

Development of Information Society in Finland

Where it came from, where it is going, and what we mean by “development”

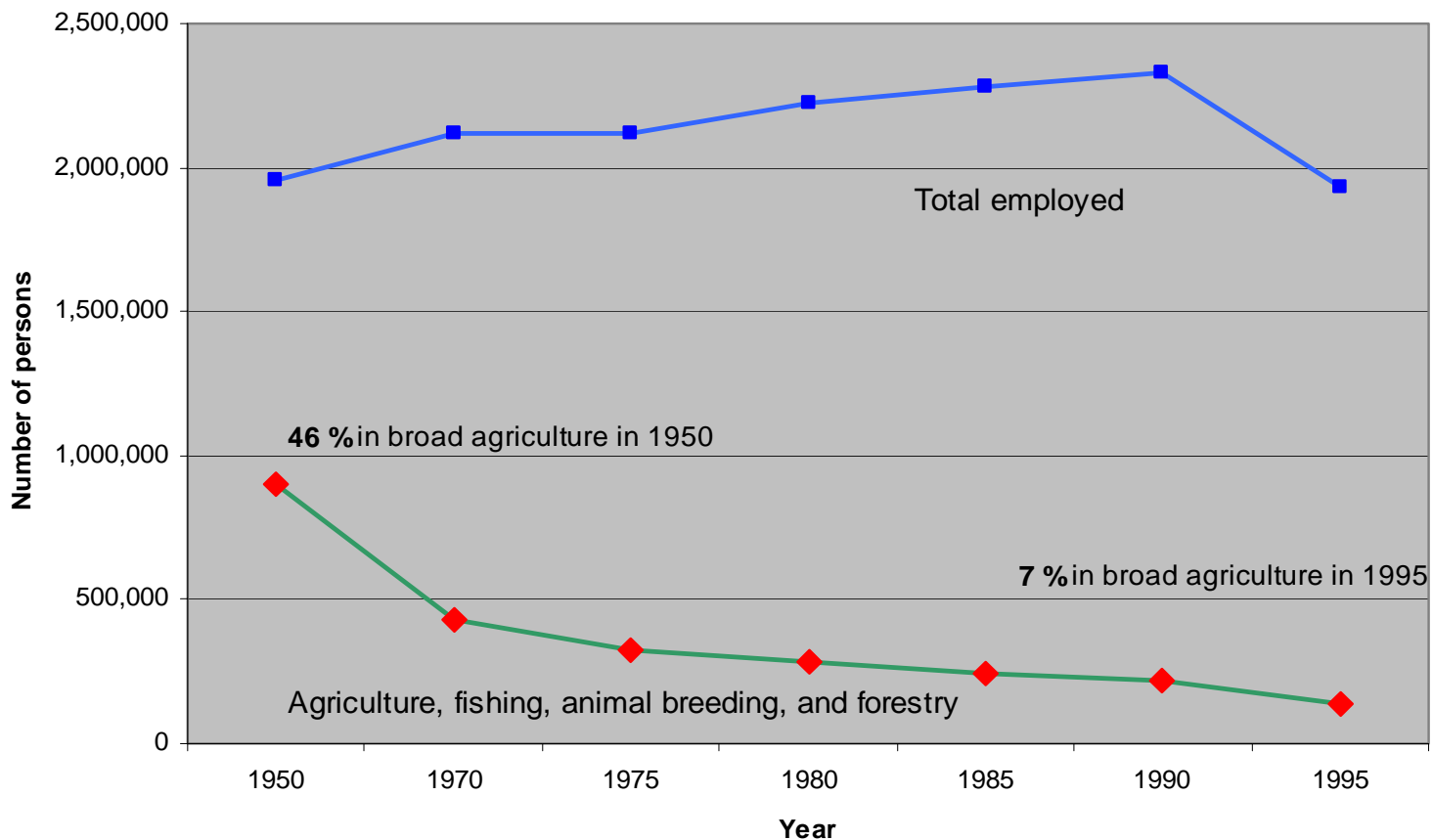
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Agenda

- Sources of success: the roots of rapid socio-economic transformation in Finland
 - Some personal observations on the history of the Finnish information society
- An important detail: case Nokia
- Challenges for the Finnish model
- Linking human, economic and technical development (work in progress)

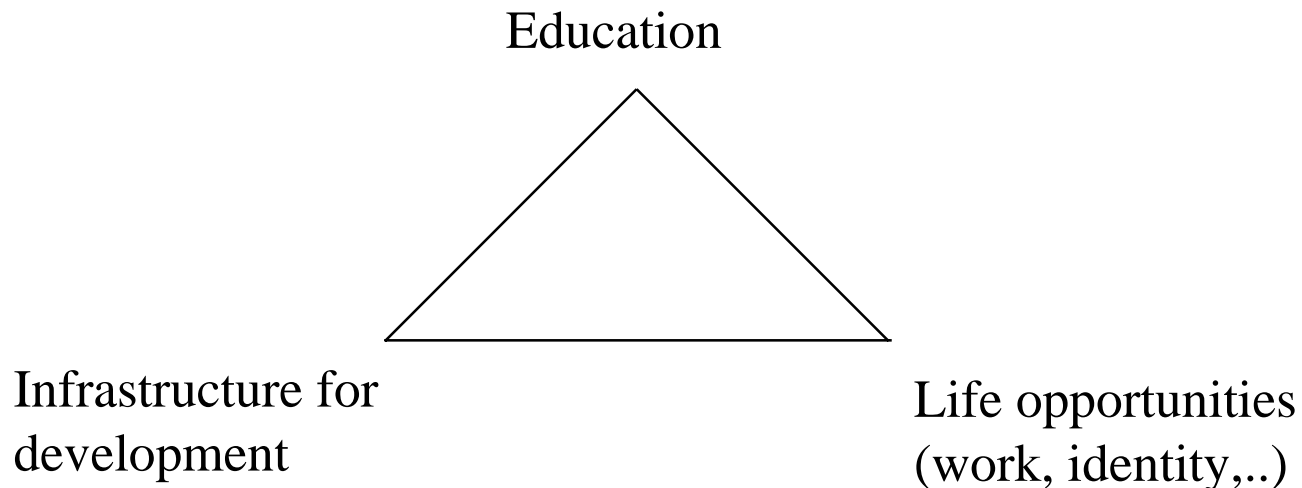
From Agriculture to Industrial Society

Labor force in Finland, 1950-1995



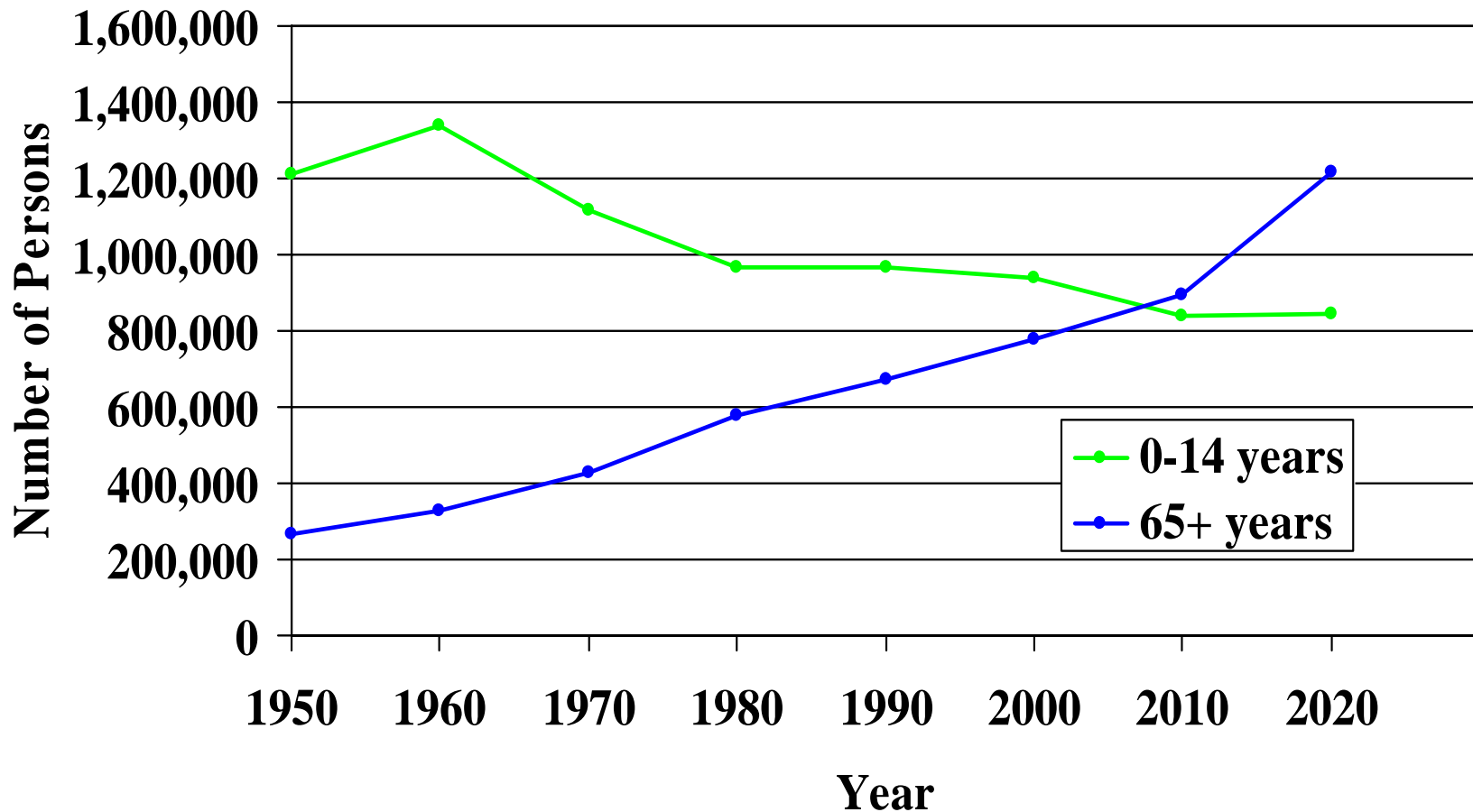
Nordic Welfare State in Finland, 1965-1975

