

**Antti Kasvio, University of Tampere:**

**ANTI-SILICON VALLEY? REFLECTIONS UPON THE FINNISH INFORMATION SOCIETY 'MODEL' AND ITS FUTURE PROSPECTS**

28.5.2002

**Introduction**

Until the 1990's Finland has been a little known small and cold country in the Northeastern periphery of Europe. Even if Finland has been part of the Western civilisation for one thousand years, the Finns have remained mostly in its margins - using a language not understood by others and maintaining a special taste for vodka, sauna and Tango music. During most of its history Finland has been a sparsely populated terrain living either under Swedish or Russian rule and without any significant national institutions or a strong cultural heritage of its own. Even if Finland gained national independence in 1917, after World War II the Finns were forced to live in close cooperation with the neighbouring Soviet superpower. Therefore Finland wasn't always considered to be really a part of the Western community. Finland has traditionally participated to the world economy mainly by selling forest industry products, and during the 1970's and 1980's Finland had already developed into one of the relatively affluent Nordic welfare states (e.g. Klinge 1997). To a certain extent Finland's economic achievements were, however, based more on the country's rich natural resources and advantageous trade political position than on the real competitiveness of its leading corporate actors. Thus shortly after the collapse of the postwar European system Finland went through the deepest economic crisis experienced by any industrial country since the 1930's. In early 1990's Finland's GDP fell with more than 13 per cent, almost half a million jobs (of the pre-crisis 2,5 million total) were lost, and the Finnish currency lost more than one third of its previous value (about Finland's recession see e.g. Honkapohja, Koskela & Paunio 1996).

Finland's situation changed, however, dramatically just a few years later. The former traditional Finnish industrial conglomerate Nokia was suddenly transformed into the world's leading mobile phone manufacturer, and it became overall one of the New Economy's most important corporate players. Finland - which had in the meantime recovered from the crisis, become a member of the EU and joined the European currency union - was in late 1990's ranked as the worldwide number one in terms of internet and mobile phone penetration. The technological level of Finland's manufacturing exports had risen from a very modest start to one of the highest in the world. International media reported enthusiastically about the entirely new mobile communication cultures that were emerging among the Finnish teenagers (see e.g. Newsweek 1999). Carly Fiorina, CEO of Hewlett-Packard, called Finland the wireless world's new Silicon Valley. In its Global Competitiveness Report 2001-2002 The World Economic Forum ranked Finland as the world's most competitive economy both in terms of its current and future growth potential (World Economic Forum 2001).

One important feature in this transformation process has been that Finland's success story has not resulted from the adoption of ruthless capitalistic economic policies or from a radical dismantling of the welfare state. Even if extensive cuts had to be made in government expenditures during the recession, Finland has maintained its basic features as one of the Nordic welfare states with a socially homogenous population, large public sector, highly organized labour markets and effectively functioning social safety networks. Finland seems thus to offer a clear alternative to the money-driven approach with which the New Economy has been built in the U.S.A and which has led to a further deepening of the country's existing sharp social cleavages. As a matter of fact in recent North American social and political discussions Finland has often been presented as a kind of 'Anti-Silicon Valley', i.e. as a place where the economic restructuring processes have been carried out on a socially concerted manner but which despite that has been able to challenge very successfully

some of the leading U.S. corporate actors. Based on such experiences Manuel Castells and Pekka Himanen have written a small book about the emergence of a specific Finnish information society 'model' (Castells & Himanen 2001).

The Finnish success story culminated a couple of years ago when the world was expected to be moving fast towards a wireless information society. It was thought that very soon virtually everybody would be carrying next-generation mobile phones or other portable digital assistants and thus become capable of being effectively on-line any time and everywhere (e.g. Brown, Green & Harper 2001). Nokia had originally invented the whole idea of unwiring the world (see e.g. Silberman 1999), and Finland was said to have all the necessary elements for a business cluster that would start producing new applications for the wireless internet (Council of Economic Advisors 2000, annex). Since then, however, the huge economic bubbles built around dotcoms and telecommunications have burst, the long boom of the 1990's has turned into a recession, and expectations concerning the future spread of new ICT applications have been scaled down dramatically. As a consequence of these developments Finland's economic growth rate has fallen from 5 per cent to a zero, the stock market valuations in Helsinki have fallen by a half, and Finland is not any longer automatically regarded as the world's leading experimental laboratory of next-generation ICT applications. The world's attention is nowadays directed rather to Japan and South Korea, that is to countries which have already 3rd generation mobile phone networks in action (e.g. The Economist 2002).

The current situation raises a number of interesting questions. We can ask first whether Finland's dramatic breakthrough to the forefront of the worldwide information technology revolution has been based just on more or less temporary or accidental factors. We can also ask whether the success story has been real or whether the idea of Finland as an experimental laboratory of tomorrow's technologies has been just a myth created by the media. In regarding this possibility one has to take into account that nowadays the media have a big hunger for good stories that sell, be they true or not. Even if Finland's success story proves to be real we can ask whether it is justified to speak about a specific Finnish 'model' of information society - i.e. about a particular strategy of combining the economic and social objectives in a manner which could be utilized in other contexts, too. We can furthermore ask whether the Finnish 'model' - if such a model exists - is sustainable enough to survive the present economic turbulences and those serious challenges that must be faced in the near future. As a preliminary conclusion it is possible to state that even if for instance Castells and Himanen have presented in their new book a large number of interesting ideas and hypotheses about the development of information society in Finland, the interpretations are based on fairly anecdotal evidence rather than upon a really systematic empirical analysis. Based on its limited evidence the book gives perhaps a somewhat too general and harmonious interpretation about the synergies between New Economy and the welfare state in Finland<sup>1</sup>.

### **Methodological Starting Points**

Before going to the actual interpretation about the development of information society in Finland I want to clarify the paper's theoretical and methodological starting points. The analysis is based on

---

<sup>1</sup> In presenting these kinds of critical comments to the analysis of Castells and Himanen I feel obliged to mention that the authors gave me kindly a possibility to comment the book's manuscript before its final publication. Therefore it wouldn't be correct from my part to present such fundamental criticisms towards the books' approach which I could have presented already at a significantly earlier stage. Rather my comments are based upon those new ideas and perspectives we have all been able to learn on the basis of real social developments and recent theoretical debates about the information society.

the general - and nowadays rather commonplace - assumption according to which the advanced industrial societies are nowadays going through a major technological breakthrough that is based upon digital information processing. The consequences of this revolution are seen for instance in the rise of entirely new business activities and in higher levels of productivity within all sectors of the economy. The information technology revolution is leading to major changes in the functioning of societal institutions and in the ways people are working, learning and organizing their everyday lives. Just because of the overwhelming character of these changes it has become customary to say that we are moving from industrial mass production societies towards postindustrial information societies. The production of new knowledge has become the key moving force of these societies' future social and economic development (about formulations used in contemporary European policy rhetorics see e.g. European Commission 2002a, 1-2).

Why is this change happening? The basic reason is that the use of new information and communication technologies provides organizations with entirely new possibilities to increase the productivity of their activities. At the same time individuals have got a chance to organize their everyday activities on a more rational manner. In an era of global economic competition the new technologies are spreading relatively fast all over the world. Individual regions or companies do not therefore have any real possibilities to decide whether they want to join the process or not. If they want to receive their share of the world's increasing affluence, they must learn to utilise new information and communication technologies. This does not, however, mean that the digital revolution would be proceeding with the same pace and on a similar manner all over the world. On the contrary, significant differences can be observed between individual countries. The United States - where the digital revolution originally started - has taken a clear leadership position as the world's foremost developer and user of new information and communication technologies, whereas the other advanced industrial societies have been lagging behind (see e.g. OECD 2001a). Simultaneously a large part of the developing countries and their citizens have not been able to enjoy at all from the beneficial effects of new information and communication technologies (for a concise overview see OECD 2001b).

It is important to point out also that the digital revolution has not resulted from processes of technological development that would have followed just their own inherent logics. On the contrary, the development of new technologies is a social activity that is in many ways linked to those social and cultural norms and beliefs that prevail in the surrounding society. The technological innovations are also tightly bound to the economic realities that either stimulate or constrain certain paths of developmental activity. For instance Manuel Castells has emphasized the significance of the peculiar economic, social and cultural conditions that prevailed in Silicon Valley when the digital revolution got its present forms. He has also stressed that the new technologies have been taken actually to use mainly because of their capability to offer new solutions to the crisis of earlier forms of capital accumulation (Castells 2000, 61-68). On an equal manner one should pay attention to the fact that modern information societies have not been emerging as a result of some universal laws of historical development. Rather they have and will be emerging as a result of concrete historical projects which are realized through the initiatives of multiple societal actors in widely differing social, institutional and cultural conditions. These projects do not deal with just technological changes but rather with a triple revolution: with the breakthrough of digital technology, with the transition to a knowledge-based economy and with major changes in the social infrastructures of production. All these processes of change are following their own internal logics even if they are also in many ways closely interrelated. Therefore the societal consequences of the information technology revolution may vary a lot between different countries depending on the objectives and strategies chosen by the key social actors at each of these domains (op.cit. 4, 20).

Up to this point one could perhaps say that there exists nowadays a rather broad consensus among social scientists about the character of the ongoing social, economic and technological change processes. But beyond that the interpretations about the essential character of ongoing changes differ still a lot. Several interpreters have remained fairly critical towards the whole idea of modern societies going through some fundamental transformations as a consequence of the digital revolution. For instance Frank Webster, one of the leading interpreters of this transition, has recently presented serious doubts about whether we can really observe among key trends typically presented as evidence about the coming of information society any signs about quantity being transformed to quality in a way that would legitimise the talk about a new stage in the development of modern societies (Webster 2002). Another commentator Krishan Kumar has defended a thesis according to which the cultural transition from modernism to postmodernism has been a more essential change in today's advanced industrial societies than the much advertised technology-led informational revolution (Kumar 1995, 162). Even among authors who believe in the transformative powers of the information technology revolution the current interpretations about the fundamental character of this transition diverge from each other in some very important aspects. For instance Manuel Castells writes about modern societies as capitalist societies that have entered the 'informational' mode of this system's development (Castells 2000, 18-21). At the same time Peter F. Drucker - the management guru who originally invented the idea of a knowledge enterprise - is firmly convinced that we have moved already into a postcapitalist stage of the development of modern societies (Drucker 1993).

