

The prospects of the ICT's in the Finnish system

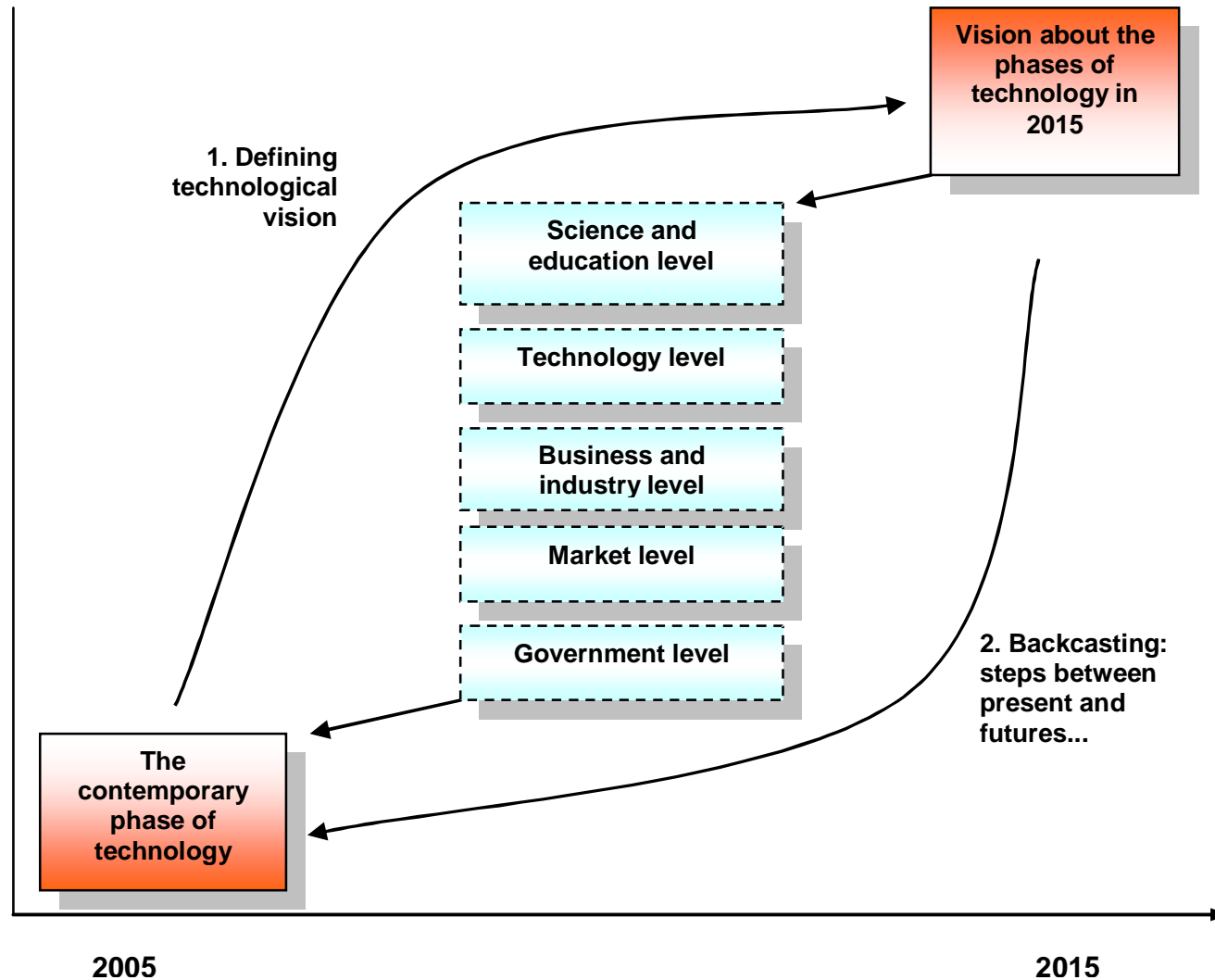
Summary of the workshop process and
results