- Baby boom of 1945-1955
- Expansion of the public sector
- Increasing levels of education
- Investment in regionally balanced university system, libraries, culture
- Rapid urbanization
- Shared experiences of war and relocation of people who lost their homes



The baby boom in 1960s

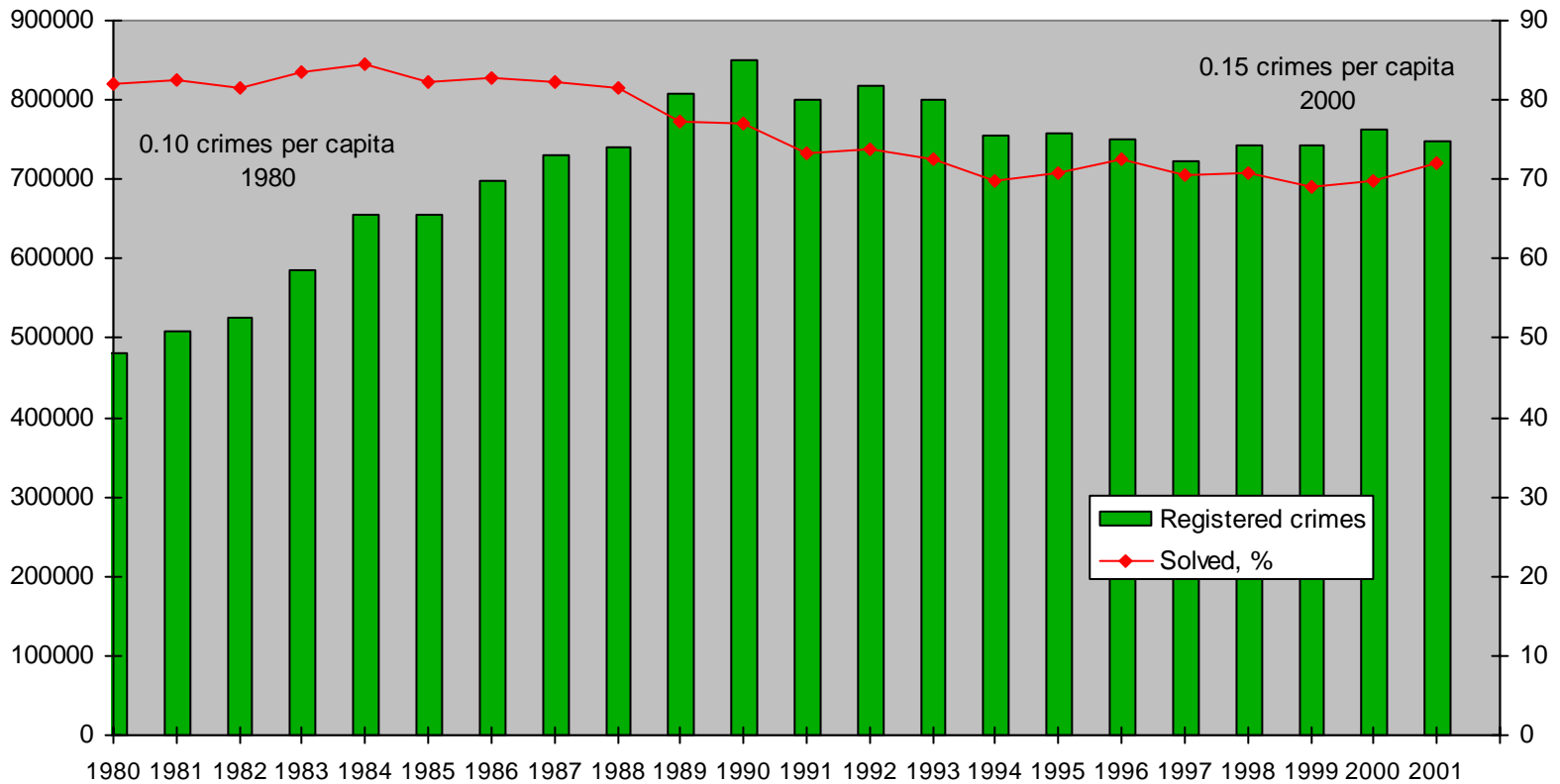
(and the aging of the population)



Characteristics of the Finnish Culture in the 1980s

- Small cultural and economic differences
- High social mobility through education
- Low hierarchy and open communication culture
- High trust culture
 - Non-existent corruption
 - High trust on public services and institutions
 - Low crime rates

Crime in Finland



Technical Infrastructure, 1980s

- **1978:** The Finnish Technology Committee introduces the theme of "Information Society" (inspired by *Nora – Minc: L'Informatisation de la société*)
- **1980:** Telset videotex service started (similar to Minitel, 1981)
- Computer networks
 - Public data network launched in 1983
 - Ministry of Education launches FUNET, the Finnish University Network, 1983
 - FUNET links the Finnish university computer centers, 1985
 - **1988:** Finland gets access to NSFNET/Internet, in a joint effort by Nordic countries (first countries to join the net: .ca, .sw, .dk, .no, .ic, .fi, .fr)
 - **1988:** "General information network and the citizen's knowledge terminal" -project. This leads to broad development of information services, commercial e-mail systems, electronic banking, etc. In 1988 it was predicted that about 20 per cent of the Finnish population will be users of the information network by 2000.
 - **1988:** Online share trading starts in Finland

Technical Infrastructure, 1980s

- Telecommunications
 - Nordic Mobile Telephone (NMT) system launched 1982
 - Competition starts in digital communications (X.25 packet-switched networks), 1985
 - New telecommunications law, 1986
 - Ministry of Traffic and Communications orders the competing digital networks to provide connections between the networks, 1989