Many social scientists have also announced their unwillingness to use the term 'information society' which is easily connected to the earlier loose futurological theoretisations and which does not necessarily express best the most fundamental features of the ongoing epochal changes. Manuel Castells prefers to speak about the 'network society' (Castells 2000, 508) whereas many others like to use the term 'knowledge society' (e.g. Stehr 1994, Mansell & Wehn 1998).

I am myself very much indebted to the groundbreaking theoretical analysis presented by Manuel Castells in his Information Age trilogy (Castells 1996-7). Castells' analysis has not, however, always been entirely coherent or unequivocal (see Kasvio 2000). It is also important to emphasise that the recent developments – especially the burst of the dotcom bubble and radically changed attitudes towards the business prospects of new ICT applications – have created a need to reassess critically some of the hypotheses and interpretations presented just a few years ago. And we have to take into account that during the writing of Castells' trilogy for instance the internet explosion was still very much in the beginning, whereas nowadays we have much more empirical evidence about the actual uses and impacts of the new information and communication technologies (for Manuel Castells' own interpretations about the significance of such evidence see Castells 2001). It must furthermore be acknowledged that during the last years we have not been dealing only with the mistaken optimism of investors concerning the future growth prospects of some new ICT applications. Certain speculative elements can be recognized also in those theoretical interpretations which social scientists and economists have earlier presented about the informational economy's future and about those changes that would happen in our everyday behaviours. Now it can be expected with good grounds that the social scientists' interpretations about the ongoing societal and economic changes are not any longer based just on general ideas and hypotheses, but rather upon carefully executed empirical studies about the actual changes that are going on in different parts of the society and in the behaviours of its members (about the need for new kinds of approaches see also the specifications for a new e-society research programme launched by the British Economic and Social Research Council, in ESRC 2002).

## Finland's Breakthrough in 1990's

Let us now start the substantial analysis by looking a little more closely at the character of Finland's breakthrough to the forefront of the information technology revolution during the 1990's. In order to do that it is necessary to look first how this transition process has been rooted in the crisis of the country's previous growth strategies.

The Finnish economy had during the postwar decades been dominated by a number of large forest industry and engineering companies most of which were grouped around a couple of commercial banks and insurance companies. Finland's economic growth was based primarily on high levels of saving and investments (see e.g. Pohjola, Tainio & Lilja 2000). Many of the large industrial companies had during the 1980's started actively to internationalise their operations without, however, achieving any significant success. This was the case with the former large Finnish industrial conglomerate Nokia which focused its efforts upon conquering a significant share of the European consumer electronic markets (Häikiö 2001, vol. 2). Several large industrial companies had participated actively also into Finland's bilateral trade with the Soviet Union. The Eastern markets had provided the Finnish companies with an opportunity to sell large amounts of machines, ships, textiles etc. whose quality perhaps wouldn't have met the requirements set in the Western markets. Under these circumstances the competitiveness of Finnish industry seemed to be fairly good during the 1980's, and the whole national economy was growing relatively fast. Finland's industrial backbone was, however, narrowing during these years, and both the productivity and technological sophistication of its manufacturing industry were still lagging clearly behind the leading Western economies. Also the Finnish currency markka became heavily overvalued towards the end of the 1980's.

The whole edifice got - somewhat ironically - into big difficulties when the Soviet Union collapsed: Finland's eastern markets disappeared almost overnight simultaneously as the Western markets were gliding into a recession. Many of the companies - including Nokia - made big losses, they had to cut down their operations, the whole Finnish banking sector got into a deep crisis, and very soon the recession was felt also in the domestic markets. The consequences could be seen e.g. in the form of extensive job losses, increasing social expenditures and huge public sector deficits. Also psychologically the situation was felt as being very insecure because nobody knew whether the transition to democracy in Russia would proceed peacefully, whether a military conflict would emerge between Russia and the newly independent Baltic states and whether migratory pressures in Finland's borders could be kept in control in case of a possible chaos in the nearby regions. Neither did anybody know whether the welfare state would be able to survive through the economic crisis or whether the savings measures would continue indefinitely.

In such a situation it was evident that drastic measures would be needed in order to correct the situation. For instance the Finnish currency - which had only a short time earlier been officially bound to the European Reserve Mechanism - was devalued in Autumn 1991, and about a year later Markka was left to flow freely. All the key political actors admitted that extensive savings measures in the public sector would be necessary, and the labour market organizations agreed about modest - once zero-level - wage increases in order to allow room for the creation of new jobs. The government was forced to bind a large amount of public resources into the rescuing of Finland's nearly collapsed banking system. Finland became thus a predecessor of the new culture of stability which was somewhat later adopted also in many other West European countries. Simultaneously the private business companies started determinate measures in order to restructure their operations and to cut down all unnecessary costs. As a consequence of these rearrangements for instance the Finnish metal industry's productivity increased with more than 10 per cent during several consequent years.

It was generally admitted in Finnish public discussions that the country would need also an extensive reindustrialisation programme in order to restore the health of its economy<sup>2</sup>.

As a matter of fact the recovery of Finland's export industry did indeed start relatively early - in Autumn 1992 - mainly because of the significantly improved price competitiveness of Finnish products. By far the most successful choices were at this stage made by a single industrial company - Nokia. In early 1990's the company decided to focus all its energies to become a global player in modern telecommunications. This happened after the company's earlier expansionist efforts in European consumer electronic industry had failed badly and the company's whole existence was in serious danger. Under the leadership of a new CEO Jorma Ollila Nokia achieved spectacular results especially as a producer of 2<sup>nd</sup> generation digital handsets. Nokia's turnover increased with 25-50 % a year, it made huge profits, and towards the end of 1990's Nokia had already passed Motorola as the world's largest producer of mobile telephones. During this process Nokia modernized its corporate governance systems, Nokia's stocks were listed in New York, and the company started to attract investors from all over the world. The value of Nokia's stocks soared from less than one dollar in early 1994 to more than 60 dollars in Spring 2000. One result of this process was that in late 1990's Nokia became Europe's most valuable company, and its brand was well known all over the world (about Nokia's transformation process during the 1990's see e.g. Pulkkinen 1997, Häikiö 2001 vol. 3, Meridden 2001, Steinbock 2001, Ali-Yrkkö & al. 2000).

Together with Nokia the whole electronic industry grew very fast - about 25 per cent a year - in Finland during the years 1993-2000. Many of the Finnish electronic industry companies were collaborating closely with Nokia, and the industry's most dynamic subsector has been the production of telecommunications equipment. Altogether about 65 per cent of Finnish electronic and electrical industry's total production consisted of telecommunications products in the year 2000 (Hienonen 2001). The Finnish telecommunications cluster includes not only equipment manufacturers but also parts manufacturers, manufacturing service companies, teleoperators like Sonera and Elisa, producers of new applications and services into the telecommunication networks as well as the R&D institutions that are collaborating with the companies. This cluster has been growing strongly in Finland during the 1990's, and at the end of the decade it had already replaced the forest industry cluster as Finnish economy's largest and most dynamically developing cluster (for an overall analysis about the growth of Finland's economic clusters see Hernesniemi et al. 2001). It is also possible to look at the growth of Finland's new economy through the development of ICT industry. Besides Nokia the Finnish ICT industry consists of such IT service and software firms as TietoEnator, ICL Invia, F-Secure etc. In this context it is important to mention also such advanced users and developers of new ICT applications as Nordea, which is currently perhaps the world's leading provider of on-line banking services (about the development of ICT industry in Finland during the 1990's see Pajja 2000, Pajja 2001).

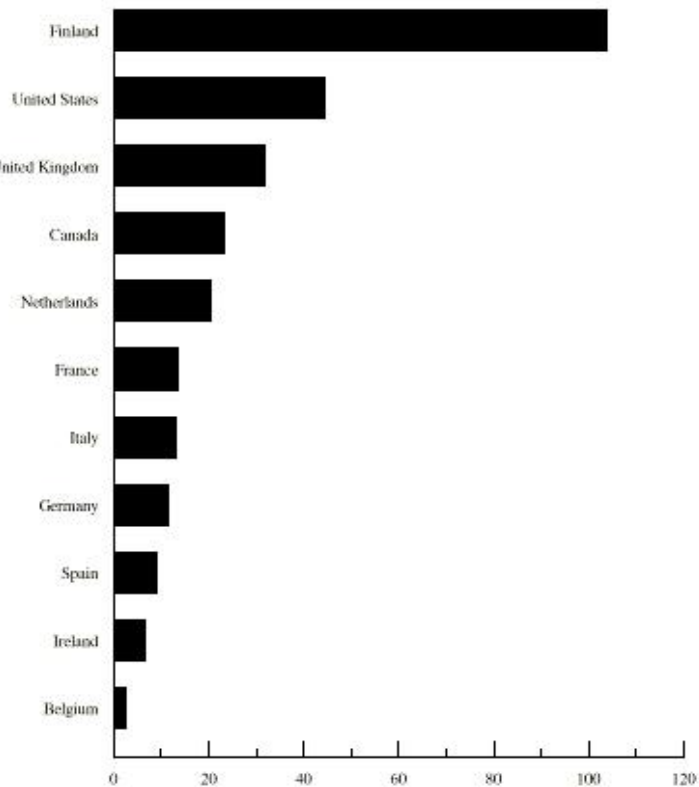
According to many recent international comparisons the growth of the new economy has really been clearly faster in Finland than in most other advanced industrial countries<sup>3</sup>. We can see this for instance if we look at the share of ICT investments in different national economies' total investments, the relative weight of ICT companies in the total valuation of companies, the ICT specialisa-

---

<sup>2</sup> The Finnish crisis policies emerged through a forced consensus between different societal actors in a situation in which it was unsure whether the international lenders would still be willing to cover Finland's expanding public sector deficits with new loans. Deeply diverging opinions existed, however, between the different political forces for instance concerning the extent to which unemployment should be allowed to increase or the ways in which the budgetary savings should be realised in practice. Similar divergences of opinion have prevailed also in later academic analyses about the recession and its consequences. See e.g. Kiander 2000

<sup>3</sup> Nancy Wagner, an economist at IMF, has written recently that "Finland's economy is truly a 'new economy', as few other advanced economies have undergone such a massive transformation in such a short timespan" (IMF 2001a, 3).

tion of R&D activities, the contribution of ICT on productivity growth etc. As a matter of fact in many key respects only the United States economy has been ahead of Finland as an advanced informational economy (see e.g. OECD 2000a OECD 2000b, Aiginger et al. 2001, 141-147, IMF 2001a, 3-23).



