EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

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Main Findings from Foresight in IST in the European Research Area (FISTERA)

Krynica, September 2005

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ipts

Foresight on IST in the European Research Area (FISTERA)

Rationale and context

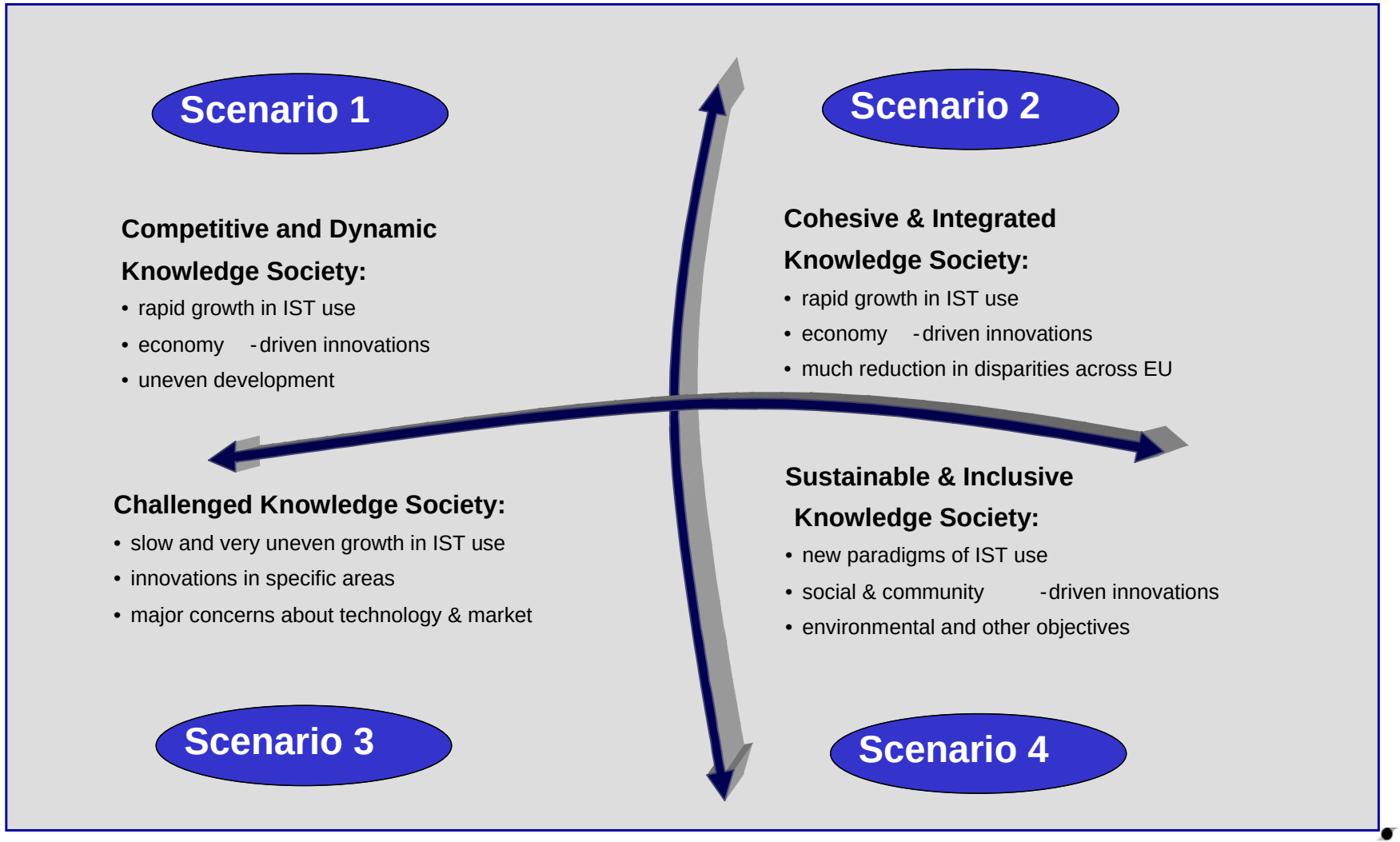
- ✓ Thematic FP5 network (DG INFSO) to contribute building ERA in IST research by involving as much as possible key EU and national IST policy makers and players.
- ✓ Launched in September 2002 after the "bursting" of the Internet bubble and in the aftermath of the Perez @ "Turning Point"
- ✓ Developing the common vision and approach to the IS in an enlarged Europe in 2010
- ✓ FISTERA network aimed to understand the key factors driving IST in a future Europe and elaborate options on how to strengthen Europe's position in crucial IST areas.

Research Questions:

- ✓ What are the elements of Europe's strengths and weaknesses in ICT as compared to its global competitors?
- ✓ What are the opportunities, threats and challenges for Europe?
- ✓ What should be done to improve Europe's situation?