Some Internet Milestones

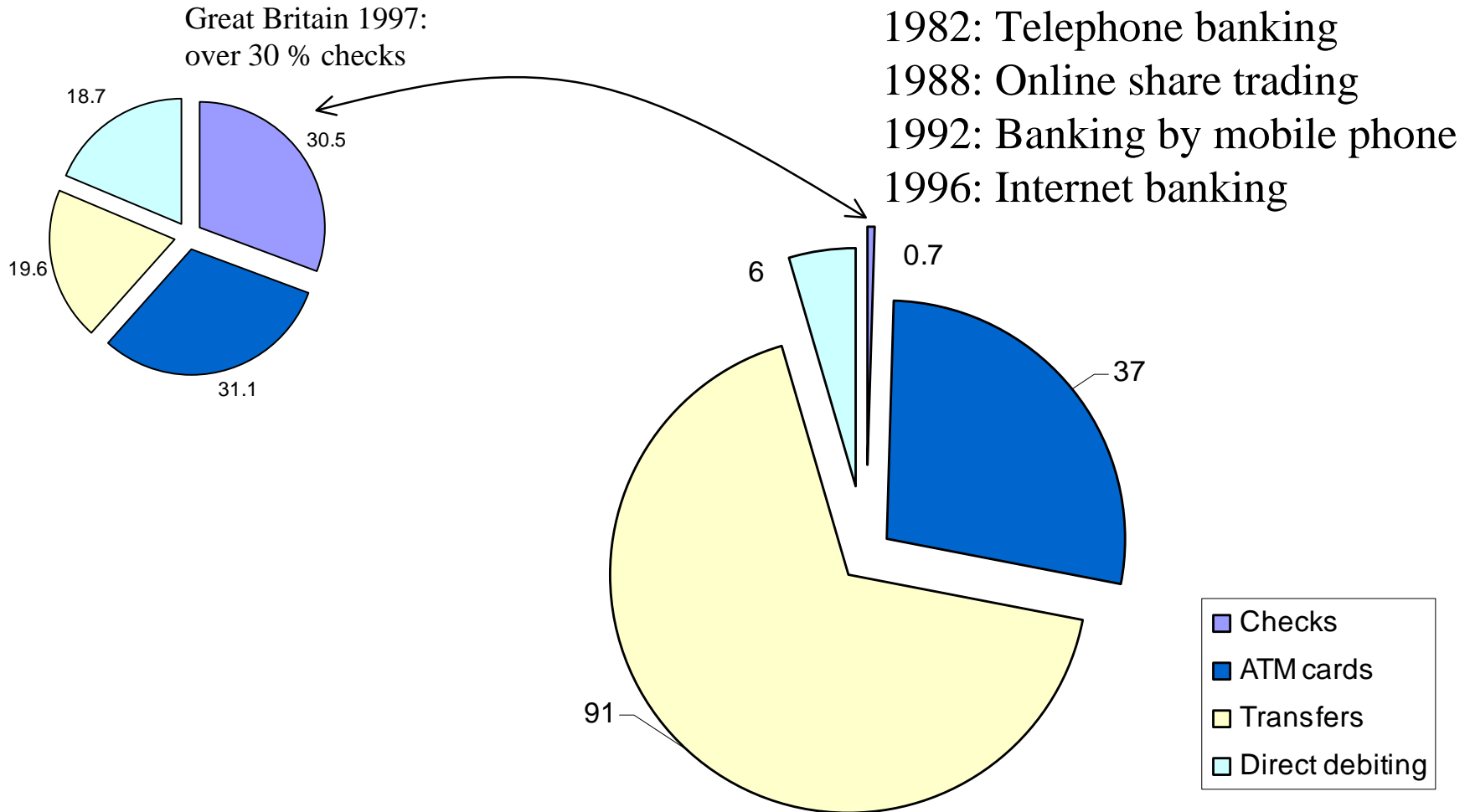
- **1988:** Jarkko Oikarinen distributes IRC (Internet Relay Chat, University of Oulu)
- **1991:** Linus Torvalds distributes the first version of Linux (University of Helsinki)
- **1992:** First graphical WWW-browser developed (Erwise, Helsinki University of Technology)
- **1992:** FUNET and Helsinki University of Technology launch the 5th and 8th WWW –servers in the world,
(first three are CERN, 4th is Dutch High-energy physics)
- **1993:** The First "Information Society Strategy." Focus on information and communication technologies and related competencies (similar to NII).
- **1993:** A "drivers license" for information networks (consists of seven modules)
- **August 1998:** Finland is the first country where mobile phone penetration exceeds 50% of the population

Mobile Phone Penetration

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Finland	3	2	2	1	3	3	1	1	1	1
Sweden	1	1	1	2	1	1	3	3	3	4
Norway	2	3	3	3	2	2	2	2	2	2
Island	4	4	4	5	6	6	6	7	4	3
USA	7	6	5	6	5	5	8	9	14	16

Source: OECD, 2000

Electronic Banking in Finland: customer transactions in 1998



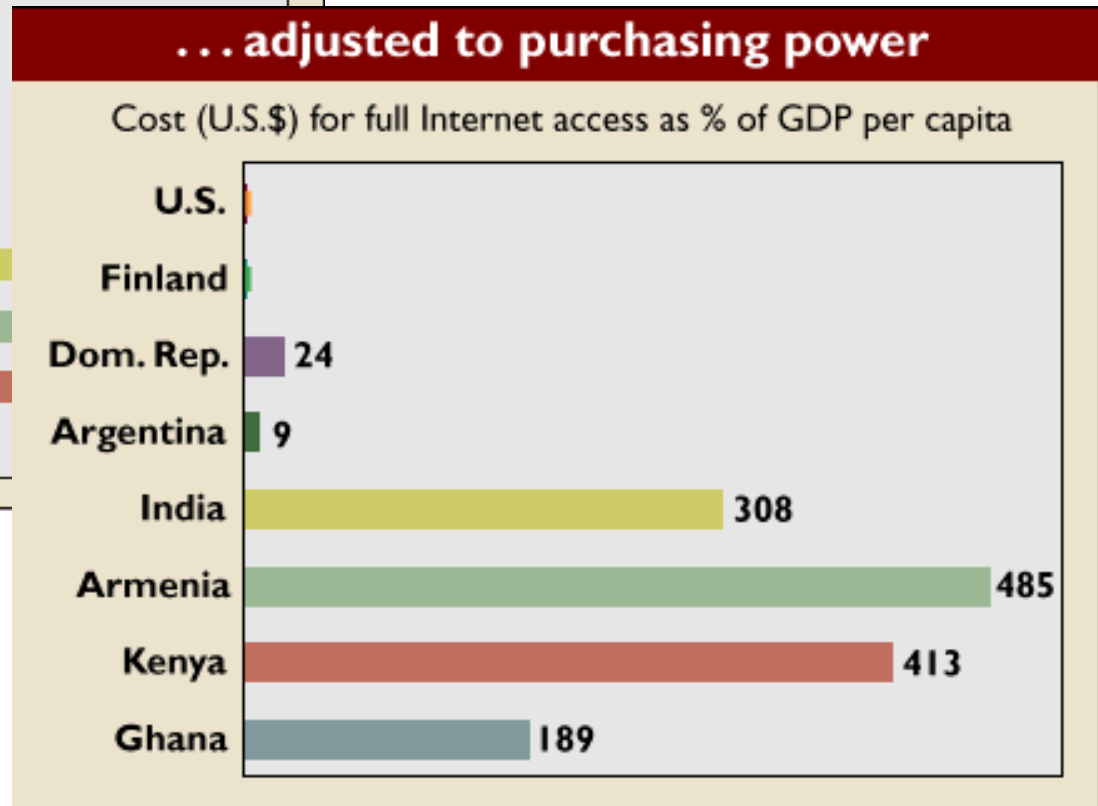
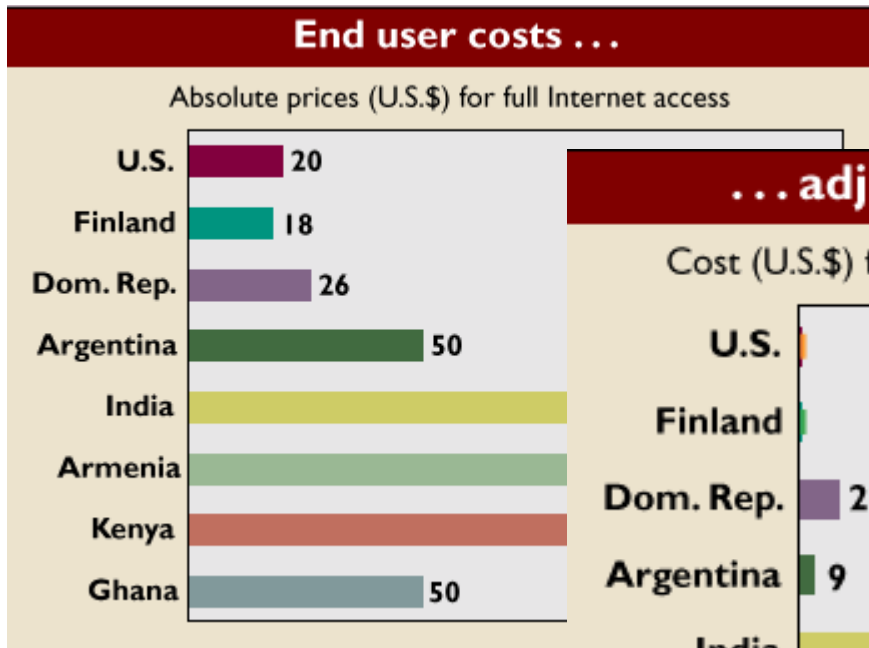
Electronic Banking in Finland (2)

- 82 % of transactions were paperless in 1998
- Within EU, the amount of cash in circulation was the lowest in Finland: 2.35 per cent of GDP (in Spain 10.7, average EU 5.2)
- On-line invoicing 1998
 - You buy through the net, get a bill as a web form, accept it, and your bank account is debited by the amount transferred:
 - both the payee and payer are verified through the bank; (today you can also do this using your mobile phone)
- At the beginning of 1999, the biggest bank in Finland had about 600,000 online customers; this was the biggest customer population in the world, in absolute numbers.
 - To compare: US has 50 times bigger population than Finland

Why Finland Became a Leader in Electronic Banking?