Technology Stocks as per cent of GDP in 1999 in a Num-

source: IMF 2000, 92

But why did the new economy reach such a remarkable growth just in Finland? One important background factor has undoubtedly been the country's relatively advanced telecommunications infrastructure. Finland has had hundreds of small independent operators in different parts of the country, and there has always been tough competition between the state-owned telephone company and the private operators. The leading Finnish operators have been technologically innovative, and the telephone tariffs have been relatively low in comparison to the other advanced industrial countries. Finland developed together with the other Nordic countries already during the 1970's a common standard for Nordic mobile telephony, and the experiences gained from its use provided important impulses also for the later creation of the wider European GSM standard for digital mobile telephones (about the development of Finland's telecommunications infrastructure see e.g. Häikiö 1998, Steinbock 2000, Ministry of Trade and Industry 2000, Pajja 2000, 7-10).

Finland has also invested systematically to knowledge and learning. The overall education of Finland's population has during the 1980's and 1990's risen to a relatively high level, and also the school performance of Finnish pupils is estimated to be good in comparison to the other advanced industrial countries (see e.g. OECD 2001c). Also the GDP share of Finland's R&D investments has reached to about 3 per cent which is clearly above the OECD average level (OECD 2001d).

Finland's R&D investments started to expand especially after the early 1980's when the national technology agency Tekes was formed. Tekes started to organize large-scale technology programmes in selected focus areas, and nowadays the science-industry-relationships are functioning quite well in comparison to most other advanced industrial countries (see e.g. OECD 2002). The internationalisation of Finnish universities and academic research has also proceeded relatively fast during especially after Finland's joining to the EU, and its products have become more visible in international scientific fora (Husso, Karjalainen & Parkkari 2000).

As one particular feature one should perhaps mention the highly valuable development work that has been made at the computer centres of Finnish universities. Finland participated actively into the building of the Nordic University Network which provided all the region's universities with highly effective data connections (CSC 2001, 8-13). The Finnish students were provided already at a relatively early stage with free internet connections, and many young students contributed to the development of a hacker culture that produced such innovations as e.g. the Linux operating system and the Internet Relay Chat (see e.g. Rheingold 1995, 179, Moody 2001, Torvalds 2001, Himanen 2001). New technology centres expanded their activities e.g. around the technical universities in Espoo, Oulu and Tampere, and these centres have provided good working environments not only for Nokia and other established companies but also for a growing number of new startup enterprises (see e.g. Rosenberg 2002, 81-100).

The Finnish consumers contributed positively to the development of new economy in Finland during the 1990's by starting to utilise mobile phones and other new ICT applications on an active and inventive manner. The overall mobile phone penetration rose already in mid-1990's onto a very high level, and for instance the Finnish teenagers developed eagerly new uses to their handsets; especially the exchange of SMS messages among friends became an extremely popular activity (Kopomaa 2000, Puro 2002, Kasesniemi & Rautiainen 2002). On a similar manner one can see that the Finnish employees and trade unions responded positively to the spread of new information and communication technologies in workplaces, and most Finns believe that information technology has a positive impact upon employment (Statistics Finland 2002a). Almost all Finnish public sector organizations have launched their own web services already at a relatively early stage in mid-1990's, and most government offices have fairly good computer facilities at their disposal (Ministry of Finance 2000)<sup>4</sup>.

In politics the consensus atmosphere that was created during the crisis of early 1990's provided favourable starting points for a widespread cooperation also somewhat later when the Finnish society had to find effective means to fight unemployment and to prepare itself for a membership in the European Union. A broad backing could be gained for instance to a presidential initiative which aimed to lower Finland's unemployment rate to 8 per cent by the end of the decade (Presidential Working Group 1994). Even if the traditional political divisions didn't disappear, practically all key issues in Finnish politics have during the 1990's been decided through negotiations. Companies operating in Finland have therefore learned to rely on a fairly strong continuity in the political decision-making, and the regulatory environment has also been stable and predictable. In the same spirit all key actors have given their backing to active efforts through which one has tried to promote the development of information society in Finland. The first national IS strategy was published in 1995

---

<sup>4</sup> Castells and Himanen emphasise in their analysis also the significance of a strong cultural and national identity as one important factor that has helped Finland to move fast in adopting the new information and communication technologies. It is, however, notoriously difficult to determine whether one country has a stronger identity than another, and the authors do not present any comparative evidence to back their overall thesis (Castells & Himanen 2001, 44, 84-93). It is, however, easier to agree with the author's interpretations about the importance of such individual features of the Finnish national identity as its basically technology-positive (89) and egalitarian (90) orientation.



still very clearly as one part of Finland's efforts to restore its economy after a deep crisis (Ministry of Finance 1995). This programme was renewed in 1998 on the initiative of the Finnish government's Information Society Council and with Sitra acting as the main coordinating partner. The new programme emphasized the need to implement new information and communication technologies effectively, but at the same time on a socially and culturally feasible manner (SITRA 1998). Almost all Finnish ministries and central agencies launched their own sectoral initiatives during the mid-1990's, and many kinds of activities were initiated also at the local and regional levels.

Certain structural factors have evidently contributed to the success of new business activities in Finland during the 1990's. Finland had developed during the previous decades into a socially homogenous country with relatively small income differences (see e.g. Förster 2000). Finland has always had a fairly egalitarian culture in which one cannot identify any deep divisions between the elites and ordinary people or between persons representing different levels of organizational hierarchies (about the extent of power distance in different cultures see Hofstede 1984). People have tended to trust each other in the Finnish society, and the relations between different actors have been fairly informal. The salaries of experts or managers have not been very high in comparison to other groups of employees. In such a culture it has been relatively easy to operate lean organizations and to build horizontal networks between the different units. The new ICT applications have also been spreading relatively fast across the whole population, and the democratic educational institutions have provided citizens with the skills needed in using the new technological devices (Nurmela 2001).

Based on these kinds of factors Finland was indeed able to make certain remarkable achievements in terms of its economic and technological development during the 1990's. Between the years 1994 and 2000 Finland's GDP grew with almost 5 per cent a year. The level of productivity in the Finnish economy grew with 3.6 per cent a year during the years 1995-2000. This is a clearly higher rate than the one that was attained during the same period in the United States. As a matter of fact the absolute level of labour productivity in Finnish manufacturing industry had risen by the end of the decade onto a higher level than was reached in the United States. The overall level of productivity in the Finnish economy has grown from less than one half to about three fourths of the U.S. level from mid-1970's to the end of 1990's (Koski, Rouvinen & Ylä-Anttila 2001b).

After the recession Finland's economic growth was driven especially by the export industry, but the domestic markets contributed increasingly to the overall growth performance towards the end of the decade. The rate of unemployment fell from 17 per cent in 1994 to less than 10 per cent in 2000, and Finland's public sector balance has turned from a large - 7.3 per cent of Finland's GDP - deficit in 1994 to a 7.0 per cent surplus in 2000. Also the balance of Finland's foreign trade has turned strongly positive, and in 2000 Finland's current account surplus was about 5 per cent of Finland's GDP. The pace of structural change in the Finnish economy has been very fast during the 1990's; for instance the electronic industry's share from Finland's total manufacturing exports has increased from 4 to 11 during the 1980's and up to 32 per cent in the year 2000. The share of high-technology products in Finland's total manufacturing exports has simultaneously increased from 5 to more than 20 per cent (Tekes 2002). Finland became, as already mentioned, during the late 1990's the worldwide number one in terms of both internet and mobile phone penetration rates, and in some recent international comparisons Finland has been ranked as technologically the most developed country in the world (UNDP 2001). In its 2001-2002 World Competitiveness Report the World Economic Forum has ranked Finland as the worldwide number one both in terms of its current and future growth competitiveness (WEF 2001). IMD has ranked Finland as number three in its own 2001 World Competitiveness Yearbook (IMD 2001; for a more detailed analysis about Finland's position in recent competitiveness rankings see Rouvinen 2002).

## Has Finland's Record Been Unequivocal?

According to the evidence presented above Finland seems really to have been one of the most convincing economic success stories during the 1990's. Especially in terms of the utilisation of new information and communication technologies Finland has been moving far ahead of all large West European countries.

Finland's success story has, however, had certain weak points. Finland focused during the 1990's very much upon the production of ICT, whereas the country's record has not been equally good as a user of these technologies<sup>5</sup>. Finland does not have any internationally significant producers of software, neither has Finland become known as an exceptionally dynamic producer of contents for the new media. A significant gap has also emerged between the dynamically developing growth sectors and the 'old economy' in Finland. The level of productivity in Finnish electronic industry has grown during the late 1990's with almost 20 per cent a year, whereas the productivity increases in other sectors of the economy have remained on a relatively modest 1,6 per cent level (OECD 2000c, 24). Also in absolute terms we can see that the level of productivity in Finnish electronic industry is very high according to the present international standards, but the same thing cannot be said about other sectors. Finland has thus been moving towards a dual economy in which the different sectors are functioning according to entirely different logics (Castells & Himanen 2001, 104-105). Such a society has necessarily lots of inefficiencies, and that is perhaps why also the purchasing powers of Finnish wages have remained on a relatively low level in comparison to most other West European countries.