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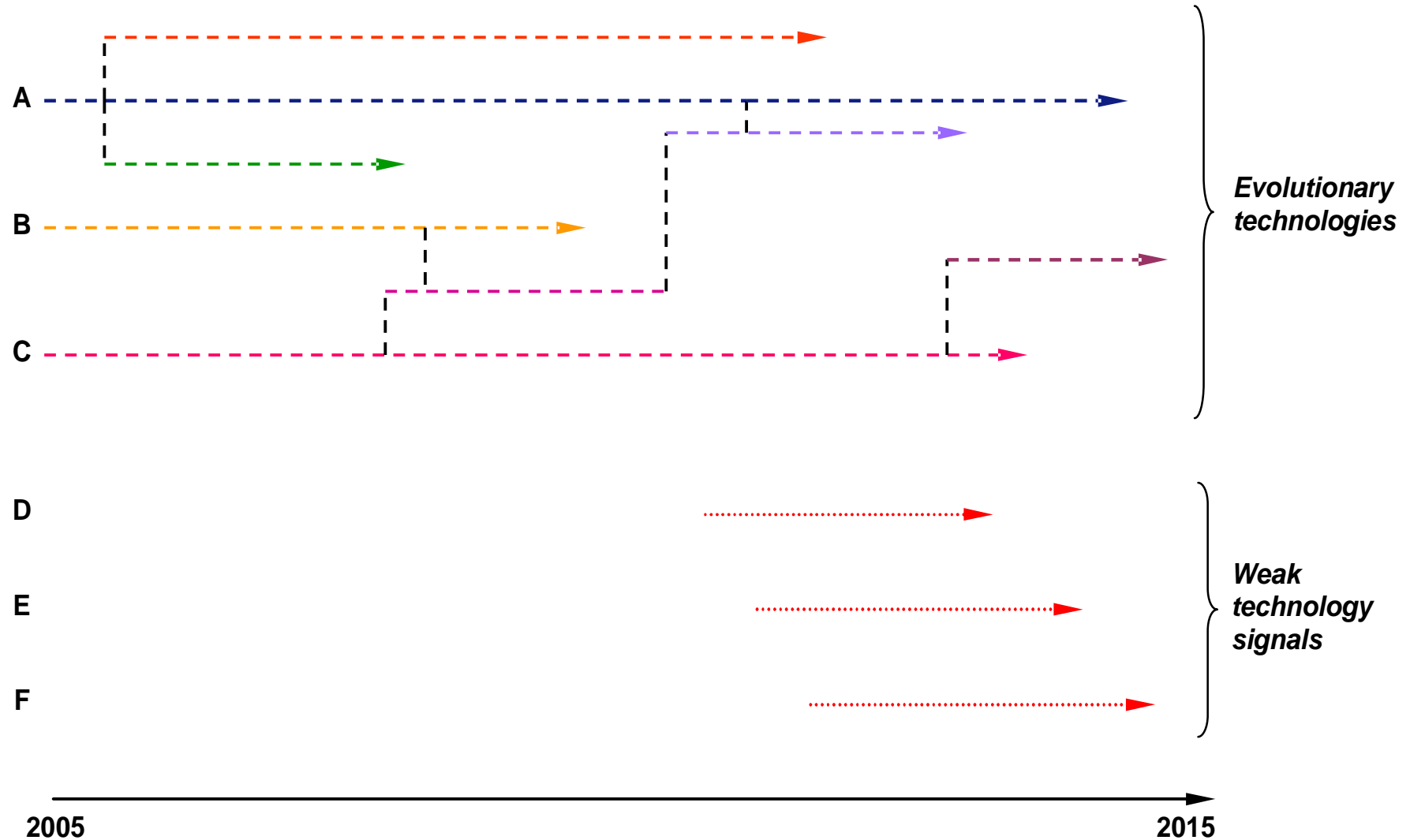
Program

12.30–12.45	Nordic ICT Foresight - presentation of the project Mika Naumanen, VTT Technology Studies
12.45–13.00	Technology foresight and roadmapping research Annele Eerola, VTT Technology Studies
13.00–13.15	The aims and working phases of the workshop Toni Ahlqvist, VTT Technology Studies
13.15–13.30	Splitting into separate working groups and moving into working spaces
13.30–14.15	Group working (phase I)
14.15–14.30	Coffee break
14.30–15.00	Group working (phase II)
15.00–15.45	Group working (phase III)
15.45–16.00	Conclusions, further activities and closing of the workshop