- In Finland, work is expensive (heavy taxation)
 - Wide use of computer applications to support bank operations and customer service (1970s-)
 - High return on investment in ATMs (Automatic Teller Machines; 1980s-)
- Reliable telecommunications infrastructure
 - Digitalized networks widely available
- Competition in banking
 - Cost competition
 - No monopolies
- Close ties between Finnish ICT manufacturers and banks
 - Good knowledge of ICTs potential (1970s - 1980s)
- **In Finland, money is information**
 - transfers widely used in 1970s
 - everyone has one or more bank account
 - reliable institutions (no need for physical money)

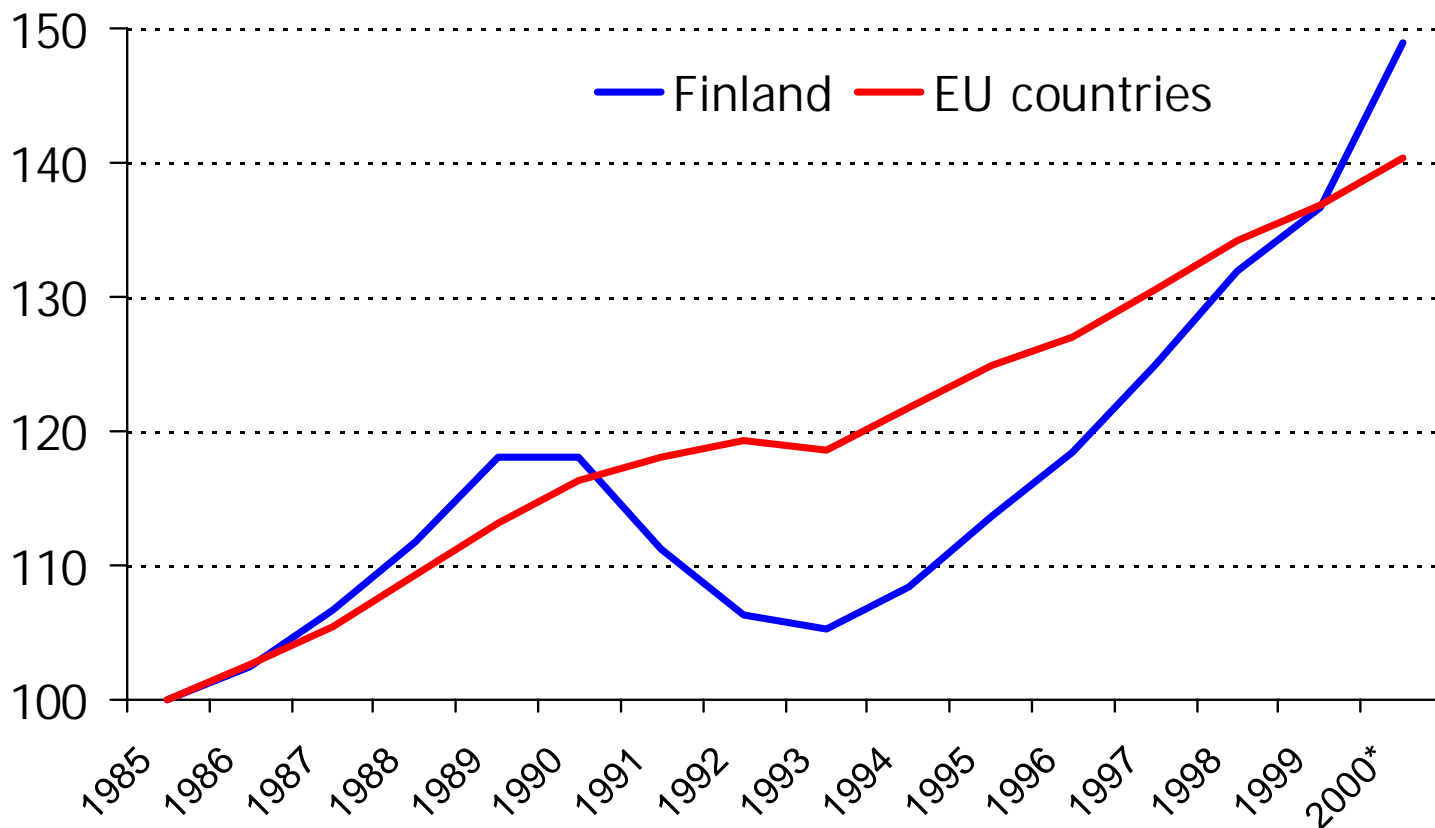
End-User Costs for Internet Access



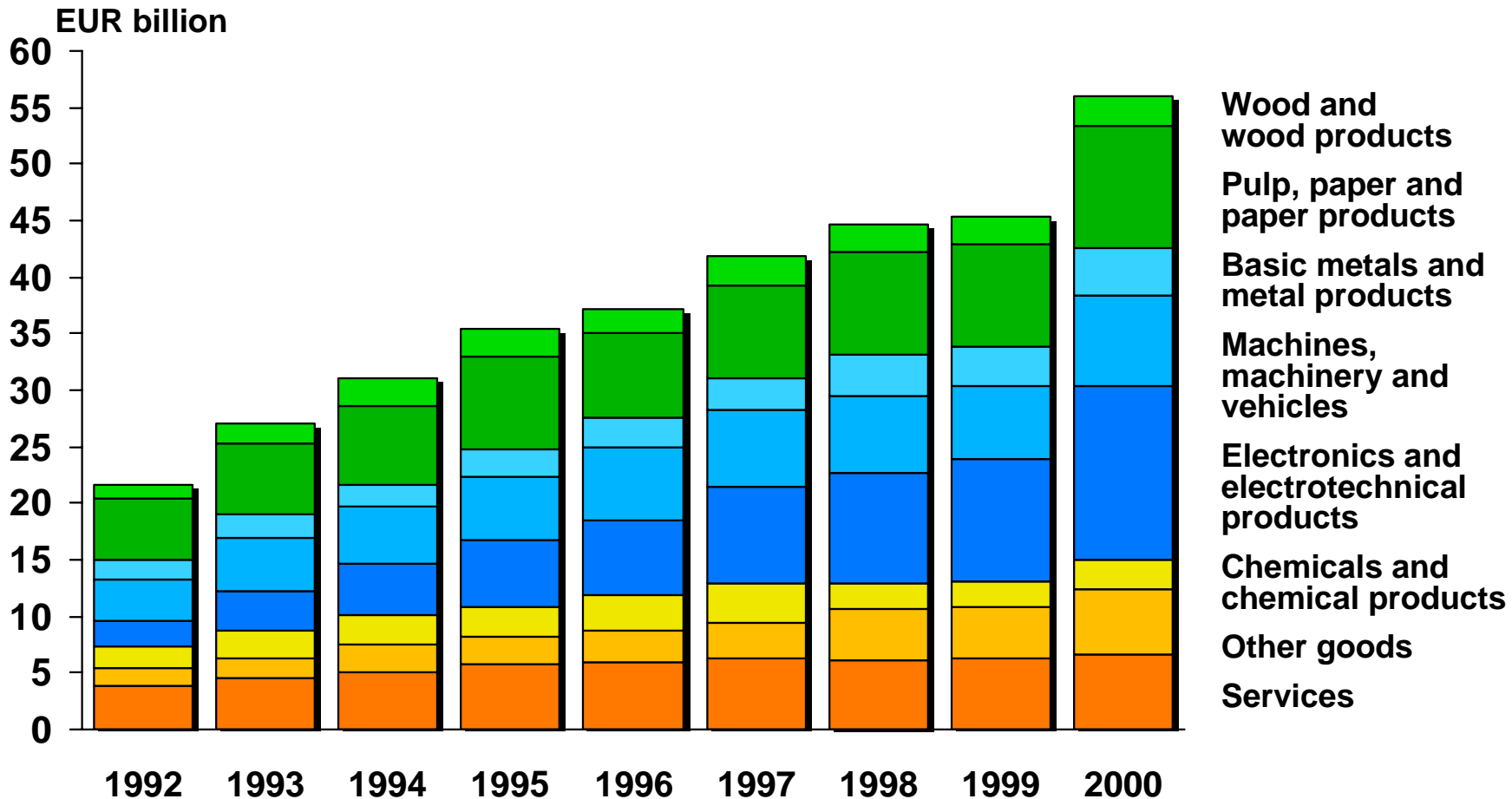
Source: Petrazzini & Kibati:
Communications of the ACM, June 1999
Vol.42 (6), p.31-6.