As a whole the Finnish economy is not therefore at present necessarily quite so competitive as the recent estimations published by the IMD or World Economic Forum might suggest. After all the competitiveness of different regions is put into a real test only when the internationally operating companies decide concretely where they will locate their future operations. The most competitive regions ought to be able to attract large amounts of investments and jobs from other parts of the world, whereas the less competitive regions and countries should be losing them. But according to official statistics we can see that Finland's balance of direct foreign investments has during the last years been most of the time clearly negative (Bank of Finland 2002). There is thus an evident contradiction between Finland's high rankings in recent global competitiveness reports and the actual investment flows to and from the country. And it is difficult to see any signs that the capital movements would start to turn into an opposite direction.

We can furthermore see that the Finns haven't been in all respects quite so eager users of the new information and communication technologies as the much advertised internet host and mobile phone penetration rates might suggest. For instance the internet penetration rate of Finnish households has according to newest statistics remained below 50 per cent, that is about ten per cent below the levels reached for instance in the United States, Sweden or Netherlands (EU Commission 2002, 5). Neither have the Finns been especially eager to install broadband connections to their homes (op.cit., 7) or to buy things through the Net (13-14). Overall the average times Finns are spending online remain clearly below for instance the current South Korean levels (Rouvinen 2002, 13). Also the takeoff of digital television has been rather sluggish in Finland, and the digital channels - which started their regular broadcasts in Autumn 2001 - are estimated to have only about 10-20.000 viewers in Spring 2002. The web services offered by different public authorities have mostly remained

---

<sup>5</sup> According to calculations made by Jalava and Pohjola about one third of new economy's impact on productivity growth has in Finland been based on the use of new ICTs and two thirds have come from the production of ICT. In the United States the relations are inverse so that two thirds of the new economy's productivity impact has come from the use and one third from the production of ICT. See Jalava & Pohjola 2001

on a relatively basic level; the Finnish citizens cannot for instance submit yet their tax declarations electronically as can be done in many other countries (EU Commission 2001, 12-17). And even if the world's first electronic citizen cards were made available in Finland already in 1999 (Finnish Population Register Centre 2002), very few citizens have actually purchased or started to use them mainly because of a scarce supply of meaningful applications for these cards. Simultaneously such cards are regularly used on a mass scale for instance in France and Estonia.

On a broader societal perspective one should pay attention to the fact that despite a relatively swift pace of economic growth Finland's unemployment has remained on a painfully high level. Finland's standardised unemployment rate was 9,7 per cent in 2000, that is clearly above the EU average level and about one and a half times as high as the OECD average<sup>6</sup>. According to most estimations a large part of the remaining unemployment in Finland is structural. Most of the unemployed persons have relatively little education, their average age is high, and many of them are living in the countryside or in stagnating industrial regions with little prospects of getting back to employment. Simultaneously the fast growing companies have been complaining about an insufficient supply of adequately skilled IT professionals. Certain institutional rigidities in the Finnish educational, labour market and social security systems have evidently prevented the markets from finding an effective match between the demand and supply of labour force. Critical remarks have been presented about Finnish policies e.g. by the representatives of OECD, IMF and the EU Commission, and suggestions are made for instance to lower the taxation of labour, to reform the existing social benefit systems and to increase flexibility in the labour markets (see e.g. OECD 2000c, 47-55, IMF 2001, 22-29, Economic Policy Committee 2001, 35-49, 53). So far the Finnish authorities have not, however, been able or willing to implement any major structural changes in the present employment and social security policies.

Another particular feature of the Finnish information society has been its weakly developed culture of entrepreneurialism. Even if Finland's dynamically developing new economy could be thought to have offered an excellent seedbed for a large number of new startup enterprises, only very few Finnish university graduates have shown an active interest towards starting their own firm. In many cases this has meant that the valuable innovations made at universities and research institutions have either remained unused or have been commercialised by foreign companies. Earlier one could still put part of the blame upon an inefficient supply of venture capital, but towards the end of 1990's significant improvements have happened in this respect. A much more important factor is probably the fact that the Finnish universities have traditionally been accustomed to educate people to work as civil servants, independent professionals or employees in large companies (Reynolds et al. 2001; see also Castells & Himanen 108-109).

The fruits of economic growth have been distributed relatively unequally in Finland during the second half of the 1990's. Finland was undoubtedly still during the late 1980's one of the socially most homogenous of advanced industrial countries, and perhaps a little unexpectedly the deep economic recession in early 1990's didn't aggravate dramatically the gaps between the haves and have-nots. Finland had during those times an effectively functioning income redistribution system which prevented for instance the unemployed persons from falling into a poverty trap. Simultaneously many middle-class households suffered from sudden job losses and excessive debt burdens. But the period of high economic growth after 1994 has led to clearly different consequences. The income gaps between richer and poorer households have increased relatively fast in Finland mainly because of the impact of large property incomes received by the highest-earning strata (Riihelä, Sullström &

---

<sup>6</sup> On the other hand it must be taken into account that more about 280 000 new jobs have been created in Finland during the years 1994-2000. This means that the yearly employment growth has been more than 2 per cent. This rate of growth has been better than in most other advanced industrial countries.

Tuomala 2001). New high-level jobs have been created especially in the Helsinki region and in a few other growth centres, whereas the economic situation has remained difficult in most rural and some old industrial regions (see e.g. Finland's Regional Councils 2001). The increasing inequalities have caused some worries in Finnish public discussions and perhaps weakened also somewhat the popular support of various information society initiatives (about warnings presented by Castells and Himanen in relation to such risks see Castells & Himanen 2001, 104-105).

### **Can We Speak about the Emergence of a Specific Finnish 'Model'?**

Manuel Castells and Pekka Himanen have written that during the 1990's there has emerged a specific Finnish 'model' for the development of information society. This model is based on the fact that during that decade Finland has become "one of the most developed information societies and economies in the world, as evaluated by any of the usual standards". This achievement is explained by stating that "in a world being reaped by globalisation, strong Finnish national identity has been an anchor that has facilitated communication and cooperation between the social actors involved in the restructuring process. The Finnish state, as the standard bearer of this identity, enjoys deep social legitimacy. And the values of solidarity institutionalized in the welfare state strengthen this legitimacy, providing maneuvering room for bold policy decisions which have paved the way for the emergence of a new business model, and for a new wave of technological innovation" (Castells & Himanen 2001, 7). In writing about the Finnish model the authors remind that this model has "emerged from the specific history and culture of Finland" and that it has been "uniquely shaped by the interaction between social, political, and economic actors in Finland". In this sense the model is distinctively Finnish, but at the same time "this particularity does not mean that the rest of the world cannot draw important lessons for the relentless effort, under way throughout the planet, of building an information society for the benefit of humankind" (op.cit., 102).

On the basis of our observations we can easily agree with the authors' conclusion about the exceptional strength of Finland's performance as an informational economy during the 1990's. These features haven't perhaps been entirely unique - for instance countries like Sweden, Denmark, Iceland and Netherlands have shared many similarities with Finland as European welfare states which have actively started to utilise the new information and communication technologies (see e.g. Aiginger et al. 2001, 148-150). Finland's exceptional achievements can also be partly explained by the fact that Nokia just happens to be a Finnish company. But is the overall picture presented by Castells and Himanen about the Finnish model entirely correct and well balanced? On the basis of our observations it is possible to argue that the authors have in some respects perhaps a little overestimated Finland's real achievements during the 1990's. For instance the descriptions of some key Finnish initiatives tell more about these initiatives' declared programmatic objectives than about their real accomplishments<sup>7</sup>.

---

<sup>7</sup> As one example we can take the Satakunta Macro Pilot Project which according to the authors is "an ambitious well-being cluster project... which has grown into the biggest endeavour of this kind in Europe". So far the project "is closest to its goals in the creation of a seamless health-care system, in which the customer does not have to be concerned with the boundaries between different organizations; all needs are served through one service point... The project uses a new electronic ID card to allow electronic identification... With the customers permission, medical information about him or her will be saved in a database open to doctors or pharmacists to help in medical decisions. The Macro Pilot has managed to advance co-operation between public bodies considerably and it has collected many innovative companies together, like Welfare Communications, which develops seamless solutions... The project has just completed its plan for disseminating its results in order to transform the whole national health system" (Castells & Himanen 2001, 58). This is an adequate description about the original aims of the project, but in actual reality the project was concluded in Summer 2001 without having been able to attain these aims. The project hasn't for instance produced those reference databases which were supposed to serve as key tools in the cooperation of different service providers. The project's potential cluster effects remain very modest especially after the key intermediary company Welfare Communications

The relationships between the new economy and the welfare state may also have been presented by Castells and Himanen as somewhat more harmonious than they have actually been. The whole international 'third way' debate and the way in which it acknowledges the need to rethink the left's traditional approaches to welfare state (e.g. Giddens 2001) is strangely absent from the book's analysis. Finland has, however, faced real problems for instance with its high levels of taxation and the relatively conservative social security and labour market policies. Some other countries - like the Netherlands and Denmark - have at the same time renewed much more radically their social and employment policies, and they have also achieved much better result than Finland in solving their employment problems. For instance the standardized unemployment rates have fallen to 2,4 per cent in the Netherlands and to 4,3 per cent in Denmark by the year 2001, whereas still during the late 1980's both of these countries had considerably higher unemployment rates than Finland (OECD 2002b). I shall come back to the question of welfare state in more detail later in this presentation.

But anyway it is easy to conclude that the prospects of the Finnish information society looked very bright still at the turn of the Millennium. Finland had just undergone a thorough structural modernisation process which seemed to offer excellent starting points also for the country's future growth. Finland was at a point of becoming the real powerhouse of the new wireless information society that was just beginning to turn from speculative visions to concrete reality. Especially the shift from second to third generation mobile telephony would open entirely new possibilities to combine the advantages of internet and mobility into an endless amount of new applications. The development of these applications would become the new economy's most important growth industry which would attract increasing amounts of talent and risk capital from all over the world. And they would transform the everyday lives of citizens in a manner not yet experienced during the PC-centred stage of modern information societies.

