



COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 19.11.2004
SEC(2004) 1475

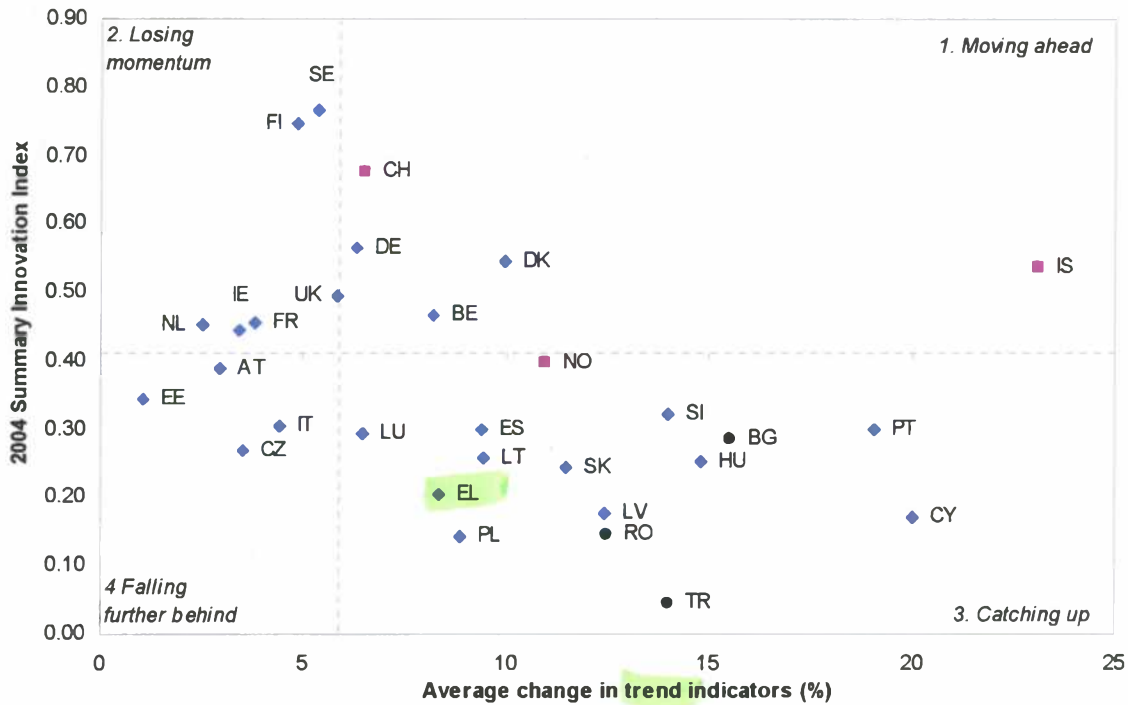
COMMISSION STAFF WORKING PAPER

EUROPEAN INNOVATION SCOREBOARD 2004
COMPARATIVE ANALYSIS OF INNOVATION PERFORMANCE

EN

EN

Figure II. Average country trend by Summary Innovation Index



dotted lines show EU25 mean performance

Innovation by sector

Using results from the latest Community Innovation Survey the EIS 2004 examines for the first time innovation differences between sectors (See Figure III). As expected, there are large differences in the innovativeness of specific sectors. The most innovative sector in the EU is electrical and optical equipment while the least innovative is textiles and textile products. In addition, there are large differences across Member States in the innovativeness of specific sectors. The electrical equipment sector for example is most innovative in Finland while Germany leads in transport equipment. The sector analyses also show marked differences in innovation styles, with 'high' and 'medium-high' technology manufacturing sectors innovating through knowledge creation, while service sectors and low technology manufacturing stress knowledge diffusion.

Figure 1. The 2004 Summary Innovation Index (SII)