“The Finnish Economic Miracle of the 90s”

GDP 1985=100 (at market prices per capita)

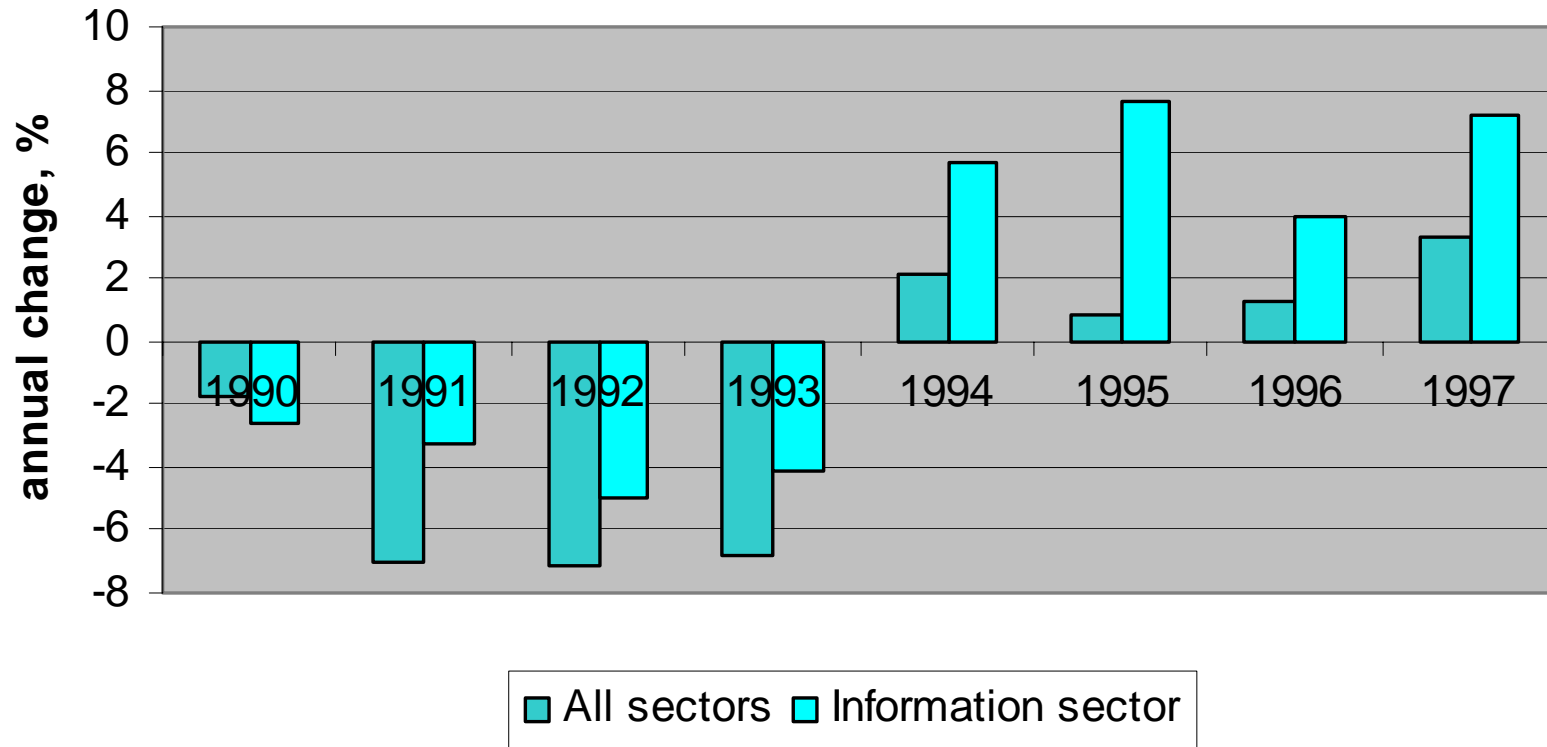


Finnish Exports by Industry



Recession and Safety Nets “The Finnish Trampoline”

Change in employment



Between 1990-1994 household income dropped 18 % in Finland;
due to income transfers, however, the usable income dropped only 10 %

Some Drivers in the Finnish ISoc

- Culture

- common interest in technological opportunities

In Finland you don't survive the winter without planning

- Finland had its first telecom operator 3 years after Bell invented the phone

- open communication culture, effective communication

People don't talk much; when they do, they mean what they say

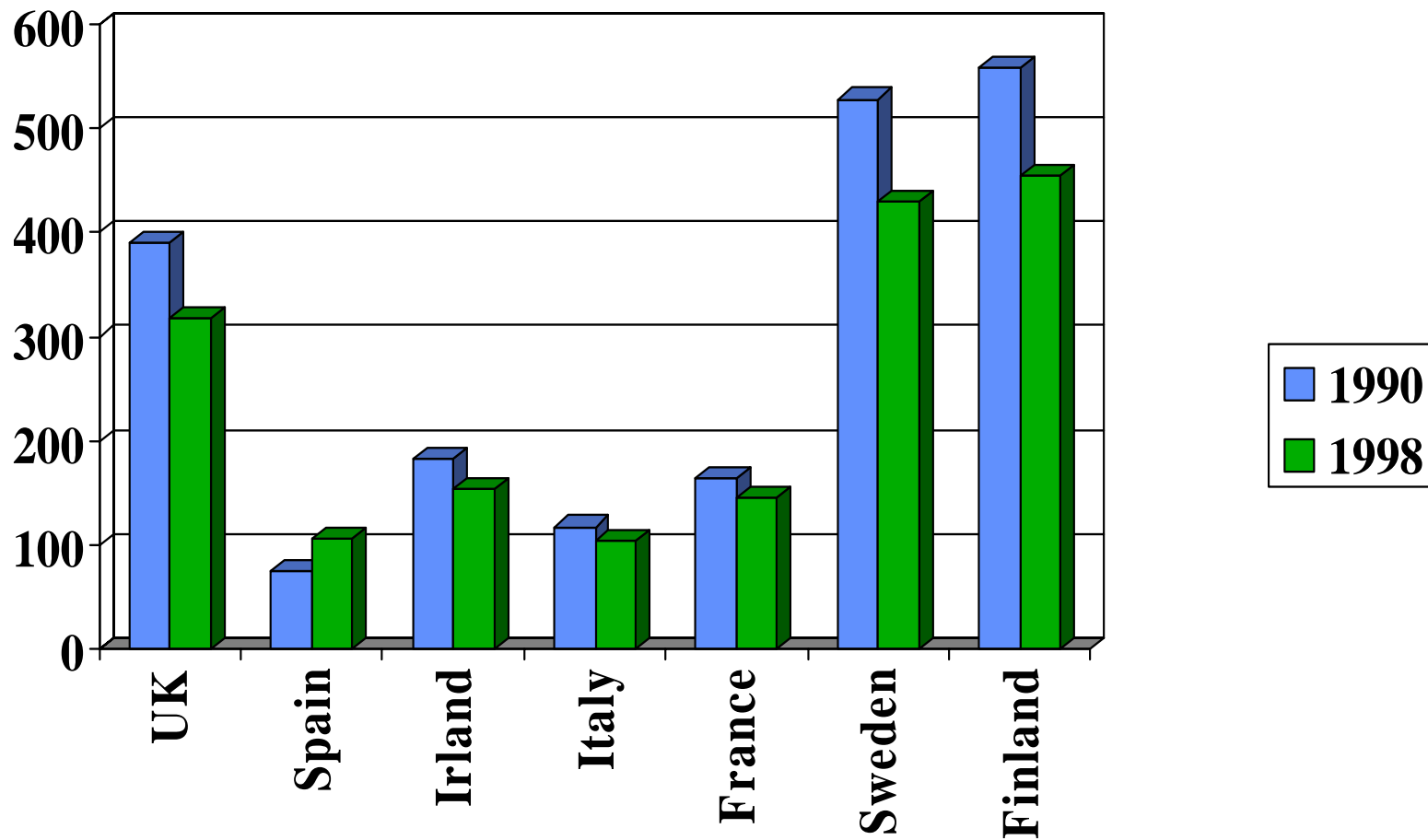
- high level of education
- low hierarchy
- homogeneous culture
- shared expectations