Images of the future for IST in the EU

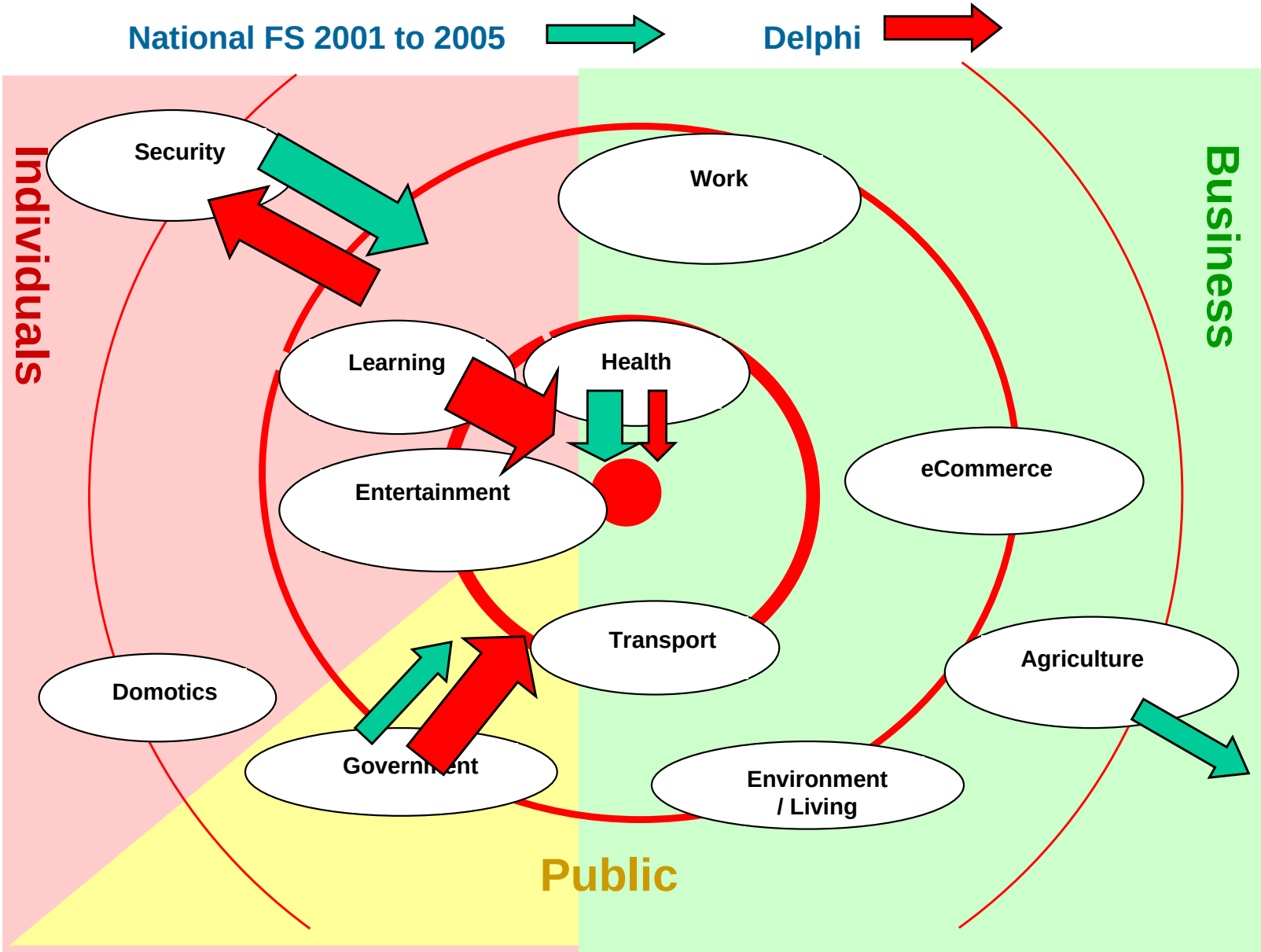
How would it be like?



Source: "Exploring Emerging Applications - Report of the FISTERA Trends, Drivers & Challenges Workshop ", 17th - 18th June 2004, Seville , PREST

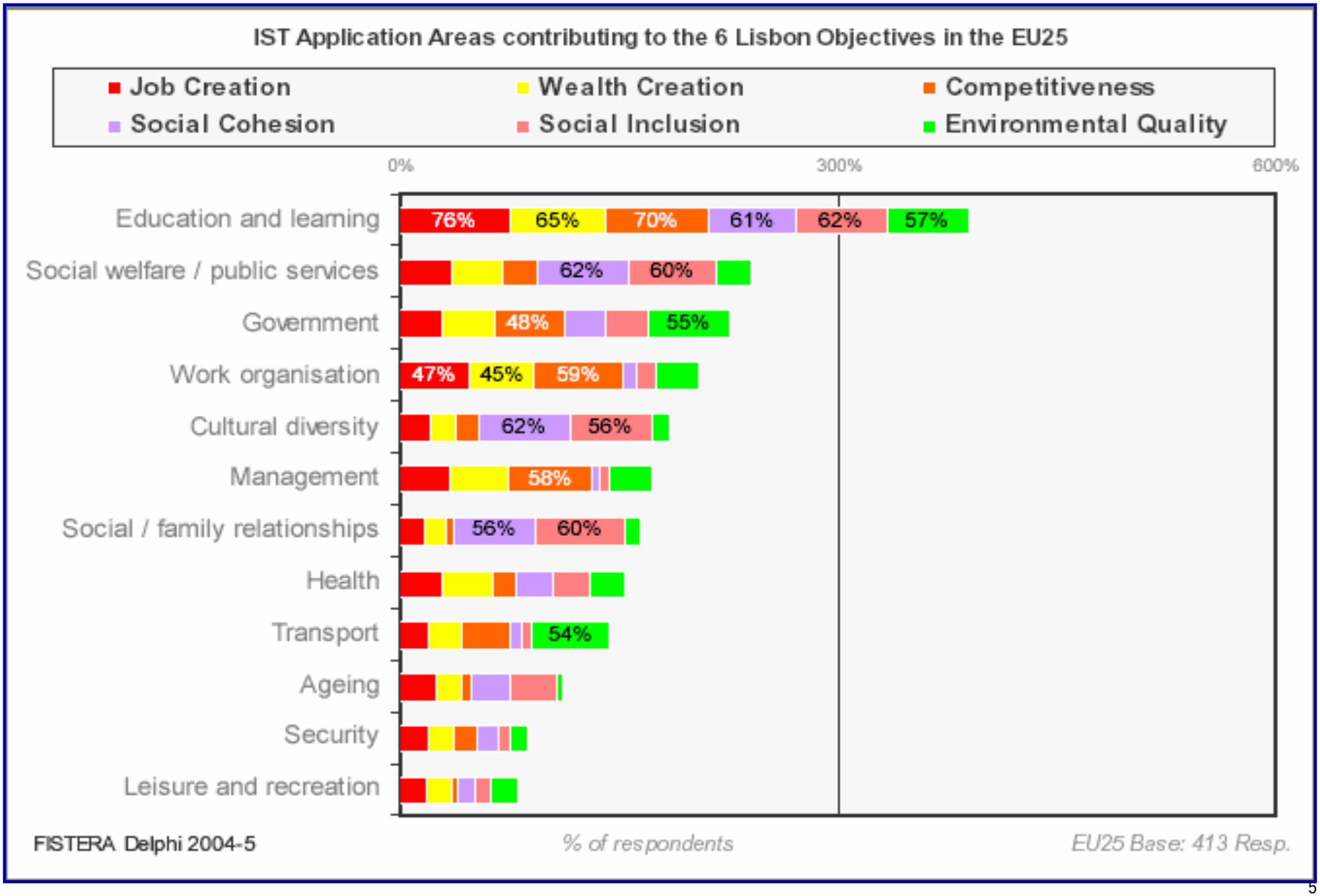
How do we get there?