Technology foresight application

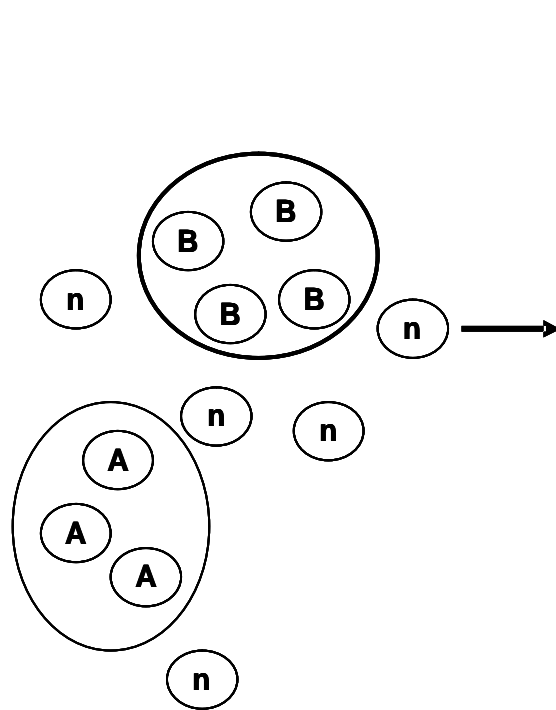


Development of ICT's

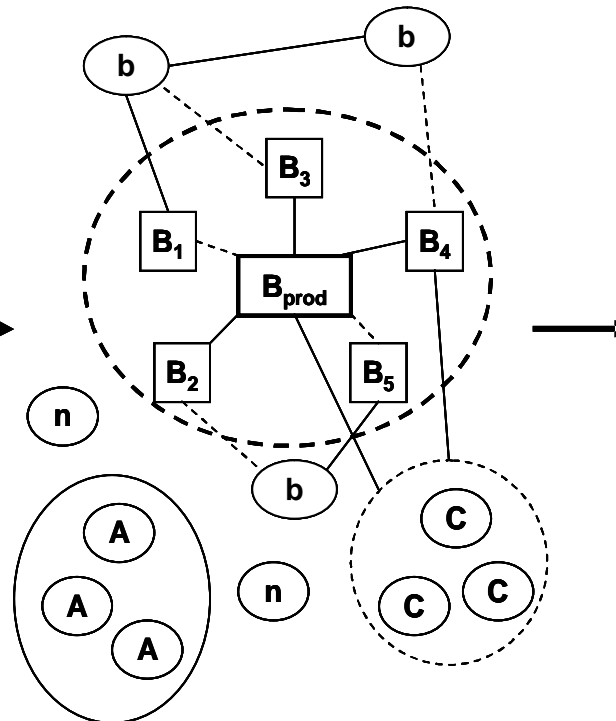


The evolution and convergence of ICT's

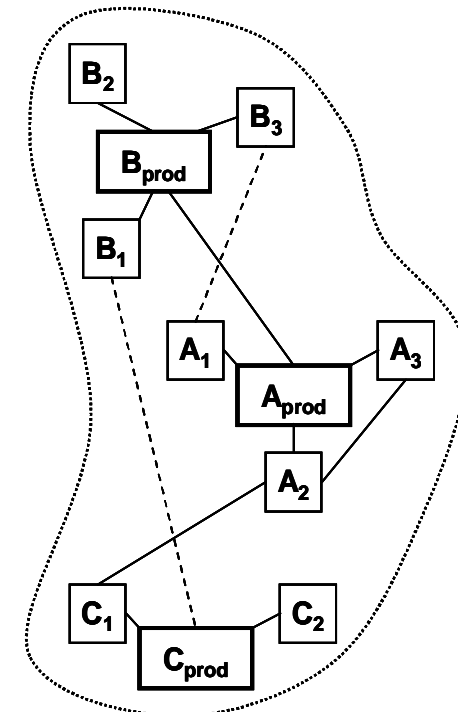
Separate technologies and product groups