Some More Drivers

- Institutions
 - Deregulation of telecom (started 10 years before the EU)
 - Acute need for change
 - Disappearing USSR
 - At the beginning of 90's, deregulation of financial markets created a "bubble economy"
 - Nordic countries are egalitarian and emphasize social responsibility
 - Heavy investments in the educational system
 - Well developed library system (over 80 % of public libraries offer free internet access)
 - Non-existent illiteracy (in Finland newspaper circulation is 473 per 1000, in the US the number is 228)

Newspaper circulation

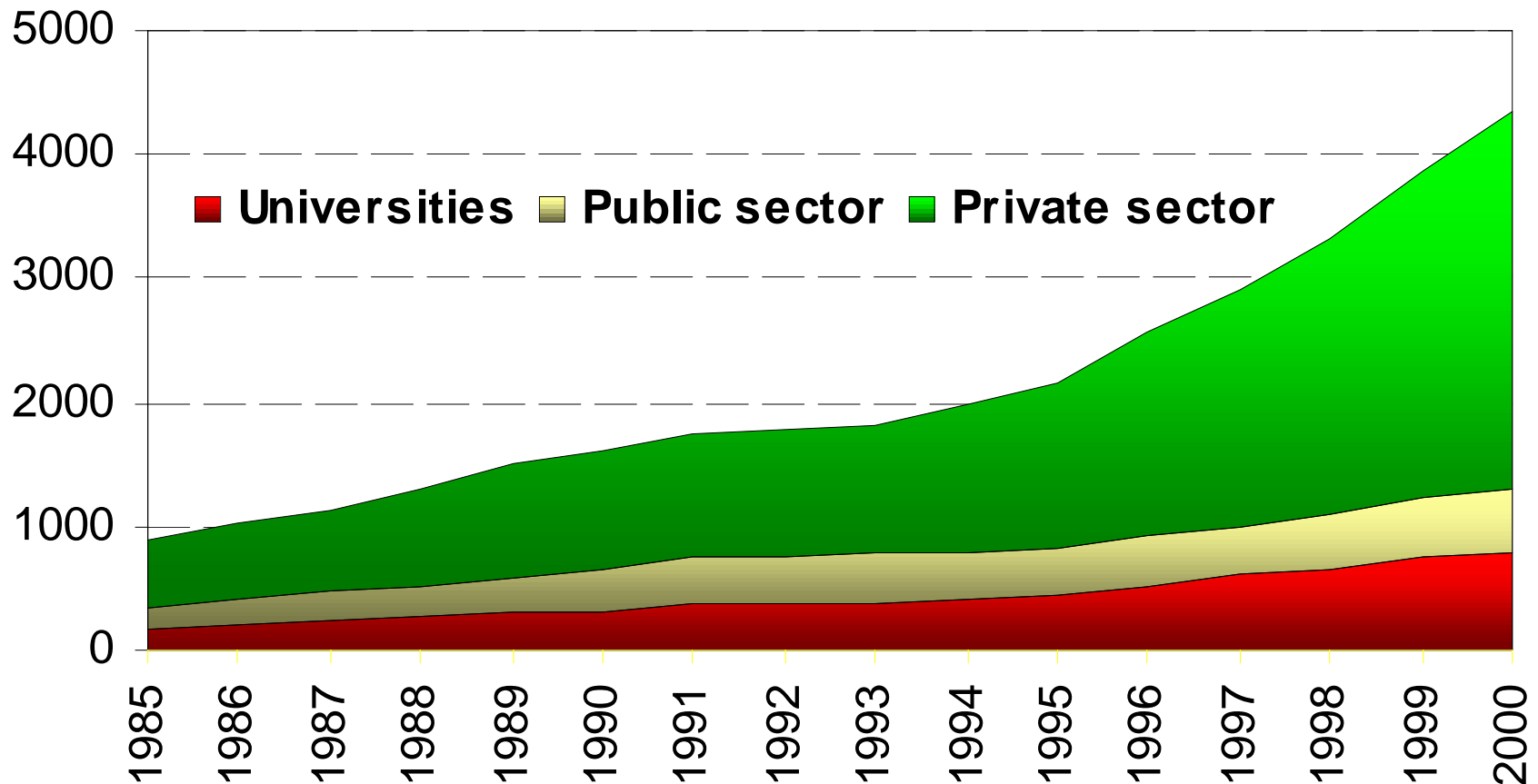
per 1000 inhabitants



...and even more...

- Economy
 - critical mass of networked people (the biggest community in the world?)
 - about 100% of primary and secondary schools have Internet access
 - low income differences: growing, but still small
 - 1994: top-ten percent had 3.9 times the income of bottom ten percent
 - 1997: the ratio was 4.6
 - this leads to shared lifestyles, easy propagation of new ideas and products
 - high taxation on work
 - investment in technology instead of human work; this is a big difference between Europe and the US
 - taxation, however, makes good public infrastructure and services possible
 - low telecom tariffs
 - about half of the OECD average
 - caller pays: no need to hide your phone number
 - Nordic countries were the first to deregulate telecom, digitalize telecom infrastructure, and start international competition
 - Nokia

R&D expenditure by sector EUR Million



Finland as a Breeding Ground for Nokia

- Mobile communications and digital transmission systems developed in Finland from 1960s
- Joint effort to get a Nordic mobile phone system in place (starting at the end of 1970s)
- Fairly open competition among operators and equipment suppliers, promoting innovation and diffusion of new technology
- Close supplier-operator collaboration, leading to effective user-producer learning
- Close interaction between firms, universities and research institutes, leading to effective competence development and utilization of state-of-the-art technology and know-how
- Flexibility in the adjustment to the new techno-economic environment
- Availability of skilled human resources
- Enthusiasm of Finnish organizations and consumers to adopt new technology

Finland as a Breeding Ground for Nokia (2)

- Laying the infrastructure for rapid growth
 - Broad competence development in ICT in 1970s-1980s
 - Entrepreneurial innovators (often with radio-amateur background)
 - Active redefinition of Nokia's strategy in the 1980s towards consumer electronics, communication, and personal computers
 - Active globalization of Nokia's business in the 1980s
 - Evolving international R&D collaboration (in particular in the EU research programmes)
- The Nokia crisis of 1991
 - leadership crisis in Nokia
 - unprofitable consumer electronics division
 - disappearing Soviet Union market
- Nokia in 1992
 - a quick reorientation to global growth markets
 - new top management team
 - focus on mobile communications

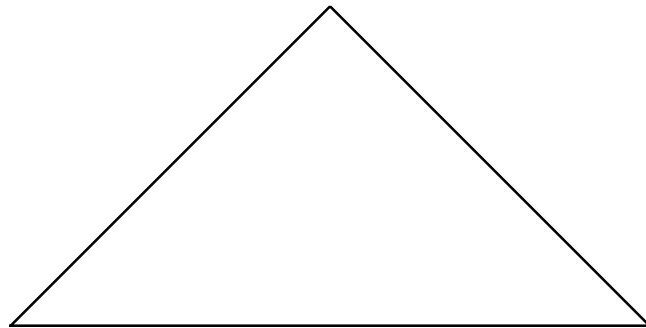
Finland as a Breeding Ground for Nokia (3)

- The Finnish economic crisis of 1992-1994
 - Over 20 % (official) unemployment touched all Finnish families and created a pool of highly educated unemployed people
 - General crisis consciousness, with ICT (Nokia) as the only economic growth sector
 - Rapid adjustment of educational system towards producing ICT competencies
 - National high-profile policies on making Finland the leader in the information society transformation
 - Policies and societal atmosphere pro-ICT and Nokia
 - Taxation system that ensured “trickle-down”
- Extremely rapid growth of mobile telecommunications