Foresighted IST applications



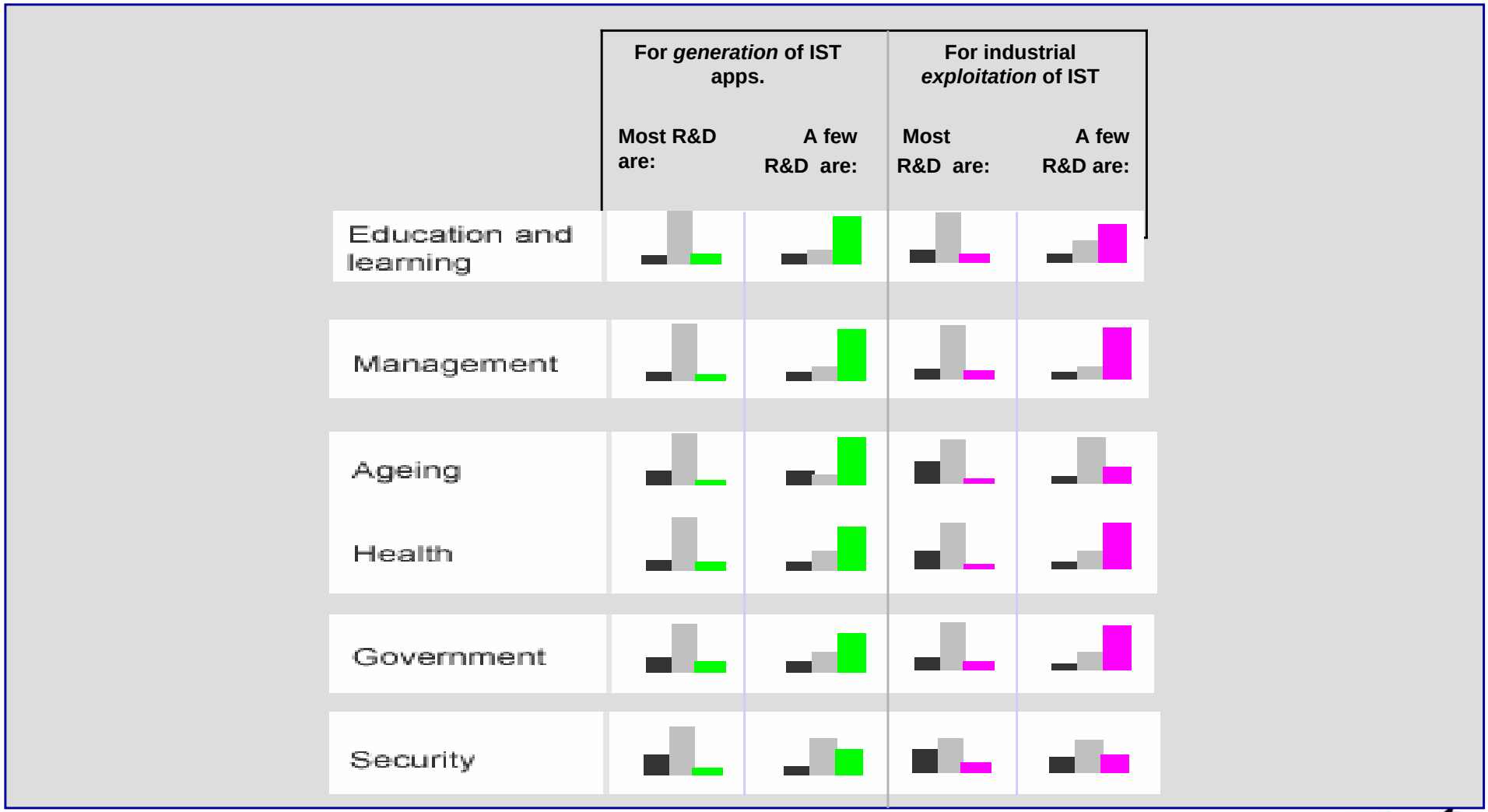
Source: authors' compilation, based on Synthesis of Foresights 2001-5 and FISTERA Delphi Report 2004-5

Key IST applications that contribute most to EU goals



Is Europe well-equipped to face the challenges?