### **The New Economy: From Boom to Bust**

A general optimism concerning the digital revolution and the future growth prospects of the new economy culminated in Spring and Summer 2000, when for instance the Nasdaq composite index climbed above 5.000 points and the teleoperators paid more than 100 billion euro to European governments for 3rd generation mobile phone licences. Also investments to new information and communication technologies rose onto an exceptionally high level. These investments seemed to carry fruit so that the long decreasing trend in yearly productivity growth turned into a clear rise in United States during the latter half of 1990's. For instance according to the 2001 economic report of the U.S. President output per hour in the nonfarm business sector increased with 1.4 per cent during the years 1973-1995, whereas in 1995-2000 the yearly growth accelerated to 3.1 per cent (2001 Economic Report of the President, 27). Even if the latter figure has afterwards been scaled down onto a more modest level, one of the basic assumptions of the new economy theorists seemed to find at least some statistical support. If investments to new information and communication technologies will really allow significant increases in productivity, the world might be heading towards a new era of prosperity. The economic boom would also be able to continue longer without leading to resource bottlenecks and accelerating inflation (see e.g. OECD 1999a).

---

has gone bankrupt. Also the planned organizational changes have remained to a large extent at the design stage, and therefore the region's welfare service producers and their customers haven't been able to observe so far any significant changes in their actual everyday operational practices or in the quality of services received by the citizens (Liikanen 2002).

Following this overall optimistic spirit the Hex index - measuring the value of stocks quoted at the Helsinki stock exchange - rose to more than 18.000 points in Spring 2000 after having exceeded 10.000 points in November 1999. Besides Nokia the Finnish new economy got a new star Sonera, an old state-owned post and telephone organization which had been privatised in early 1990's and which was soon transformed into one of Europe's most innovative mobile telephone operators. Sonera participated actively into the competition over UMTS licences e.g. in Germany, Spain and Norway.

Shortly afterwards, however, the whole atmosphere changed completely. The investors lost their confidence to dotcoms which hadn't been able to cut down their losses, and some of the startups went bankrupt. Companies in other sectors became more cautious in their ICT investments, and technology stocks started to fall. In Spring 2000 the Nasdaq stock market lost almost two fifths of its value in only about one month's time. Also the stocks of European teleoperators started losing weight when investors began to doubt the rationality of their recent huge UMTS investments. The WAP applications were already a clear disappointment, and it had become evident that neither the technological nor commercial promises connected to the 3rd mobile phone generation would be fulfilled within the originally scheduled time frames. The customers wouldn't be prepared to pay the expected sums of money for a possibility to see moving pictures in the tiny screens of their mobile handsets, and nobody seemed to know what the other killer applications might be. Simultaneously many North American operators got into big difficulties because of the large investments they had made into added optical fibre network capacities. Soon the whole TMT sector was in a deep crisis, and significant cutdowns of personnel were announced in 2000-2001 by almost all big companies.

In Autumn 2000 also the overall economic situation in the United States deteriorated significantly, and the Federal Reserve started aggressive interest rate cuts in order to prevent the economy from falling into an outright recession. Next year the new Bush administration promised to realise extensive tax cuts with the expectation that these would help maintain private demand on a high level. Nothing could, however, prevent the downward trends, and the U.S. economy was officially declared to have entered recession in March 2001 (National Bureau of Economic Research 2001). Several commentators spoke initially only about a minor correction in a basically healthy economy. Also the falling down of equities was considered to be just a welcome awakening from the irrational exuberance that had a little earlier driven the stock markets onto unsustainable heights. It was therefore believed that lower interest rates and lighter taxes would provide sufficient stimuli for the restoration of growth (see e.g. Greenspan 2001). But gradually the recession turned out to be much more serious especially because of the significantly worsened economic prospects in Western Europe and in other parts of the world economy. Some economists pointed out furthermore that the long boom in the United States during the 1990's had led into the formation of huge structural imbalances. Both private companies and households were deeply indebted, and also the U.S. foreign trade deficit had grown to unprecedented dimensions. Therefore it wouldn't be possible to return to the earlier high growth rates without aggravating further the already existing imbalances (see e.g. Godley & Izurieta 2001). The September 11 terrorist attack into New York and Washington was a final blow after which the stock markets bottomed out and exceptional measures were needed in order to prevent the whole Western financial system from falling into a chaos.

At the time of this paper's writing the world is in a state of war against terrorism. Many signs are indicating that the U.S. recession might already be over and that the American economy would be growing relatively fast towards the end of the year 2002. The situation is, however, still rather unclear. One has to take into account that the Western economies are just awakening from the biggest financial mania ever experienced in the history of capitalism (see e.g. Mandel 2000). Therefore some time will be needed before one can see fully the consequences of this event. It does not neces-

sarily mean that the whole idea of a 'new economy' would be dead; neither does it mean that the digital revolution would have lost entirely its transformative powers. We are evidently still moving towards a society in which the new information and communication technologies are changing essentially the ways in which we are working, living and communicating with each other. We are also moving towards a society in which the citizens will be almost continuously on-line and therefore able to organize their everyday activities on a much more rational manner than is possible still at present. But the new information and communication technologies will hardly be spreading according to those time schedules and through the channels on the basis of which many optimistic business plans were made just a moment ago. Neither will the European teleoperators with their UMTS services be able to serve as the dynamo which would help transform the whole continent into the world's most competitive economy by the year 2010. Therefore also those growth strategies that have been based upon such assumptions (see Lisbon European Council 2000) need to be reexamined critically.

### **Consequences for Finland**

When the world economic situation started to deteriorate many Finnish authorities emphasized that Finland's economy was in a very good condition and that therefore its further growth wouldn't probably be seriously disturbed by the newest international turbulences. Especially one wanted to avoid interpretations according to which Finland would be in danger of facing a similar kind of crisis as was experienced a decade ago. It was pointed out that the balances of both companies and private households were in a much better shape and that the overall competitiveness of Finland's economy had also improved significantly during the last ten years. Even if the Finnish export industry might face some problems, the domestic markets were still expanding. Possible adjustments made in the export sector wouldn't therefore probably have any major effects upon the overall employment situation. If there is a slowdown, it ought to remain relatively shortlived (see e.g. Ministry of Finance 2001b).

On the other hand as a consequence of the recent structural changes Finland's whole national economy had become exceptionally strongly dependent upon the success of one single company, Nokia, and of the telecommunications cluster that has emerged under its leadership. More than any other major company Nokia has based its future growth strategies on an assumption about increasing synergies between mobility and internet. The company has expected also to make its biggest profits during the next years through fast expanding sales of third generation mobile networks, handsets and other mobile multimedia applications. Sonera - which became at the end of the 1990's Finland's second most valuable company - had invested a lot of money to new services marketed under the brand names of Zed, Plaza and Smart Trust. In collaboration with other companies Sonera purchased UMTS licences e.g. in Germany, Spain and Norway. The company's strategic moves haven't, however, led into the expected results, and Sonera has become the biggest victim of the TMT crisis in Finland. The company's debt burden increased to more than 5 billion euro, and in Autumn 2001 Sonera had lost about 95 per cent of its previous top market value. An extensive rights issue was carried through in order to save the company, and in Spring 2002 it was announced that Sonera will be sold to the Swedish Telia. Several other smaller Finnish TMT companies have got into big difficulties as their financial reserves have been ebbing out, and some of them have already gone bankrupt.

In comparison to many other big international players Nokia has as a matter of fact been able to defend until recently its competitive positions quite successfully. This can be seen for instance in the company's widening market shares, its exceptionally high level of profitability and the contin-

ued confidence of investors. But also Nokia has been forced to scale down its future growth prospects especially in the network products business. In recent times the company's technological and design leadership positions have been seriously challenged by the new models introduced e.g. by Sony Ericsson, Motorola and Samsung. As a consequence the value of Nokia's stocks has been gliding downwards almost two years in a row since Spring 2000, and in May 2002 it has fallen to about 15-16 euro from the previous top level of more than 60 euro.

The real depth of the worldwide telecommunications crisis has, however, become visible only gradually. For a while it was expected that the North American markets for cellular phones would start booming after the terrorist attack, but in fact the U.S. mobile phone penetration rate has remained continuously on a relatively low level. Simultaneously the West European mobile phone markets have shown clear signs of maturation. Also worldwide the sales of mobile phones declined in 2001 for the first time in history. The teleoperators have cut down significantly their infrastructure investment plans especially for the year 2002, and significant delays will probably also later be experienced in the launch of 3G services. This has forced also Nokia into a situation in which its network product sales have fallen rather significantly, and the company has cut down its personnel with about ten per cent during the year 2001. From the Finnish point of view it is important to notice that Nokia has started to move the focus of its operations from Europe to faster growing markets in Asia and in the Americas, and Nokia has also started to rearrange its supply chains accordingly. This has led into significant cutdowns of production among the company's main Finnish co-operating partners. Altogether the recent 20-25 per cent yearly growth of the production and exports of Finland's electronic and electrical industry has turned since autumn 2000 into an equally fast decline.

Simultaneously the market situation of Finland's forest industry has worsened due to a decreasing world market demand and falling prices. Overall the profits of large Finnish industrial companies have remained significantly below the record results achieved during the previous year. The level of investments in Finland has fallen, and the economy has been kept moving mainly by increases in domestic demand. The 5 per cent growth rate of Finland's GDP has turned into negative growth during the 4<sup>th</sup> quarter of 2001, and the same trend is expected to continue still at least during the 1<sup>st</sup> quarter of 2002. Thus the Finnish economy has entered into a downright recession, and also the rate of unemployment has started to increase again from the 9.4 per cent level reached in 2001. At the same time Finland's relatively large public sector financial surplus has started to melt away relatively fast, and it will probably turn into a deficit in 2003. The risks connected to the increased volatility of Finland's new economic structure (see e.g. Castells & Himanen 2001, 110-111, Wagner 2001, 19) seem thus to have realised very soon.