The Nokia Miracle

Technological
& market
discontinuity

Business
Opportunity



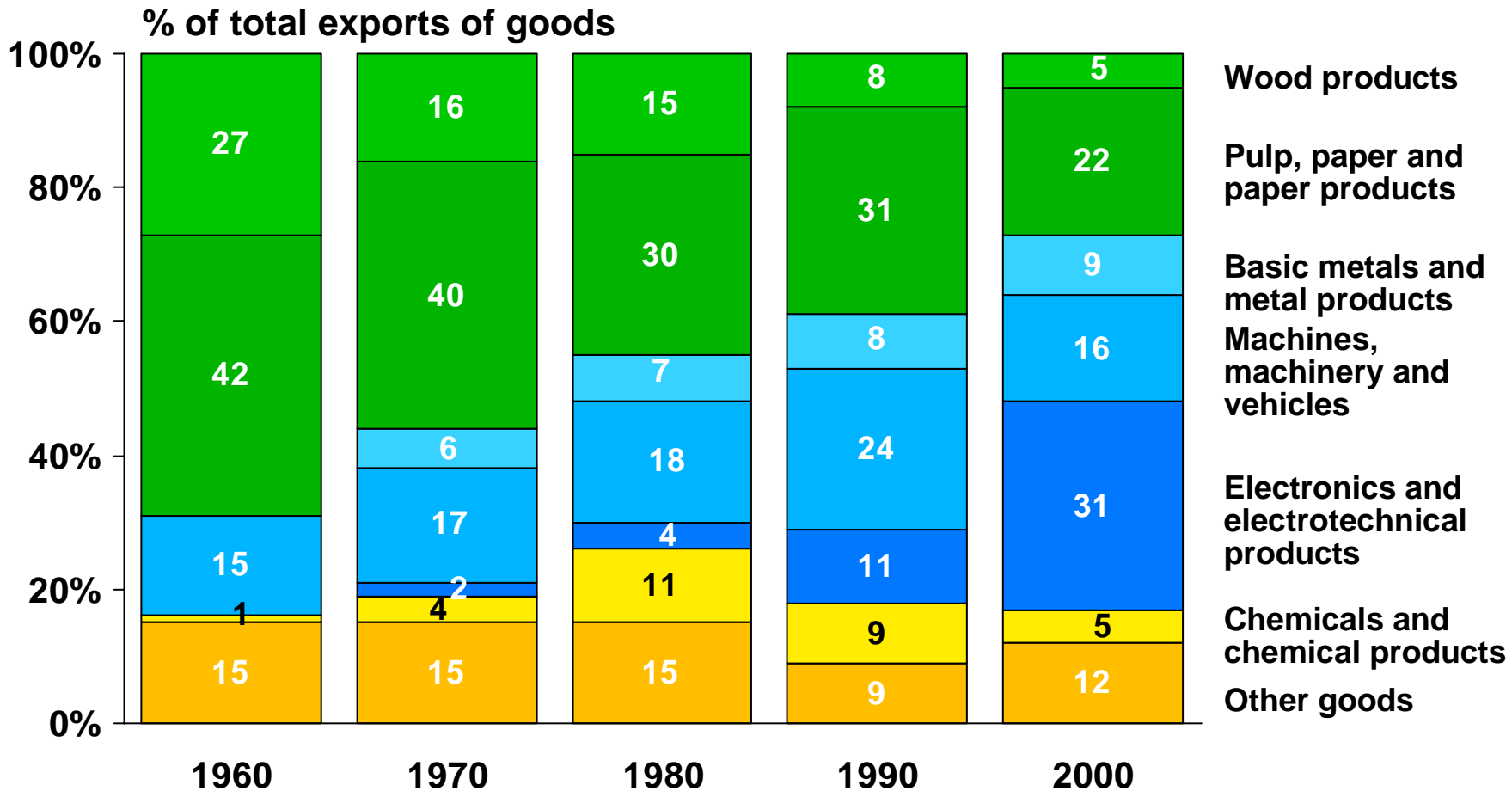
Crisis

Organizational
& environmental
crisis

Institutional and
Organizational
Flexibility

Competent labor and management
Social capital
Low hierarchy
Open communication

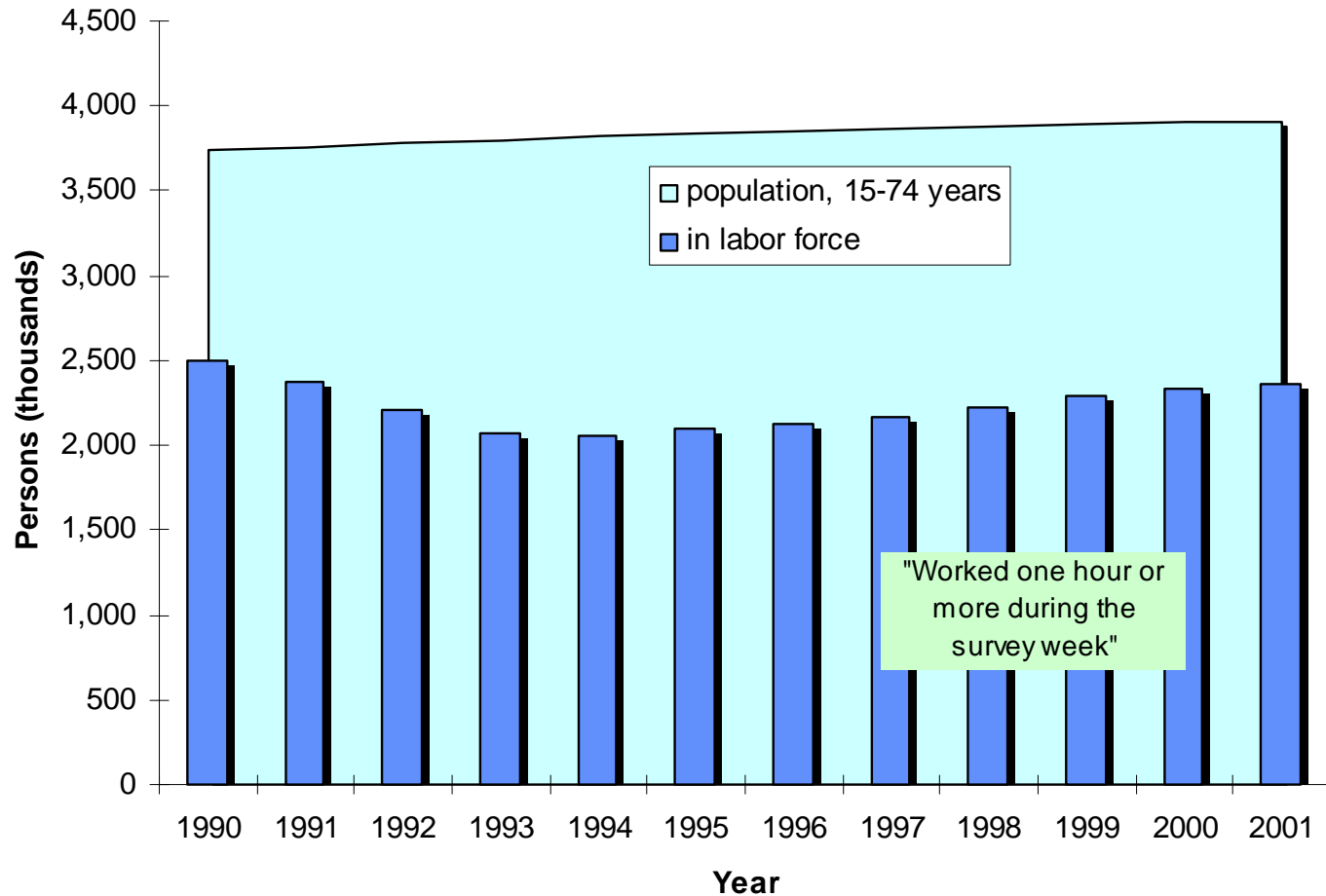
Finnish Exports of Goods



Nokia's Contribution to the Finnish Economy

- 1.1 % of total employment, 30 % of the ICT cluster employment (25,000 employees in Finland)
- 300 first-tier partnerships in Finland (18,000-20,000 employees), 10 % of Nokia's turnover
- 24 % of exports, 80 % of ICT cluster exports
- 30 % of the total Finnish R&D, 43-47 % of the business enterprise sector
- 50 % of the growth in total R&D expenditure
- 54 % of the company's R&D input is spent in Finland