Does Europe have R&D capabilities in these IST areas compared to the world?



Cutting-edge **Average** **Lagging behind**

Source: authors' compilation from FISTERA Delphi report 2004-5

Is Europe well-equipped to face the challenges? (cont.)

To what extent areas are taken up in research by the research communities?

✓Most public R&D org. seize "moderately" the opportunities in different IST apps areas.

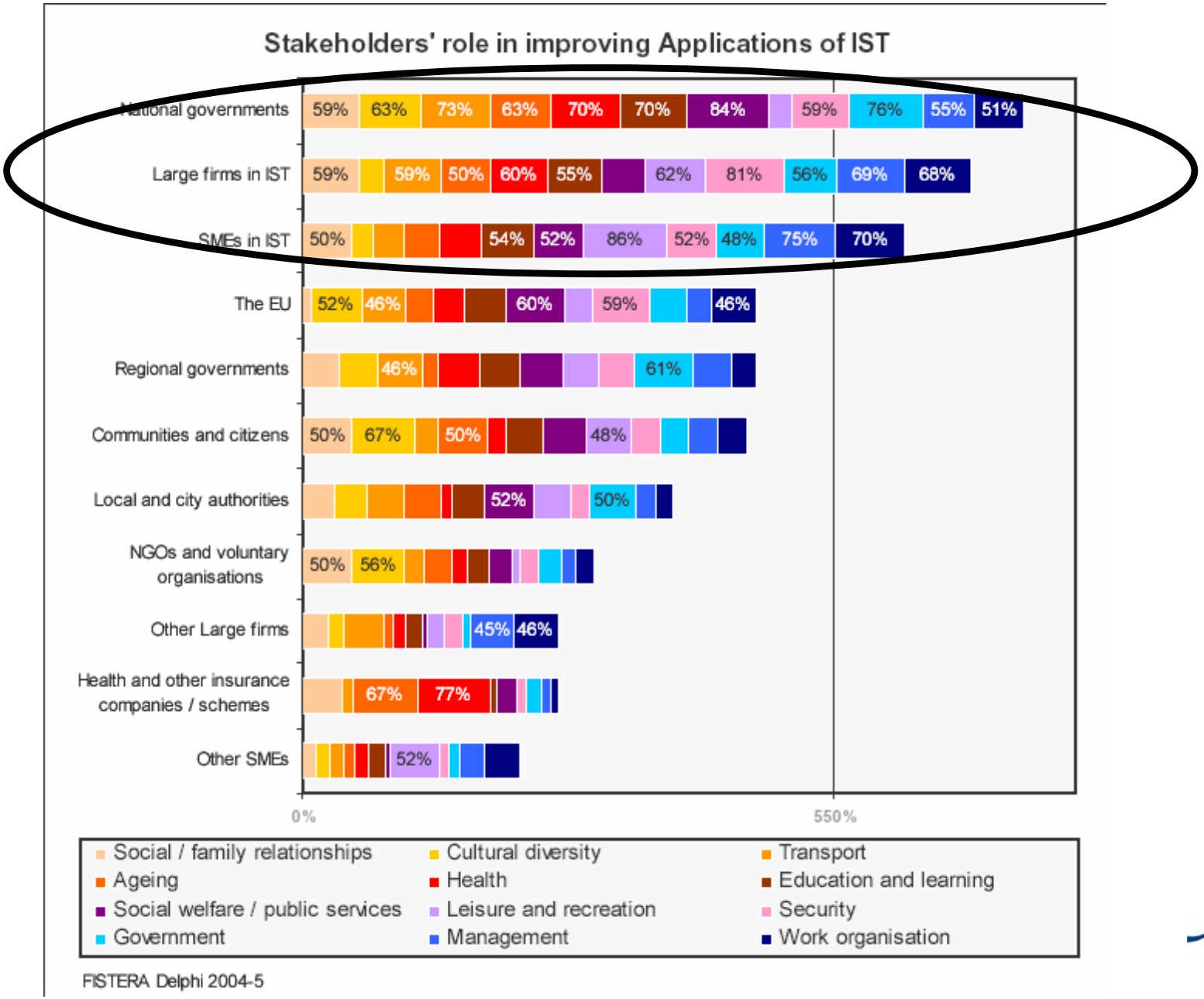
✓Public R&D org see better opportunities in Health than the private ones.

✓Most public R&D org are perceived be poorly prepared for take up apps in security, social welfare and cultural diversity, but well-prepared for IST apps for transport

✓Most R&D private org are well prepared for IST apps for transport and management.

Source: authors' compilation from FISTERA Delphi report 2004-5

Which are the most important stakeholders improving IST apps in EU-25?



Policy actions for effective IST

Key actions for effective and socially beneficial IST for the EU25	EU25 views		EU15 views		NMS views		CCs views		Non-EU views	
Social and institutional innovations	1	58.4%	1	59.3%	1	53.1%	2	50.0%	1	57.8%
Reducing the "digital divide"	2	52.1%	2	52.1%	2	51.6%	5	33.3%	3	38.2%
Improved communications infrastructure	3	44.3%	3	47.0%	7	29.7%	6	33.3%	5	30.4%
Development of new & improved IST applications	4	40.2%	4	39.3%	3	45.3%	1	55.6%	2	43.1%
Better IST training and awareness programmes	5	33.7%	5	32.1%	4	42.2%	3	50.0%	4	33.3%
More diffusion & deployment of current applications	6	29.3%	6	28.9%	6	31.3%	7	33.3%	7	28.4%
Application of other technologies (e.g. biotechnology)	7	25.4%	7	22.9%	5	39.1%	4	44.4%	6	30.4%
Other	8	5.6%	8	6.3%	8	1.6%	8	0.0%	8	3.9%
Total number of votes	1193		1005		188		54		271	
Total number of experts	413		349		64		18		102	