Modularization of technologies and increase of relationships



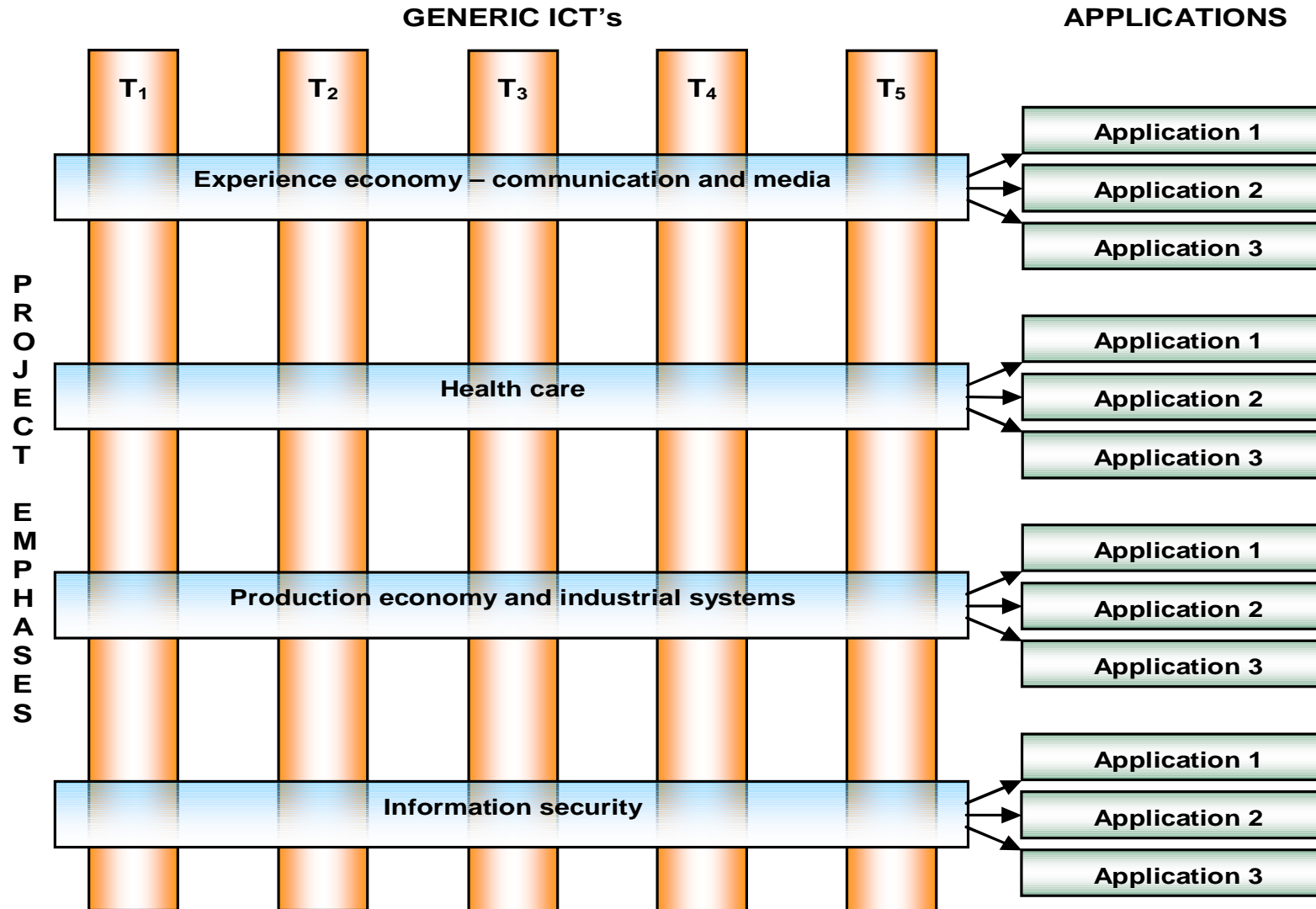
Convergence and compatibility of modular product groups – heterogeneous networks