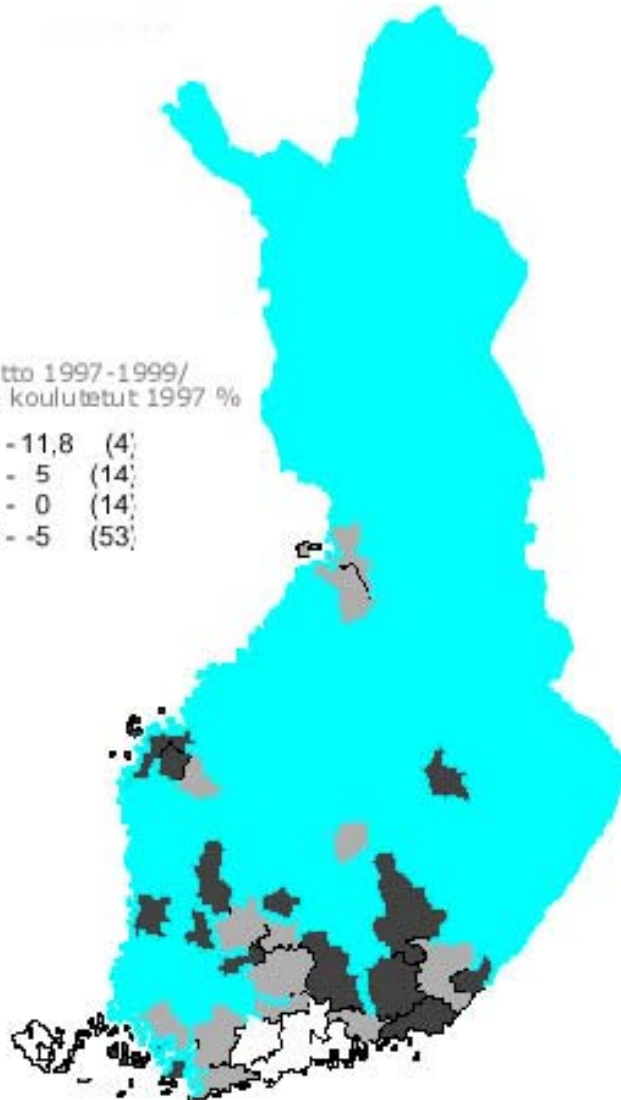
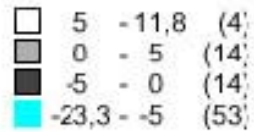
Challenge: Jobless Growth



Challenge: Space Matters

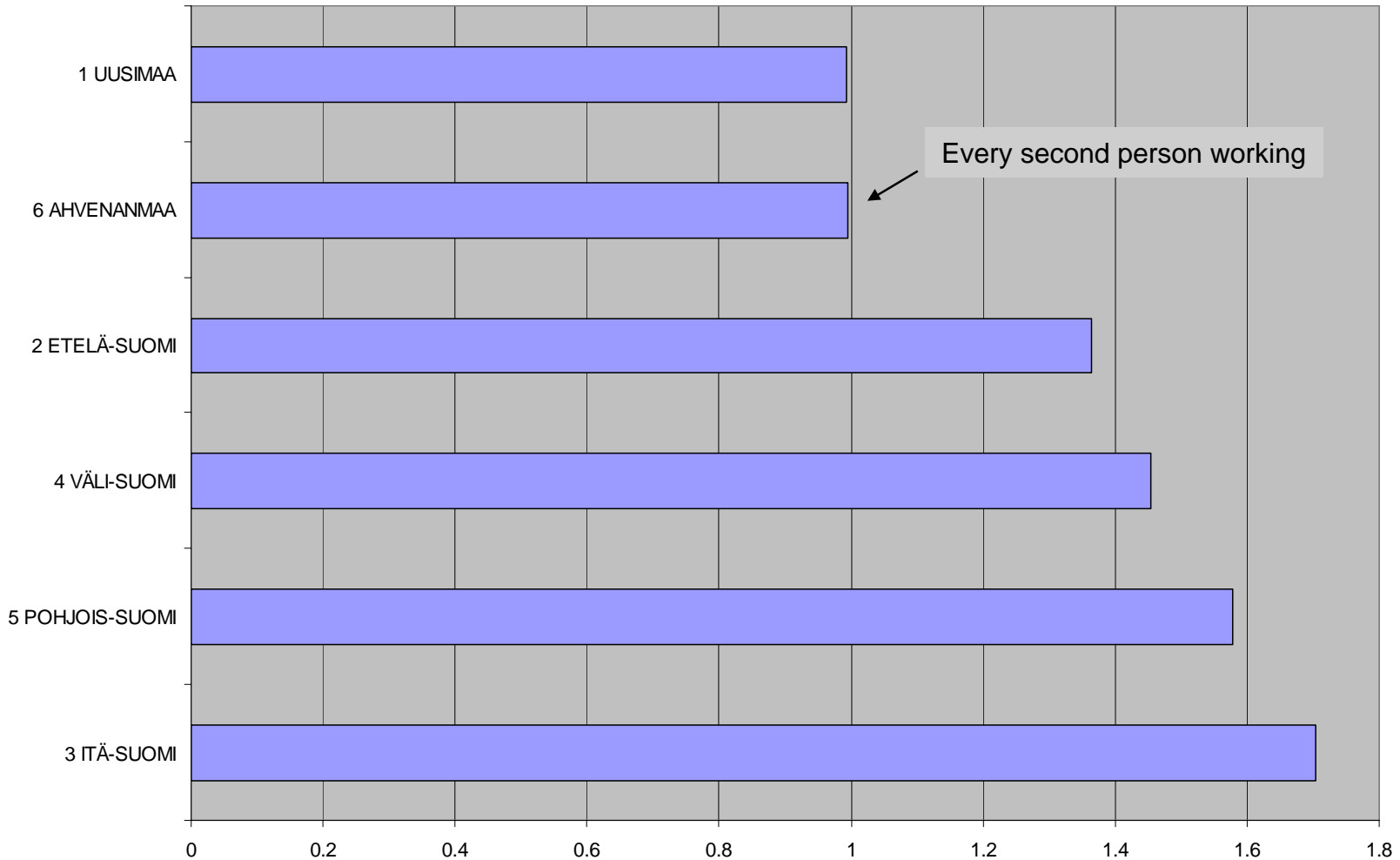
Net movement of
people with post-
secondary degrees
1997-1999

Nettomuutto 1997-1999/
korkea-asteen koulutetut 1997 %



Number of Unemployed per Employed

Finland 2002 divided in six major regions



Information Society as “Development”

One possible theoretical basis: Amartya Sen and economics of capabilities

- Development should be viewed as increased “freedoms”
- Freedoms are important both as ends and means
 - increased freedom to participate in the market leads to economic growth (i.e. means)
 - increased freedom to participate makes life more valuable (i.e. end in itself)
- Five distinct types of freedoms
 - 1. Political freedoms
 - 2. Economic facilities
 - 3. Social opportunities
 - 4. Transparency guarantees
 - 5. Protective security

Sen, A. (1999) Development as Freedom

Types of Freedom

- 1. Political freedoms
 - opportunities that people have to determine who should govern and on what principles, possibility to scrutinize and criticize, freedom of political expression...
- 2. Economic facilities
 - opportunities to utilize economic resources for the purpose of consumption, production, or exchange
- 3. Social opportunities
 - arrangements that allow people access to health, education, social influence
- 4. Transparency guarantees
 - access to information
- 5. Protective security
 - social safety nets against deprivation, misery, and death

Finland 2001 WD audit

Topic	Range	Result
World Democracy Audit Overall Ranking	1-149	1
Political Rights	1-7	1
Civil Liberties	1-7	1
Press Freedom	0-100	7
Corruption	0-100	1

Source: <http://www.worldaudit.org/countries/fi.htm>

Different Models of Advanced Information Society

		Finland	USA	Singapore
Technology				
	Infrastructure			
	Production			
	Technology competences			
Economy				
	National economy			
	Enterprise sector			
	Innovativeness			
Well-being				
	Education			
	Health			
	Well-being			
Openness				
	Politics			
	Civil society			
	Globalization			

Source: Castells & Himanen (2002) The Information Society and the Welfare State: The Finnish Model.