Source: FISTERA Delphi Report 2004-5

Policy actions for effective IST

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Reducing the "digital divide"	2	52.1%	2	52.1%	2	51.6%	5	33.3%	3	38.2%
Improved communications infrastructure	3	44.3%	3	47.0%	7	29.7%	6	33.3%	5	30.4%
Development of new & improved IST applications	4	40.2%	4	39.3%	3	45.3%	1	55.6%	2	43.1%
Better IST training and awareness programmes	5	33.7%	5	32.1%	4	42.2%	3	50.0%	4	33.3%
More diffusion & deployment of current applications	6	29.3%	6	28.9%	6	31.3%	7	33.3%	7	28.4%
Application of other technologies (e.g. biotechnology)	7	25.4%	7	22.9%	5	39.1%	4	44.4%	6	30.4%
Other	8	5.6%	8	6.3%	8	1.6%	8	0.0%	8	3.9%
Total number of votes	1193		1005		188		54		271	
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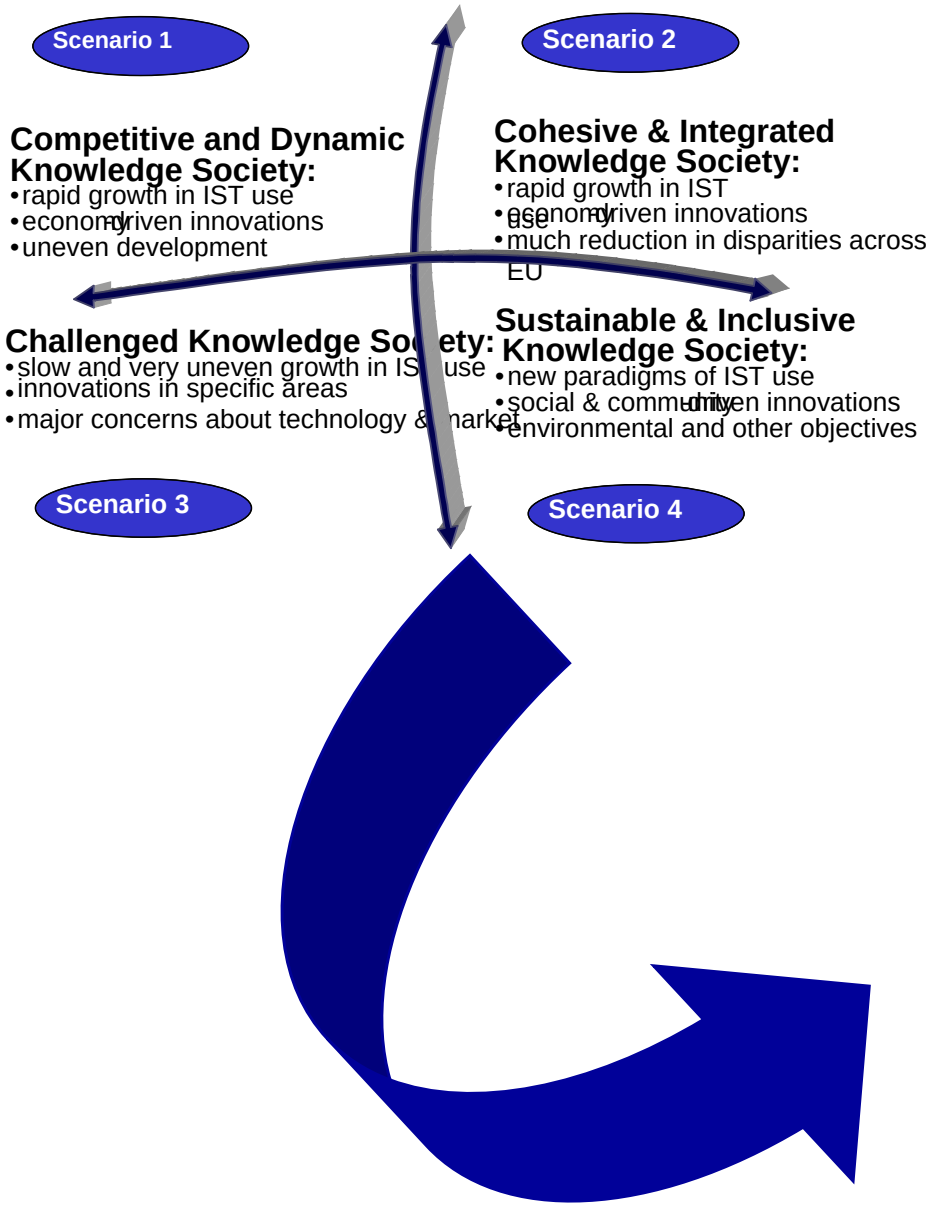
Source: FISTERA Delphi Report 2004-5

Final Word



Time to act!

- ✓ There is a consensus in Europe on the pioneering role of eApplications, the role of governments and the capabilities of the R&D communities

BUT,

- ✓ No opportunities without risk! What will IST future be like is a political choice in terms of scenarios.