It is still very much open how fast the Finnish economy will recover from its newest recession. Most of the Finnish economic research institutions are prognosing economic growth between 1,5-2 per cent in 2002 and about 3 per cent in 2003 (see e.g. Ministry of Finance 2002). Many kinds of insecurities are, however, still connected for instance to the extent and timing of the economic recovery in the United States and to the operational decisions that will be made by Nokia. From our point of view the most important question is, however, whether Finland has been able to maintain its positions at the leading edge of today's information technology revolution. In answering this question one has to take into account how dramatically the prospects of advanced industrial countries' movement towards a wireless information society have changed. After all Finland's future growth possibilities have been closely connected to the country's assumed functioning as a living laboratory of the next-generation solutions. If Finland's positions have weakened significantly in this respect, we may have to wait rather long before Finland has again reached back to a solid growth path.



Certain signs indicate that Finland may really have in recent times lost some of its previous dynamism as an innovative user of new information and communication technologies. We have mentioned already earlier that for instance according to the European Union's newest benchmarking report Finland reaches in many rankings only slightly above the EU average<sup>8</sup>. We have also pointed out that South Korea and Japan have recently become known as the world's foremost developers of wireless internet, and nowadays it is speculated whether certain Japanese applications might start spreading also in Western Europe (see *The Economist* 2002b). The weakening of Finland's momentum of change may have been caused by different kinds of factors. The actual results of some earlier initiatives may have remained below expectations, new business prospects connected to the development of new applications are nowadays much more limited than they were a couple of years ago, and some Finns may also feel that the benefits of new applications haven't been distributed on a just manner. Finland's good international reputation may also have lured some of the actors into a false self-complacency. It may be assumed that Finland is automatically ahead of others in matters related to the use of new information and communication technologies even when concrete evidence shows that this isn't at all the case.

One should furthermore pay attention to the fact that even if serious warnings have recently been presented by the management of Nokia and some other companies about Finland's excessively high taxes, the warnings haven't necessarily been received in Finnish public discussion in the spirit that something ought to be done. On the contrary the present levels of taxation have been defended for instance in the country's leading newspaper by arguing that the most important objective at present is to secure the funding of the welfare state. It has also been maintained that the welfare state provides companies with so many advantages that they as a matter of fact ought to pay the high taxes without any special complaints. Thus it seems that neither all the key political actors nor the Finnish social scientists have really realised the tough realities of today's global competition for instance with respect to the need to renew the country's existing welfare state institutions.

### **Some Longer-Term Challenges**

It won't necessarily last very long before key decisions are made with significant consequences for the whole future development of Finnish information society. For instance Nokia is continuously considering where to locate its future R&D operations and other strategic activities. Many other companies are also assessing the locational advantages and disadvantages they face if they decide to do business in Finland. Companies may be attracted for instance by the innovative environments and professional atmosphere that can be found in some Finnish growth centres. But also other factors count, and in all important respects the Finnish locations may not feel quite so attractive. Companies operating on the global marketplace cannot wait for long to see whether the possible problems will some day be sorted out or not. Finland and its main growth centres must therefore be continuously very alert and respond immediately to all signals if they want to enjoy continuously about the presence of high-level business activities operating in key areas of growth.

---

<sup>8</sup> In terms of mobile phone penetration rate Finland has fallen globally to a fifth place after Luxembourg, Iceland, Italy and Austria in Summer 2001 (Statistics Finland 2002) and in terms of the number of internet hosts per capita Finland has fallen behind the United States and Iceland (Tieke 2002). In terms of household internet connections Finland ranks within the EU as number four after The Netherlands, Sweden and Denmark, in terms of ADSL prices seventh, according to the amount of secure servers fourth, according to the amount internet connections at schools third, according to computer training received at work third, according to experiences about e-commerce seventh and according to the availability of basic services on line second. See EU Commission 2002

Within a little longer time perspective Finland will face very big challenges because of significant changes happening in the demographic structure of its population. Similar changes are nowadays taking place in practically all advanced industrial countries (see e.g. OECD 2000d), but in Finland's case the shifts will be especially dramatic. The large age cohorts that were born after the Second World War will start retiring fairly soon, and the new age cohorts which should replace them in Finnish workplaces are much smaller. The total supply of labour force will probably start decreasing already sometimes around the year 2005, and the trend cannot be changed for instance through increased immigration. After that the Finnish economy cannot grow faster than is allowed by the yearly increases in labour productivity (see Ministry of Labour 2001a). If Finland isn't able to mobilise its human resources more effectively before entering to that stage it will be almost impossible to adjust the taxation of labour onto an internationally competitive level. And if the taxes remain high, the most dynamically developing economic activities will almost surely be continuing their operations somewhere else<sup>9</sup>.

This does not, however, mean that Finland would already have lost the game and that the idea of a Finnish success story should be abandoned. On the contrary, Finland has inherited from the 1990's a highly developed technological and business culture. This culture will have good possibilities to grow further also during the next stage of the information technology revolution which will be based on increasing synergies between internet and mobility. But such a culture can flourish only in a well functioning and supportive environment, and the creation of such an environment will require a thorough dynamisation of Finland's traditional economic sectors. At the same time it will require a radical renewal of the Finnish welfare state and of some of its basic institutional arrangements. This is probably the point in which this paper's interpretation about the Finnish 'model' diverges most from the one presented by Castells and Himanen in their book. Castells and Himanen seem to think that significant positive synergies prevail between the new economy and the Finnish welfare state in its present form, whereas this paper tries to show that significant problems have been connected to its functioning at least since the 1980's. The extraordinarily high rates of growth during the 1990's have perhaps kept a number of structural problems hidden, but they have become more clearly visible again when the economic situation has started to deteriorate.

In order to formulate the issue more clearly let us notice that Castells and Himanen have presented in their book three alternative interpretations about the meaning of Finland being an information society and welfare state simultaneously. This coincidence may according to them be seen as a proof of real synergies between the two, but it may also be seen to follow from a more or less accidental co-existence of these features. As a third option the authors present that this combination may have been "just an optical illusion, hiding the fact that the information society is rising and the welfare state fading away, and we are just witnessing the last overlapping of the two very different trends. If that were the case, Finland's reputation would be just an image without justification" (Castells & Himanen 2001, 48). In writing about the Finnish information society 'model' the authors have clearly chosen the first one of the three alternatives<sup>10</sup>. This paper's interpretation is much closer to the third option - with the important correction that what seems currently to be fading away in

---

<sup>9</sup> The questions of Finland's future demographic changes and their implications to the future growth prospects of the economy, taxation and the funding of the welfare state have been discussed very actively in Finland. A rather widespread consensus prevails for instance about the need to raise the average retirement ages significantly as soon as possible. It has also been considered important to get the young generations from school to working life at an earlier age than is customary still at present. See e.g. Ministry of Finance 2001c)

<sup>10</sup> The authors have chosen this interpretation despite the fact that many of the problematic features they see in today's Finnish society - like the existing divisions between the old and new economy, the rise of new inequalities connected to high unemployment, byzantine features in the Finnish administrative culture, lack of entrepreneurialism etc. - could be seen equally well as systemic consequences of the country's existing welfare state model as just individual deviations from its basically orderly functioning.

Finland is rather the information society than the welfare state, and this is happening because the Finnish society hasn't been able to renew its welfare state to the extent required in today's conditions. In this connection it is important to point out that a renewal of the welfare state and its dismantling are supposed to be entirely different things. It is also important to point out that a radical renewal of the welfare state does not mean that one should simultaneously abolish efforts to build information society on a socially feasible manner. On the contrary, the basic intention is to attain this objective on a more modern and effective manner.

Within this perspective one of the most challenging tasks will undoubtedly be the modernization of Finland's present labour political regime. The Finnish authorities have until recently been following fairly traditional employment policies. This means that they have tried to restore full employment mainly through high levels of economic growth, whereas much less attention has been laid upon major structural reforms in the functioning of labour market institutions (see e.g. Ministry of Labour 2001b). In order to reach into the forefront of today's social and economic development the emphasis should in future be shifted towards searching new kinds of tradeoffs between increased flexibility and well functioning social security networks<sup>11</sup>. At the same time the Finnish social benefit system should be transformed to become more work-oriented. The role of the welfare state ought to be redefined on the basis of shared responsibilities between the state, private companies and third sector organizations. Finland should move towards an active society in which communities have a bigger stake at solving problems that have traditionally been left to welfare state bureaucracies. New information and communication technologies ought to be used actively in all parts of the public sector in order to increase the productivity of their operations. The general objective should be to build an effectively functioning overall system of electronic government. New ICT's ought to be purchased actively also within the households in order to improve the citizen's possibilities to use the new e-government services.

By focusing on just the most essential tasks and by executing them in collaboration with other actors the Finnish welfare state would be able to meet its obligations with lower rates of taxation, and more room would be left for entrepreneurship and the creation of new activities within the private sector. Determinate efforts ought to be made simultaneously in order to raise the level of productivity in all sectors of the Finnish economy. An effectively functioning domestic economy would contribute positively also to the development of more internationally oriented business activities. These kinds of revisions in the sharing of responsibilities between the private and public sector shouldn't, however, prevent the state from adopting an active developmental role and from striving for instance towards a further strengthening of the Finnish innovation system.

In searching models for these kinds of reforms one shouldn't look only at those innovative socio-economic strategies that are nowadays being developed in other West European countries. One should be conscious about the fact that the United States has during the last years proceeded far ahead of Western Europe in renewing its economic and societal institutions. Under its current presidency the country intends to proceed still further in searching new possibilities for market-oriented reforms (see e.g. the 2002 Economic Report of the President, 184-192). Much bolder reforms will therefore be needed also in Western Europe if the European Union really wants to catch the lead of the United States as the world's strongest economy. Otherwise there is an evident danger that the present productivity gap between the United States and Western Europe will grow still further and that the European currency will continue weakening in comparison to the U.S. Dollar. Learning

---

<sup>11</sup> Here one could perhaps point out that the positive assessment presented by Castells and Himanen about the current flexibility of Finland's labour markets (Castells & Himanen 2001, 54-55) is not fully in accordance with the conclusions that can be drawn for instance on the basis of recent comparative analyses made by OECD or IMF; see e.g. OECD 1999b, 41-58, IMF 2001a, 24-39

from the U.S. experiences is a necessity even if one wouldn't want to abandon the basic values of solidarity and cohesion which have always formed an essential part of the European socio-economic strategies<sup>12</sup>.