2000

2015

Generic ICT's and applications



Applications - group 1

Experience economy – comm. and media	Health care	Production economy and industrial systems	Information security
<p><u>Tailored service applications</u></p> <ul style="list-style-type: none"> • Personal information control: communication and identity independent of the device • Digital identity • Personal media production: personal value chain, real time production • Community based information solutions • Bi-directional mediaservices: informing, teaching, "users as innovators" <p><u>Network applications</u></p> <ul style="list-style-type: none"> • Content delivery through networks: peer to peer • Compatibility of networks • Intelligent information search and organization techniques: e.g. based on neural networks <p><u>Voice and language oriented applications</u></p> <ul style="list-style-type: none"> • Applications of language technologies • Multilingual solutions (traveling, informing, speech recognition) <p><u>Ubiquitous technologies</u></p> <ul style="list-style-type: none"> • Ubi-intelligence: techniques of virtual presence • Ambient Design: multiple senses, marketing 	<p><u>Personal healthcare, "home medicine" (8)</u></p> <ul style="list-style-type: none"> • Gathering and analysis of information: diaries, training calendar, prevention (6) • Systems that monitor and assist elderly people living in homes: controlling the changes in health, monitoring day-to-day activities (2) • Technology assisted training: modular technologies • Vital sign data capture / collection <p><u>Diagnostic and treatment applications</u></p> <ul style="list-style-type: none"> • General ICT applications in health: pattern recognition, ubicomputing, mobility, hybrid media, dosing... • Nano / picosensors • ICT based diet and nutrition systems • Chip laboratories • Virtual diagnostics, distance diagnostics (2) <p><u>Medical information processing</u></p> <ul style="list-style-type: none"> • eHealth & ePrevention: knowledge based, data warehouses, data mining / drilling • National health databases 	<p><u>Industrial production applications</u></p> <ul style="list-style-type: none"> • Sensor technologies • Applications of RFID (radio frequency identification) • IP- based (Internet Protocol) systems • Learning devices: self-monitoring of machines • Fully automatic factories • Minimization of production related environmental hazards <p><u>Industrial information processing</u></p> <ul style="list-style-type: none"> • Information and data transfer in production systems: man2 man, man2machine, machine2man • General information gathering: technology, markets, financing... <p><u>Control of the logistic chain</u></p> <ul style="list-style-type: none"> • Gathering and analyzing the process data in real time • Quality control • Mobile and automatic maintenance and repair 	<p><u>Confidentiality in general</u></p> <ul style="list-style-type: none"> • Identity management • Dynamic privilege management • Integrity • Long term preservation • Non-reproducing technologies <p><u>Security in environments and networks</u></p> <ul style="list-style-type: none"> • Automatic control in open spaces: e.g. figure identification for cameras • Invisible information security: ad hoc, availability, PMAC + PMF, mobility... <p><u>Biometrics</u></p> <ul style="list-style-type: none"> • Biometric tags • Security of biometric information: prevention of malpractices (2)