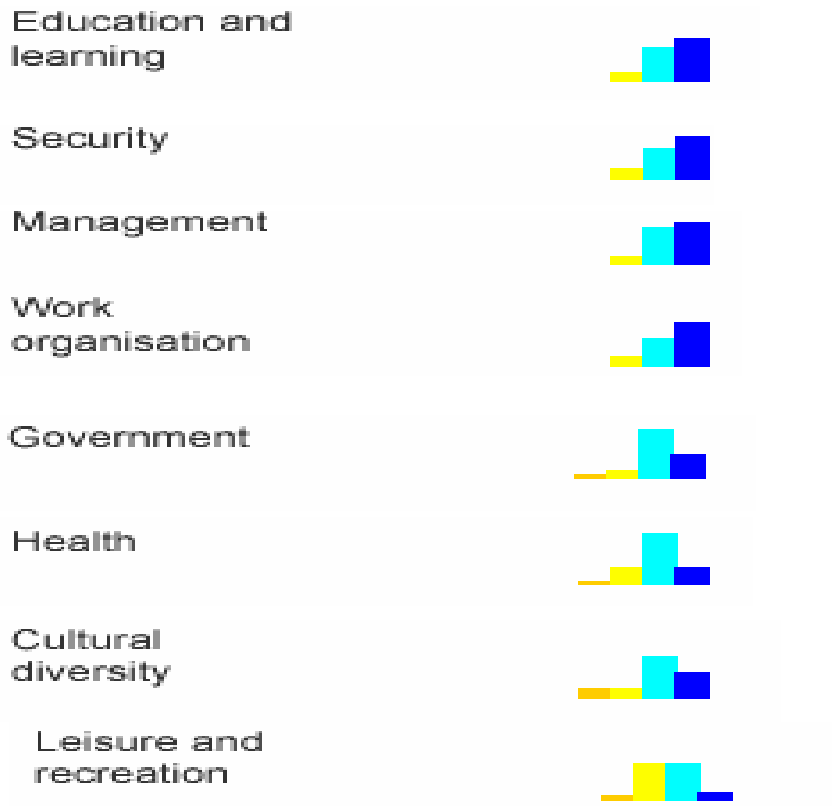
Thank you

http://fistera.jrc.es

Backup slides

Is Europe well-equipped to face the challenges?

Which areas are important to the European knowledge economy?



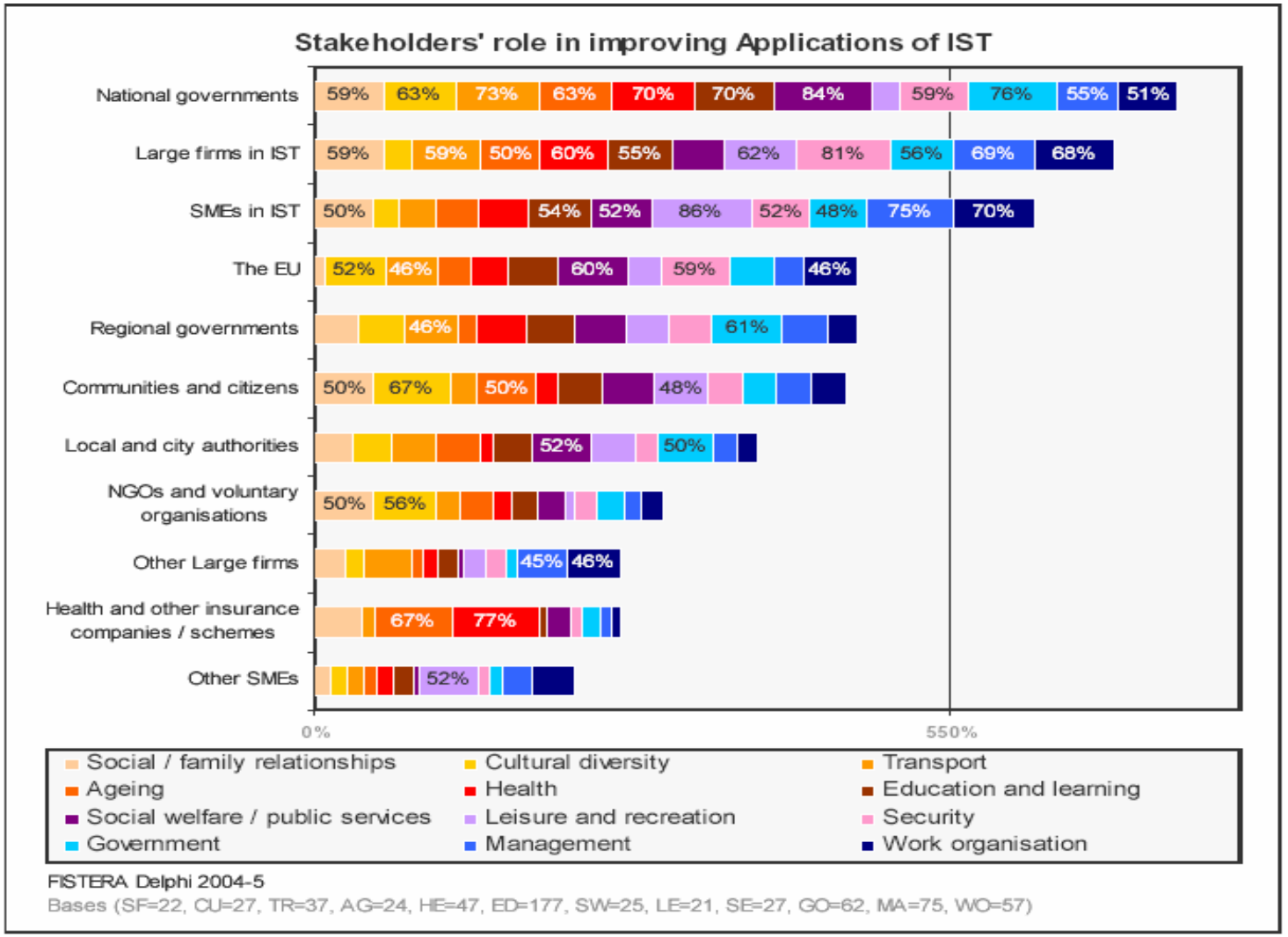
Source: authors' compilation from FISTERA Delphi report 2004-5

Essential **Important** **Moderately important**

Is Europe well-equipped to face the challenges?