## Conclusions

We have now come to the end of our analysis, and it is time to get back to the original questions about whether we can speak about a specific Finnish 'model' of information society and whether some useful lessons can be learned also in a wider international perspective about the ways in which Finland has been able to create a dynamically growing new economy without abolishing the principles of social solidarity.

Our first conclusion is that Finland has really been able to achieve excellent results during the 1990's in renewing its old economic structures, and in this process Finland has been able to maintain its basic features as a relatively egalitarian society especially if comparisons are made to the United States and most other advanced industrial societies. But Finland's success story both as a dynamically growing economy and as a leading-edge information society may have ended in its recently advertised forms as a consequence of the recent economic recession. Serious drawbacks are caused also by the collapse of those illusory expectations that were connected to dotcoms and to next-generation mobile phone services. From now on Finland's achievements will not necessarily be at all exceptional in comparison to other advanced industrial countries. In certain respects Finland may even have to fight hard in order not to fall behind the developments that are taking place elsewhere.

Secondly we can conclude that Finland has not invented a magic formula with the help of which one could avoid those innovatory pressures that are felt in all modern welfare states in an era of tightening global competition and increasing performance requirements. It may indeed be true that new information and communication technologies can be taken to use relatively fast in a society in which all citizens have a certain basic education and in which they can afford to purchase and use the new devices. It may also be true that a modern, flexible network economy has good possibilities to grow in an environment in which companies can find a highly developed information infrastructure, a stable regulatory regime, a well functioning innovation system, a broad supply of skilled labour force as well as an unhierarchical and egalitarian culture. And many kinds of benefits can undoubtedly be gained if high-trust relations prevail between the different actors. But even if modern welfare states are to a certain extent well prepared to offer such advantages, they are also strained heavily by high taxes, too much regulation, different kinds of cultural and institutional rigidities and lots of inefficiencies.

These are problems that have to be tackled with somehow in Finland as well as in all the other European welfare states. Let us still repeat that it will probably be possible to find new kinds of positive tradeoffs between an effectively functioning market system and modern welfare state insti-

---

<sup>12</sup> One big question in this connection will be to find ways in which social sciences could contribute on a positive manner to the search of new socioeconomic strategies. So far for instance the general stance of Finnish social science has been fairly conservative in discussions about the future of the welfare state or about the ways in which research could promote the development of information society in Finland. In future it will be extremely important that the social scientists are prepared to analyse very carefully the development and spread of new information and communication technologies in different areas of social life and among the various social strata as well as the problems that arise in the course of these changes. It is equally important that the social scientists are ready to do realistic and policy-relevant research about the adjustment pressures and possibilities for renewal of the existing welfare state institutions. So far the discussion about such new challenges has as a matter of fact just only begun in Finland. See e.g. Pukkila 2002

tutions. But such tradeoffs must first be found through innovative policies and – to be frank - Finland has not in recent times been among the foremost reformers of its welfare state institutions. For instance Denmark, Netherlands and a number of Angloamerican countries have shown during the last years much more dynamism in this respect. As long as things remain in Finland as they are, the country does not have necessarily very much to teach to others in the area of institutional reform, and it may be losing also essential parts of its earlier technological innovativeness. But things may turn essentially different if Finland and its key societal actors recognize the real challenges of our time and Finland proves capable of reinventing itself not only as an advanced information society, but also as a modern and future-oriented welfare state.

## References:

2001 Economic Report of the President (2001): Transmitted to the Congress January 2001 together with the Annual Report of the Council of Economic Advisers Washington DC: United States Government Printing Office

2002 Economic Report of the President (2002): Transmitted to the Congress in February 2002 Together with The Annual Report Of the Council of Economic Advisers, Washington DC: United States Government Printing Office

Aiginger, Kurt, Hutchenreiter, Gernot, Hollenstein, Heinz, Knoll, Norbert, Leo, Hannes, Wieser, Norbert (2001): Innovation and Productivity in European Manufacturing. WIFO Background working paper commissioned by the European Commission, DG Enterprise 21.7. Wien: WIFO

Ali-Yrkkö, Jyrki, Paija, Laura, Reilly, Catherine, Ylä-Anttila, Pekka (2000): Nokia - A Big Company in a Small Country. Helsinki: ETLA B

Bank of Finland (2002): Economic Statistics on Finland: Direct Investment, 12-Month Moving Totals. <http://www.bof.fi/env/rhinden.htm>

Brown, Barry, Green, Nicola, Harper, Richard (Eds.) (2001): Wireless World. Social and Interactional Aspects of the Mobile Age. London: Springer

Castells, Manuel (1996-7): The Information Age: Economy, Society and Culture Vols. 1-3 (Vol 1: The Rise of the Network Society; Vol. 2: Power and Identity; Vol. 3: End of Millennium). Oxford: Blackwell

Castells, Manuel (2000): The Rise of the Network Society, Second Edition. Oxford: Blackwell

Castells, Manuel (2001): The Internet galaxy: reflections on the Internet, business, and society. Oxford : Oxford University Press

Castells, M., Himanen, Pekka (2001): The Finnish Model of the Information Society. Helsinki: Sitra

Council of Economic Advisors for the U.S. President (2000): The Economic Impact of Third-Generation Wireless Technology. Washington D.C.

CSC News (2001): CSC 30 Years -Some Personal Notes and Memoirs. CSCNews 13, 4, 8-11

Drucker, Peter F. (1993): Post-Capitalist Society. New York: HarperCollins

Economic Policy Committee of the European Union (2001): Annual Report on Structural Reforms 2001. Report Addressed to the Council and the Commission. Brussels 6 March. ECFIN/EPC/171/01-EN

Economist, The (2002): 3G by Any Other Name. The Economist January 10th-16th, 66 (2002a)

Economist, The (2002): A la i-mode. Will Japan's successful mobile-Internet system take off in Europe? The Economist Mar 28th (2002b)

- ESRC (2002): The e-Society Programme Specification. London: Economic and Social Scientific Research Council. [http://www.esrc.ac.uk/ESRCContent/researchfunding/e-Society\\_specification.asp](http://www.esrc.ac.uk/ESRCContent/researchfunding/e-Society_specification.asp)
- European Commission (2001): Summary Report. Web-based Survey on Electronic Public Services (Results of the first measurement: October 2001). Luxembourg: European Commission, DG Information Society
- European Commission (2002): Information Society Policy - An Overview and History. See [http://europa.eu.int/information\\_society/newsroom/library/referencedoc/index\\_en.htm](http://europa.eu.int/information_society/newsroom/library/referencedoc/index_en.htm) (2002a)
- European Commission (2002): eEurope Benchmarking Report. Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions. Brussels: Commission of the European Communities
- Finland's Regional Councils - the Association of Finnish Local and Regional Authorities (2001): The Views of Finland's Regions Concerning European Regional Development Policy - Memorandum to Commissioner Michel Barnier in Helsinki 14.9. <http://www.kuntaliitto.fi/english/barniereng.htm>
- Finnish Population Register Centre (2002): FINEID and Supporting Technologies Presentation. <http://www.sahkoinenhenkilokortti.fi/>
- Finland's Regional Councils - the Association of Finnish Local and Regional Authorities (2001): The views of Finland's regions concerning European regional development policy - memorandum to Commissioner Michel Barnier in Helsinki, 14.9.2001. <http://www.kuntaliitto.fi/english/barniereng.htm#alku>
- Förster, M.F. (2000): Trends and Driving Factors in Income Distribution and Poverty in the OECD Area. Labour Market and Social Policy - Occasional Papers No. 42. Paris: OECD
- Giddens, Anthony (ed.) (2001): The Global Third Way Debate. Cambridge: Polity Press
- Godley, Wynne, Izurieta, Alex (2001): As The Implosion Begins . . . ? Prospects and Policies for the U.S. Economy: A Strategic View. Blithewood, NY: The Levy Economics Institute
- Greenspan, Alan (2001): Testimony of Chairman Alan Greenspan Concerning the Federal Reserve Board's semiannual monetary policy report to the Congress before the Committee on Financial Services, U.S. House of Representatives July 18. Washington DC: The United States Federal Reserve Board
- Hernesniemi, Hannu, Kymäläinen, Pasi, Mäkelä, Pekka, Rantala, Olavi, Rautkylä-Willey, Ritva, Valtakari, Mikko (2001): Suomen avainklusterit ja niiden tulevaisuus. Tuotanto, työllisyys ja osaaminen (Finland's Key Clusters and their Future. Production, Employment and Skills, in Finnish with an English summary). Helsinki: ETLA B 179
- Hienonen, Risto (2001): Electronic and Electrical Business in Finland. Forecast 2001-2005. Helsinki: VTT Automation & SET
- Himanen, Pekka (2001): The Hacker Ethic and the Spirit of the Information Age. New York: Random House
- Hofstede, Geert (1984): Culture's Consequences International Differences in Work-Related Values. Newbury Park (Calif.): Sage
- Honkapohja, Seppo, Koskela, Eero & Paunio, Jouko (1996): The Depression of the 1990's in Finland: An Analytic View. Finnish Economic Papers 9 (1)
- Husso, Kalevi, Karjalainen, Sakari, Parkkari, Tapio (eds.) (2000): The State and Quality of Scientific Research in Finland. A Review of Scientific Research and Its Environment in the Late 1990s. Helsinki: Academy of Finland
- Häikiö, Martti (1998): Alkuräjähdyks (The Big Bang of GSM - Mobile Phone Revolution. The Story of Radiolinja, Finland, 1988-1998. In Finnish with an English summary). Helsinki: Edita
- Häikiö, Martti (2001): Nokia Oyj:n historia ('The History of Nokia Oyj, in Finnish), vols. 1-3. Helsinki: Edita
- IMD (2001): World Competitiveness Yearbook 2001. Lausanne: IMD