Applications - group 2

Experience economy – comm. and media	Health care	Production economy and industrial systems	Information security
<p style="text-align: center;">Hybrid media (1)</p> <ul style="list-style-type: none"> • Combinations of printed and electronic media: e.g. 2D code that is readable via camera mobile phone which connects the mobile phone to database • Intelligent paper and intelligent package • “Talking paper”: sound + still image • Tailored news: printed either to communication device or local printing service (communal printing) (2) <p style="text-align: center;">Communication services</p> <ul style="list-style-type: none"> • Global media network: you can see your favourite show anywhere • Digital me • Mobile ID-TV • Group phone calls • Free services with different devices (2) • Expression and performance of civil rights via networks: voting, taxes (2) <p style="text-align: center;">Voice and language oriented applications</p> <ul style="list-style-type: none"> • Simultaneous translation services (4) <p style="text-align: center;">Technical solutions</p> <ul style="list-style-type: none"> • Printable electronics • Silent computer and digital technology: without background noise or humming • Home robots • RFID tags <p style="text-align: center;">Virtual environments</p> <ul style="list-style-type: none"> • Home virtual environments • Enhanced reality (1) • Multisensory environments and virtual learning platforms <p style="text-align: center;">Entertainment (2)</p> <ul style="list-style-type: none"> • Games • “Edutainment” • Games based on mobile positioning 	<p style="text-align: center;">“Home medicine”</p> <ul style="list-style-type: none"> • ICT home treatment: free self service systems, health centre and pharmacy systems, additional services, “mobile service and competition” automata (5) • Adaptive, intelligent home: conditions adapt to inhabitants’ health conditions • “Every home” service robots • Systems that monitor patient’s condition in real time: especially in the case of emergency (elderly people etc.), real time diagnostics <p style="text-align: center;">Assisting and socially activating applications (5)</p> <ul style="list-style-type: none"> • Brain interface: for the seriously disabled • Basic technology, tailored interfaces • Intelligent user centred services for the senior housing: technologies that activate everyday social contacts <p style="text-align: center;">Applications for the control of allergies (4)</p> <ul style="list-style-type: none"> • Prevention • Diagnosis • Self treatment <p style="text-align: center;">Documentation applications</p> <ul style="list-style-type: none"> • Documentation in the doctor’s reception: records of the doctor’s instructions in the net, crisp instructions in the net and as a print (1) 	<p style="text-align: center;">Industrial production applications</p> <ul style="list-style-type: none"> • Mass tailored production lines: on demand systems, no storages (2) • New interfaces: tangible, wearable, embedded (4) • Multi-sensory process control and robotics: input / output (1) • Applications enabling telework and mobile work (1) • Mobile maintenance systems (1) • Automatic reasoning systems: error seeking, production optimization • Environmental measuring systems and services: security, “emission trading” and emission control (2) <p style="text-align: center;">Convergence of information systems</p> <ul style="list-style-type: none"> • Convergence of information: the performing, controlling and packing of information is combined via sensors, then combined information moves to be compared with planned information (1) • Convergence of all of the life cycle systems (3) <p style="text-align: center;">Simulation applications</p> <ul style="list-style-type: none"> • Simulation of micro level phenomena in different fields : electronics, nanotechnology, fabrication of medicines, material technologies (2) • Combination of 3D visualization and simulation 	<p style="text-align: center;">Confidentiality in general</p> <ul style="list-style-type: none"> • IPR in the industrial information processes: rights to use, billing, software licences like in the entertainment (2) • Animated agents that endorse the trust of the users • Virus-free “internet” (4) <p style="text-align: center;">Security in environments and networks</p> <ul style="list-style-type: none"> • Distributed networks: important information is directed to different network <p style="text-align: center;">Biometrics</p> <ul style="list-style-type: none"> • Bioidentifiers: reliable electronic system, bioidentity (7)

Identified generic technologies

Group 1 - generic technologies	Group 2 - generic technologies
<p style="text-align: center;"><u>Evolving network concepts</u></p> <ul style="list-style-type: none"> •Personal Area Network •Ad Hoc -networks •Ambient Intelligence: urban environment as a experiment environment, security, entertainment, informing <p style="text-align: center;"><u>Network technologies</u></p> <ul style="list-style-type: none"> •Wireless applications: last mile, terminals, gadgets •Semantic networks: distribution of contents <p style="text-align: center;"><u>New media solutions</u></p> <ul style="list-style-type: none"> •Cross media: multiple channels, interoperability •Printed codes: intelligent paper, matrix codes <p style="text-align: center;"><u>New technological solutions</u></p> <ul style="list-style-type: none"> •3D avatars •Wearable computing 	<p style="text-align: center;"><u>Mobility</u></p> <ul style="list-style-type: none"> •Systems •Terminals •Services •WIFI •3G •Network technologies •Wireless wideband •Positioning technologies <p style="text-align: center;"><u>Intelligent systems</u></p> <ul style="list-style-type: none"> •Sensors technologies and networks •RFID •Systems that measure the reliability and value of information •Flexible, distributed architectures •Visualisation techniques of information semantics •Semantic web •Multitechnical modelling design <p style="text-align: center;"><u>Interfaces</u></p> <ul style="list-style-type: none"> •Flat •Flexible •3D •Systems that endorse communality and social interactions •User modelling in real time •Voice controlled systems > producing, understanding and interpretation