Panoramic View of EU R&D Capabilities & Preparedness		Importance for the European Knowledge Economy	EU R&D capabilities compared to the World				Preparedness of EU research communities to seize the research opportunities					
			For generation of IST applications		For industrial exploitation of IST		None = N	Few = F		Many = M	All = A	
Areas	Number of Resps.	irrelevant unimportant moderately imp. very important essential	cutting-edge average lagging-behind		cutting-edge average lagging-behind		Preparedness in the Public Sector			Preparedness in the Private Sector		
			Most are	But few	Most are	But few	poor	moderate	well	poor	moderate	well
Social / family relationships	34						F	M	F	F	M	F
Cultural diversity	23						M	F	F	F	F	F
Transport	33						F	M	M	F	F	M
Ageing	22						F	F	F	F	F	F
Health	46						F	M	F	F	F	F
Education and learning	165						F	M	F	F	M	F
Social welfare / public services	25						M	M	F	F	M	F
Leisure and recreation	19						F	M	F	F	M	F
Security	24						M	F	F	F	M	F
Government	58						F	M	F	F	M	F
Management	71						F	M	F	F	M	M
Work organisation	54						F	M	F	F	M	F

Which are the most important stakeholders improving IST apps in EU-25?



Stakeholders improving IST applications to 'Education and learning'

1) National governments
2) Large firms in IST
3) SMEs in IST

Stakeholders improving IST applications to 'Health'

1) Health & insurance companies/schemes
2) National governments
3) Large firms in IST

Stakeholders improving IST applications to 'Government'

1) National governments
2) Regional governments
3) Large firms in IST
4) Local and city authorities
5) SMEs in IST

FOR JOB CREATION	EU25		EU15		NMS		CCs		Non-EU	
Education and learning	**1**	**76%**	**1**	**73%**	**1**	**92%**	**1**	**89%**	**1**	**71%**
Work organisation	**2**	**47%**	**2**	**46%**	**2**	**55%**	**3**	**56%**	**3**	**36%**
Social welfare / public services	**3**	**35%**	**3**	**34%**	**5**	**42%**	**4**	**39%**	**7**	**29%**
Management	**4**	**34%**	**4**	**31%**	**3**	**53%**	**2**	**56%**	**2**	**38%**
Government	**5**	**29%**	6	26%	**4**	**48%**	6	33%	4	32%
Health	6	29%	**5**	28%	6	30%	**5**	39%	**5**	31%
Ageing	7	25%	7	26%	9	20%	10	11%	9	25%
Cultural diversity	8	20%	9	21%	10	19%	8	22%	8	26%
Transport	9	20%	8	19%	8	22%	11	6%	12	19%
Security	10	19%	10	18%	7	23%	9	22%	11	21%
Leisure and recreation	11	18%	11	19%	12	13%	12	6%	10	24%
Social / family relationships	12	16%	12	16%	11	16%	7	33%	6	30%
Total number of votes	1521		1244		277		74		391	
Total number of experts	413		349		64		18		102	

Consensus higher than 50% is highlighted with dark background

FOR WEALTH CREATION	EU25		EU15		NMS		CCs		Non-EU	
Education and learning	1	65%	1	63%	1	73%	1	89%	1	66%
Work organisation	2	45%	2	43%	2	56%	4	39%	3	33%
Management	3	39%	3	37%	3	55%	3	44%	2	38%
Health	4	35%	4	33%	6	42%	5	39%	6	31%
Government	5	35%	5	33%	5	44%	6	33%	5	32%
Social welfare / public services	6	34%	6	32%	4	44%	2	50%	4	33%
Transport	7	22%	7	23%	10	16%	12	6%	10	20%
Security	8	19%	8	18%	8	23%	7	33%	7	25%
Leisure and recreation	9	18%	9	18%	9	16%	8	22%	8	26%
Cultural diversity	10	17%	12	18%	7	14%	9	11%	9	17%
Ageing	11	17%	11	17%	11	16%	10	6%	12	10%
Social / family relationships	12	16%	10	15%	12	22%	11	22%	11	22%
Total number of votes	1495		1226		269		71		361	
Total number of experts	413		349		64		18		102	

Consensus higher than 50% is highlighted with dark background

FOR COMPETITIVENESS	EU25		EU15		NMS		CCs		Non-EU	
Education and learning	1	70%	1	67%	1	88%	2	78%	1	66%
Work organisation	2	59%	2	57%	3	73%	3	72%	3	48%
Management	3	58%	3	54%	2	78%	1	89%	2	61%
Government	4	48%	4	48%	4	48%	4	56%	4	44%
Transport	5	34%	5	34%	5	36%	5	39%	5	32%
Social welfare / public services	6	25%	6	24%	6	31%	7	17%	6	22%
Cultural diversity	7	17%	7	17%	7	22%	8	17%	9	13%
Health	8	17%	9	16%	8	22%	9	6%	8	19%
Security	9	16%	8	17%	9	11%	6	28%	7	22%
Ageing	10	8%	10	8%	10	3%	9	11%	10	12%
Social / family relationships	11	5%	11	5%	11	3%	12	6%	11	10%
Leisure and recreation	12	4%	12	5%	12	2%	10	6%	12	8%
Total number of votes	1493		1226		267		326		418	
Total number of experts	413		349		64		18		102	

