ICT-led development, Second comes the ability to capitalise on creative tension; that is to bring to the fore themes that are rife with this tension and that make people take interest in and become motivated for development work. Utilising creative tension in development work has required the presence of active people with an interest in the development of the urban region, leaders of change with the courage to propose large development projects calling into question innovative and established action models.

The third main explanatory phenomenon is networking: The main characteristic of development work has been the intense and functional co-operation among actors. The business community and research and educational institutions have also been involved in the development. The fourth explanatory factor has been the exploitation of publicity for the development, the improvement of the City of Jyväskylä's image. The

fifth main phenomenon has been the ability of the actors to seize opportunities as they opened up and make prompt use of the new practices of development work, especially action models for programme-based development and sources of funding.

Numerous strengths are present in the development work of the Jyväskylä urban region that leads us to predict that positive development will continue. On the other hand, potential bottlenecks to development include especially the slowdown of development in the ICT field and a possible recession as well as the fact that not all actors are committed to ICT-led development and the modes of operation employed. Failure to listen to criticism may lead to a crisis in the atmosphere of co-operation, the more so if strategic choices do not produce the anticipated results.

Although the development of the Jyväskylä urban region has been path-dependent, it also includes features with suitable implications for more extensive regional development. To be able to respond to the dynamic nature of the environment with dynamic development work as in the development process of the Jyväskylä urban region, attention should be paid to:

- Dynamics of processes, the start-up of processes and their management.
- Correct timing of development work, making the “right” strategic choices, seizing the competitive advantage by being a pioneer.
- Ability to create and utilise creative tension in development work and the sense of drama: presenting issues so that people become enthusiastic and join in the development work.
- Ability to attain short-term success in order to sustain motivation.
- Management of change and the importance of bold, innovative people.
- Functioning of networks and the importance of broad participation; on the other hand, sufficiently strong coalition behind the change that still does not preclude listening to different opinions and questioning objectives.

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Appendix: Interviewees

Jouni Juutilainen, Development Manager, City of Jyväskylä	26.3.2001
Jari Kovanen, Senior Technical Advisor, Employment and Economic Development Centre, Technology Unit	26.3.2001
Hannu Korhonen, Development Manager, Regional Council of Central Finland	26.3.2001
Erkki Laatikainen, Editor-in-Chief, Keskisuomalainen Plc	5.4.2001
Jussi Nukari, Director (IT Sector), Jyväskylä Science Park Ltd, Centre of Expertise Programme in Information technology	5.4.2001
Ritva Nirkkonen, Director (Business Development), Jykes Ltd (Jyväskylä Regional Development Company)	5.4.2001
Dan Asplund, Technology Manager (Development Programmes), Jyväskylä Science Park Ltd	6.4.2001
Petri Maaranen, Director, Jyväskylä Polytechnic, School of Information Technology	6.4.2001
Erkki Järvelä, Executive Director, Regional Council of Central Finland	20.4.2001
Mikko Koskela, Development Manager (Electronics Industry), Jyväskylä Science Park Ltd	20.4.2001
Pekka Kettunen, Mayor, City of Jyväskylä	23.4.2001
Uljas Valkeinen, Managing Director, Central Finland Chamber of Commerce	23.4.2001
Esko Peltonen, Managing Director, Jyväskylä Science Park Ltd	23.4.2001
Jukka Akselin, Managing Director, JSP Facilities Ltd	11.5.2001
Olli Väätäinen, CEO, Yomi Group	22.5.2001
Esko Miikkulainen, Vice-President, (Business Development), KSP Group Plc	22.5.2001
Pekka Neittaanmäki, Professor, University of Jyväskylä	23.5.2001

Erkki Ikonen, Chair of the City Board	23.5.2001
Asko Malinen, Area Director, Sonera Entrum Ltd	25.5.2001
Mauri Pekkarinen, Member of Parliament	4.6.2001
Pasi Mäkinen, Director, Employment and Economic Development Centre	6.6.2001
Matti Ojala, Vice-Chairman of the City Board	6.6.2001
Pentti Sahi, Ex-Chair of the City Board	6.6.2001
Antti Tanskanen, CEO, OKOBANK	8.6.2001
Kauko Keränen, Site Manager, Nokia (NMP Jyväskylä)	12.6.2001