SWOT - results of the group 1

Strengths	Weaknesses
<p style="text-align: center;"><u>State functions</u></p> <ul style="list-style-type: none"> •State subsidies: economic and political •State is an advanced regulator •ICT infrastructure <p style="text-align: center;"><u>Corporations and market functions</u></p> <ul style="list-style-type: none"> •Advanced markets: new products are easy to pilot in the consumer markets •Advanced corporations in many sectors •IPR/patent base <p style="text-align: center;"><u>Universities, competencies and research functions</u></p> <ul style="list-style-type: none"> •Cooperation between corporations and universities •Competencies in mobile technologies and industries •Competencies in RF and communication technologies •High standards of applied research •Strong R&D system •Education system can be integrated with the competencies needed in information technologies > navigation competencies, control of health information <p style="text-align: center;"><u>Cultural and regional functions</u></p> <ul style="list-style-type: none"> •Municipal communes are advanced and ready to reform •People are willing to try new things •People obey authorities •People are educated and all-around education is high •Positive attitudes towards technologies 	<p style="text-align: center;"><u>State functions</u></p> <ul style="list-style-type: none"> •Orientation towards regional development: one should not endorse national solutions •Lack of capital and finances •Tax incentives <p style="text-align: center;"><u>Corporations and market functions</u></p> <ul style="list-style-type: none"> •The chain between ideas and commercial solutions is leaking (2) •Small country, small resources, small markets: should one have pilot customers abroad? •Too little venture capital funding to improve new businesses, lack of risk funding •One should master the ways to standardize things <p style="text-align: center;"><u>Universities, competencies and research functions</u></p> <ul style="list-style-type: none"> •Abilities to utilize new technologies •The level of basic research in technical universities •Convergence of the information systems is slow <p style="text-align: center;"><u>Cultural and regional functions</u></p> <ul style="list-style-type: none"> •Technological orientation > the social dimension is often forgotten
Opportunities	Threats
<p style="text-align: center;"><u>State functions</u></p> <ul style="list-style-type: none"> •Attractiveness: the marketing of Finland as internationally interesting research and development field •Developing new ways of acting: from the regional development orientation towards "open innovation processes" <p style="text-align: center;"><u>Corporations and market functions</u></p> <ul style="list-style-type: none"> •Strong investments to certain competence areas •Proliferation of business orientation in ICT's •New products and new markets •New mobile services as support system for health care •Direct orientation towards international markets •Combinations of sciences <p style="text-align: center;"><u>Universities, competencies and research functions</u></p> <ul style="list-style-type: none"> •Coming revolutions in industrial automation 	<p style="text-align: center;"><u>State functions</u></p> <ul style="list-style-type: none"> •Weakening of the sovereignty •Lessening of the resources and finances <p style="text-align: center;"><u>Corporations and market functions</u></p> <ul style="list-style-type: none"> •International competition is tightening: Finland moves slowly, language differences, remote location, image •Rigidities in the cooperation of different sectors and branches •Multinational sectors dictate the directions <p style="text-align: center;"><u>Universities, competencies and research functions</u></p> <ul style="list-style-type: none"> •Not just production, but also research and development moves to Asia <p style="text-align: center;"><u>Cultural and regional functions</u></p> <ul style="list-style-type: none"> •Difficulties in giving up the old •Distribution of competencies to regions •Diminishing of the autonomous thinking •Parochialism: things should be seen in global perspective

SWOT - results of the group 2

Strengths	Weaknesses
<ul style="list-style-type: none"> •Strong competencies in the mobile sector > strong spearhead sectors •Commitment to the development of the ICT applications in the well being sector("one must do something") > the point was criticized in the discussion •Application oriented culture (R&D) 	<ul style="list-style-type: none"> •Gaps in the competencies > technical competencies, for example new screen technologies •Small population > the need to focus research and education, the need to select the aims •Finnish can handle technology and design, but others take the business •Undeveloped risk financing
Opportunities	Threats
<ul style="list-style-type: none"> •Potential new export products and services > e.g. applications of the well being sector •Cost effective data transmission solutions in the sparsely populated areas •Mobile application markets in the Third World > e.g. connected to energy systems 	<ul style="list-style-type: none"> •China & India •"New illiteracy" •One cannot find risk financing for the development of added value applications •Consumers do not feel that the value of applications are worth paying •ICT applications demand stable development, the benefits of the ICT applications fade in global risk situations

Conclusions

- Challenges:
 - How to compare and combine the results of the national SWOT's? (metareport)
 - How to connect the results of the SWOT's and scenario workshop to the roadmapping workshop process?