Consensus higher than 45% is highlighted with dark background

FOR SOCIAL COHESION	EU25		EU15		NMS		CCs		Non-EU	
Social welfare / public services	1	62%	2	60%	1	77%	3	56%	4	49%
Cultural diversity	2	62%	1	62%	3	64%	1	78%	1	62%
Education and learning	3	61%	3	60%	4	61%	4	56%	3	54%
Social / family relationships	4	56%	4	53%	2	73%	2	67%	2	60%
Government	5	29%	5	28%	5	39%	7	28%	5	29%
Ageing	6	26%	6	26%	7	27%	9	11%	7	20%
Health	7	25%	7	23%	6	31%	5	39%	6	25%
Security	8	15%	8	14%	9	19%	10	11%	10	9%
Leisure and recreation	9	12%	10	10%	8	22%	6	33%	8	19%
Work organisation	10	11%	9	11%	10	11%	11	0%	12	7%
Transport	11	8%	11	9%	12	3%	8	17%	9	15%
Management	12	6%	12	5%	11	11%	12	0%	11	8%
Total number of votes	1535		1255		280		71		362	
Total number of experts	413		349		64		18		102	
Consensus higher than 45% is highlighted with dark background										

FOR SOCIAL INCLUSION	EU25		EU15		NMS		CCs		Non-EU	
Education and learning	1	62%	1	61%	2	67%	4	50%	3	56%
Social / family relationships	2	60%	2	58%	1	70%	2	61%	1	57%
Social welfare / public services	3	60%	3	58%	3	67%	1	72%	4	52%
Cultural diversity	4	56%	4	56%	4	61%	3	61%	2	57%
Ageing	5	31%	5	31%	5	36%	5	50%	5	33%
Government	6	29%	6	28%	6	36%	7	17%	7	25%
Health	7	26%	7	26%	7	27%	6	44%	6	28%
Work organisation	8	13%	8	13%	10	11%	11	0%	10	7%
Leisure and recreation	9	10%	9	9%	9	14%	8	11%	8	10%
Transport	10	8%	10	8%	11	5%	9	11%	9	8%
Security	11	7%	11	7%	12	5%	10	11%	12	5%
Management	12	7%	12	4%	8	19%	12	0%	11	7%
Total number of votes	1525		1258		326		70		352	
Total number of experts	413		349		64		18		102	

Consensus higher than 45% is highlighted with dark background

Scenario 1: 'Competitive and Dynamic' EU by 2015

- This is described succinctly as a "market-driven economy". The scenario has a number of positive elements, however it was considered in many ways a somewhat Americanised future (thus the alternative title provided by the Seville workshop was "US or them?").
- Here, European governments would establish conditions for enterprise to flourish and markets to grow. Innovation is high and profit-driven, with new markets emerging and high levels of consumer demand for new products. Companies increase their investment in new market-oriented R&D, while the state underpins this with investment in basic research, education and training. The attitudes are techno-optimistic, individualistic, entrepreneurial & materialistic (expecting high quality technologies & services).
- There is some push in environmentalist directions, supporting a substitution of telecommunications for travel that has also been driven by security concerns. Additionally, consumers will push (sometimes) for more environmentally sustainable products and business processes, and will be better-informed about the environmental footprint of consumption choices. There would be both large and visible innovation successes and failures. Limits are anticipated for economic growth rates, in part associated with skill shortages (job creation will lead to uptake of highly skilled workers, other may find few rewarding opportunities) a lack of general standards (proprietary systems increase their hold). Universality will not be mandated for new services, which will therefore be unevenly available - though basic services will be commonly offered. There will be considerable problems with social cohesion, and associated issues such as crime. Digital as well as social divides will be apparent, with a growing underclass of excluded people. One wild card suggested for this scenario was that some countries might pull out of the EU!

Scenario 1: 'Competitive and Dynamic' EU by 2015 - continued

- Sustainability / environmental quality

  IST will enable the spreading of information on sustainability and market driven green technologies. But sustainability is still regarded as a luxury due to social divide and the reaction of society as a customer! This result comes from the market, rather than policies; and more public awareness helps to slightly improve environmental quality.
- Social cohesion

  Problems associated with persistent unemployment. Less developed areas are left out of the picture and disadvantaged groups are neglected, unless they constitute substantial markets. Some standardised solutions support social cohesion.
- Social inclusion

  Disabled groups will still be neglected under this scenario and there will be no economic incentive to support social inclusion (Although IST could facilitate access, Europe will not take full advantage of it because the lack of motivation for improvement will live the current situation unchanged).
- Job creation

  IST will facilitate outsourcing and there will be more jobs due to economic growth – mainly for skilled workers, who will be able to exercise more power in the workplace
- Economic growth / wealth creation

  Particular IST solutions can hinder economic growth since inactive and untrained workers would reduce national wealth
- Competitiveness & innovativeness

  The will be favourable conditions for competition and there is a great possibility of generalised standards to appear as big companies tend to introduce standards
- Employer-employee relations

  There is a lack of trade unions or other employees' organisations, and legal regulations are less important determinants of working conditions – though professional employees can wield enough influence to establish generally positive working conditions. IST use results in increased awareness of employees' rights thus improving transparency in employer-employee relations and the lack of trained work force empowers employees.
- Work-life balance

  Longer hours of working will often be experienced due to mobility and use of IST (e.g. for working at home and other places away from the workplace). However IST would also help to release stress by providing better working conditions; and much-in-demand professional employees can bargain for better working arrangements.