- IMF (2000): World Economic Outlook May. Washington DC: IMF
- IMF (2001): Finland: 2001 Article IV Consultation – Staff Report. Washington: IMF Country Report No 01/213, November
- IMF (2001): Finland: Selected Issues. Country Report No. 01/215. Washington DC: International Monetary Fund
- Jalava, Jukka, Pohjola, Matti (2001): Economic Growth in the New Economy. Evidence from Advanced Economies. Helsinki: UNU/Wider Discussion Papers 2001/5
- Kasesniemi, Eija-Liisa, Rautiainen, Pirjo (2002): Mobile Culture of Children and Teenagers in Finland. In J.E. Katz, M. Aakhus (eds.): Perpetual Contact. Mobile Communication, Private Talk, Public Performance. Cambridge: Cambridge University Press 2002, 170-192
- Kasvio, Antti (2001): 'Information Society' as A Theoretical Research Programme. Methodological Starting Points for Concrete Analysis. <http://www.info.uta.fi/winsoc/engl/lect/THEORY.htm>
- Kiander, Jaakko (ed.) (2000): 1990s Economic Crisis the Research Programme of the Academy of Finland: Conference 1999. Helsinki: Valtion taloudellinen tutkimuskeskus
- Klinge, Martti (1997): A Brief History of Finland. Helsinki: Otava 1997
- Kopomaa, Timo (2000): The City in Your Pocket. Birth of the Mobile Information Society. Helsinki: Gaudeamus
- Koski, Heli, Rouvinen, Petri, Ylä-Anttila, Pekka (2001): Uuden talouden loppu? (The End of New Economy?, in Finnish). Helsinki: ETLA B 184, Sitra 245
- Kumar, Krishan (1995): From Post-Industrial to Post-Modern Society New Theories of the Contemporary World. Oxford: Blackwell
- Liikanen, Hanna (2002): Tietotekniikan lupaus ja sosiaali- ja terveystalouden kehittäminen - Makropilotin arviointia ('Promise of Information Technology and the Development of Social and Health Services - Evaluating the Satakunta Macro Pilot Project'). Unpublished research report, in Finnish
- Lisbon European Council (2000): Presidency Conclusions 23 and 24 March. Brussels: Commission of the European Communities
- Mandel, Michael (2000): The Coming Internet Depression. New York: Basic Books
- Mansell, Robin, Wehn, Uta (eds.) (1998): Knowledge Societies: Information Technology for Sustainable Development. Oxford: Blackwell
- Meridden, Trevor (2001): Big Shots, Business the Nokia Way: Secrets of the World's Fastest Moving Company. New York: Capstone Pub.
- Ministry of Finance (1995): Suomi tietoyhteiskunnaksi - kansalliset linjaukset (Strategy for the Finnish Information Society, in Finnish). Helsinki: Painatuskeskus Oy
- Ministry of Finance (2001): Information Technology Within the Government 2000. Helsinki: Ministry of Finance (2001a)
- Ministry of Finance (2001): Economic Bulletin 2/2001 May 29<sup>th</sup>. Helsinki: Ministry of Finance (2001b)
- Ministry of Finance (2001): Economic Policy Challenges in Coming Years: Ageing requires early policy actions. Press Release 29th May. Helsinki: Ministry of Finance (2001c)
- Ministry of Finance (2002): Economic Bulletin 1/2002, March 9. Helsinki: Ministry of Finance, Economics Department

- Ministry of Labour (2001): Interim report of the project Preparing for the changes in labour market caused by the baby boom generation. Helsinki: Ministry of Labour 29.8. (2001a)
- Ministry of Labour (2001): Finland'S National Action Plan For Employment. Helsinki: Ministry Of Labour April (2001b)
- Ministry of Transport and Communications (2000): Case Mobile Finland. Helsinki: Ministry of Transport and Communications, Publications 16/2000
- Moody, Glyn (2001): Rebel Code: Linux and the Open Source Revolution. San Francisco: Perseus Press
- (2001): The NBER's Business-Cycle Dating Procedure Business Cycle Dating Committee, Release of September xxth. Cambridge, MA: National Bureau of Economic Research
- Nurmela, Juha (2001): Three Years of the Information Society. A Longitudinal Survey of the Use Made of Modern Information and Communications Technology in Finland. Helsinki: Statistics Finland, Reviews 2000/4
- OECD (1999): The Future of the Global Economy. Towards a Long Boom? Paris: OECD (1999a)
- OECD (1999): Implementing the OECD Jobs Strategy: Assessing Performance and Policy. Paris: OECD 1999 (1999b)
- OECD (2000): A New Economy? The Changing Role of Innovation and Information Technology in Growth. Paris: OECD, DSTI (2000a)
- OECD (2000): Measuring the ICT Sector. Paris: OECD (2000b)
- OECD (2000): OECD Economic Surveys: Finland. July 2000. Paris: OECD (2000c)
- OECD (2000): Reforms for an Ageing Society. Paris: OECD (2000d)
- OECD (2001): OECD Communications Outlook 2001 Edition: Information Society. Paris: OECD (2001a)
- OECD (2001): Understanding the Digital Divide. Paris: OECD (2001b)
- OECD (2001): Knowledge and Skills for Life: First Results from PISA 2000. Paris: OECD (2001c)
- OECD (2001): OECD Science, Technology and Industry Scoreboard: Towards a Knowledge-based Economy 2001 Edition. Paris: OECD (2001d)
- OECD (2002): Benchmarking Industry-Science Relationships. Paris: OECD (2002a)
- OECD (2002): Standardised Unemployment Rates in OECD Countries.  
<http://www.oecd.org/pdf/M00027000/M00027156.pdf> (2002b)
- Paija, Laura (2000): ICT Cluster - The Engine of Knowledge-driven Growth in Finland. Helsinki: ETLA Discussion Papers Nro 733
- Paija, Laura (ed.) (2001): Finnish ICT Cluster in the Digital Economy. Helsinki: ETLA B 176
- Pohjola, Matti, Tainio, Risto, Lilja, Kari (2000): Economic Performance of Finland after the Second World War: From Success to Failure. In: S. Quack, G. Morgan & R. Whitley (eds.): National Capitalism, Global Competition, and Economic Performance. Amsterdam: John Benjamins, 277-289
- Presidential Working Group on Employment (1994): Unemployment Down to 200 000. September 30. Helsinki: Ministry of Labour
- Pukkila, Tarmo (2002): Yliopisto suunnannäyttäjänä ('The University as a Guide to the Future', in Finnish). Aikalainen 6, 5



- Pulkkinen, Matti (1997): *The Breakthrough of Nokia Mobile Phones*. Helsinki: Helsinki School of Economics and Business Administration A-122
- Puro, Jukka-Pekka (2002): *Finland: A Mobile Culture*. In J.E. Katz, M. Aakhus (eds.): *Perpetual Contact. Mobile Communication, Private Talk, Public Performance*. Cambridge: Cambridge University Press 2002, 19-29
- Riihelä, Marja, Sullström, Risto, Tuomala, Matti (2001): *What Lies Behind the Unprecedented Increase in Income Inequality in Finland During the 1990's*. Helsinki: VATT Discussion Papers 247
- Reynolds, Paul D., Camp, S. Michael, Bygrave, William D., Autio, Erkkö, Hay, Michael: *Global Entrepreneurship Monitor. 2001 Summary Report*. London: London Business School and Babson College
- Rosenberg, D. (2002): *Cloning Silicon Valley. The Next Generation High-Tech Hotspots*. London: Reuters
- Rouvinen, Petri (2002): *Competitiveness in the New Economy*. Discussion Papers Nro 786. Helsinki: ETLA
- Rheingold, Howard (1995): *The Virtual Community. Finding Connection in a Computerized World*. London: Mandarin
- Silberman, Steven (1999): 'Just Say Nokia'. *Wired* September, 135-149, 202
- Sitra (1998): *Quality of Life, Knowledge and Competitiveness. Premises and Objectives for Strategic Development of the Finnish Information Society*. Sitra 211. Helsinki: Sitra
- Statistics Finland (2002): *Statistics on the Finnish Information Society: Opinions on the information society and data protection*. [http://www.stat.fi/tk/yr/tietoyhteiskunta/nakemys\\_en.html](http://www.stat.fi/tk/yr/tietoyhteiskunta/nakemys_en.html) (2002a)
- Statistics Finland (2002): *Numbers of mobile phones relative to population in certain countries 1.6.2001*. [http://www.stat.fi/tk/yr/tietoyhteiskunta/infrastrukturi\\_liittymatvrtmaailma\\_taulukko\\_en.html](http://www.stat.fi/tk/yr/tietoyhteiskunta/infrastrukturi_liittymatvrtmaailma_taulukko_en.html) (2002b)
- Stehr, Nico (1994): *Knowledge Societies*. London: Sage
- Steinbock, Dan (2000): *Finland's Wireless Valley / From Industrial Policies Toward Cluster Strategies*. Helsinki: Ministry of Transport and Communications, Publications 36/2000
- Steinbock, Dan (2001): *The Nokia Revolution : The Story of an Extraordinary Company That Transformed an Industry*. New York: Amacom
- Tekes (2002): *R&D In Finland Statistics*. <http://www.tekes.fi/eng/rd/statistics.html>
- Tieke (2002): *Statistics about the Spread of Internet (in Finnish)*. See <http://www.tieke.fi/tietopalvelut.nsf?OpenDatabase> (2.4.2002)
- Torvalds, Linus, Diamond, David (2001): *Just for Fun: The Story of an Accidental Revolutionary*. New York: Harper-Business
- UNDP (2001): *Human Development Report 2001 - Making New Technologies Work for Human Development*. New York: Oxford University Press
- Webster, Frank (2002): *The Information Society Revisited*. In Lievrouw, L.A., Livingstone, S.N. (eds.): *The Handbook of New Media: Social Shaping and Consequences of ICT's*. Oxford: Blackwell
- World Economic Forum (2001): *World Competitiveness Yearbook 2001-2002*. New York: Oxford University Press