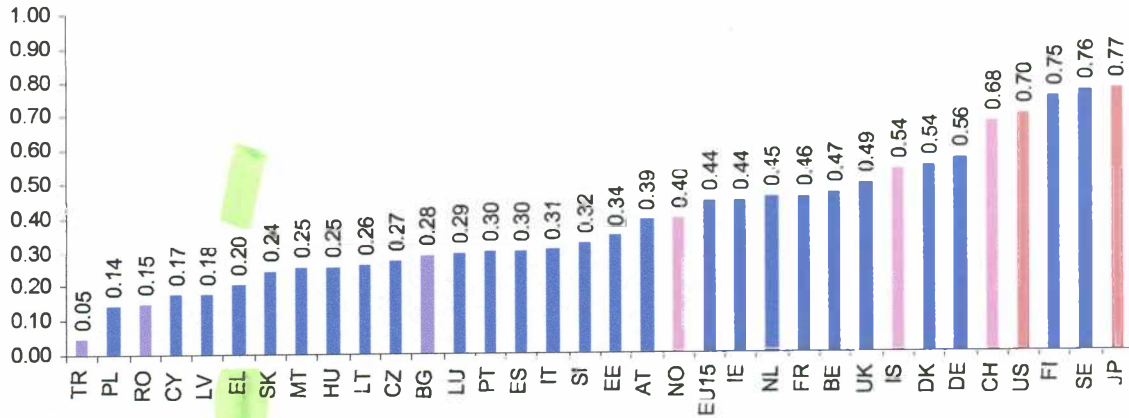
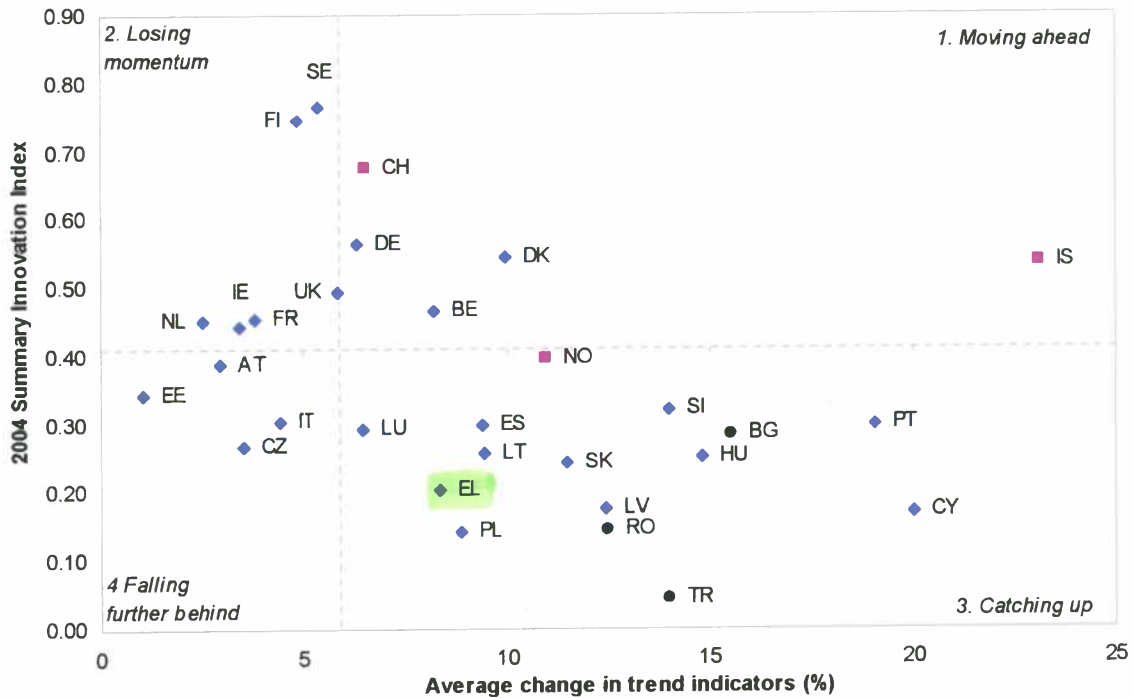
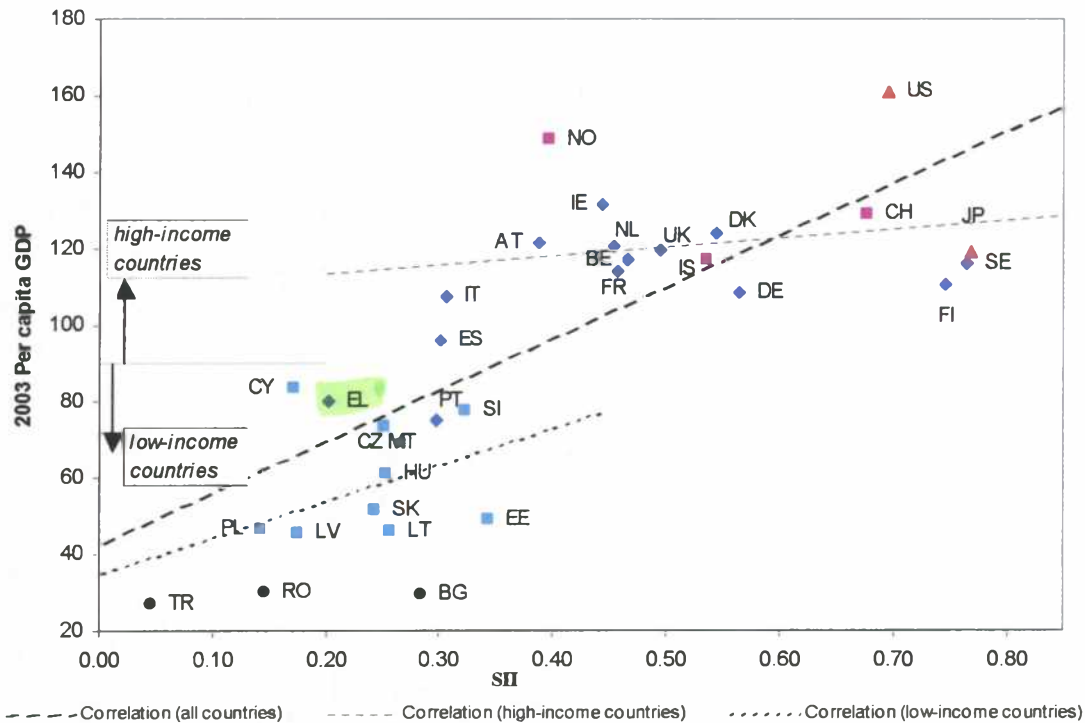


Figure 2. Average country trend by SII



Dotted lines show EU25 mean performance

Figure 3. Correlation between innovation and per capita GDP



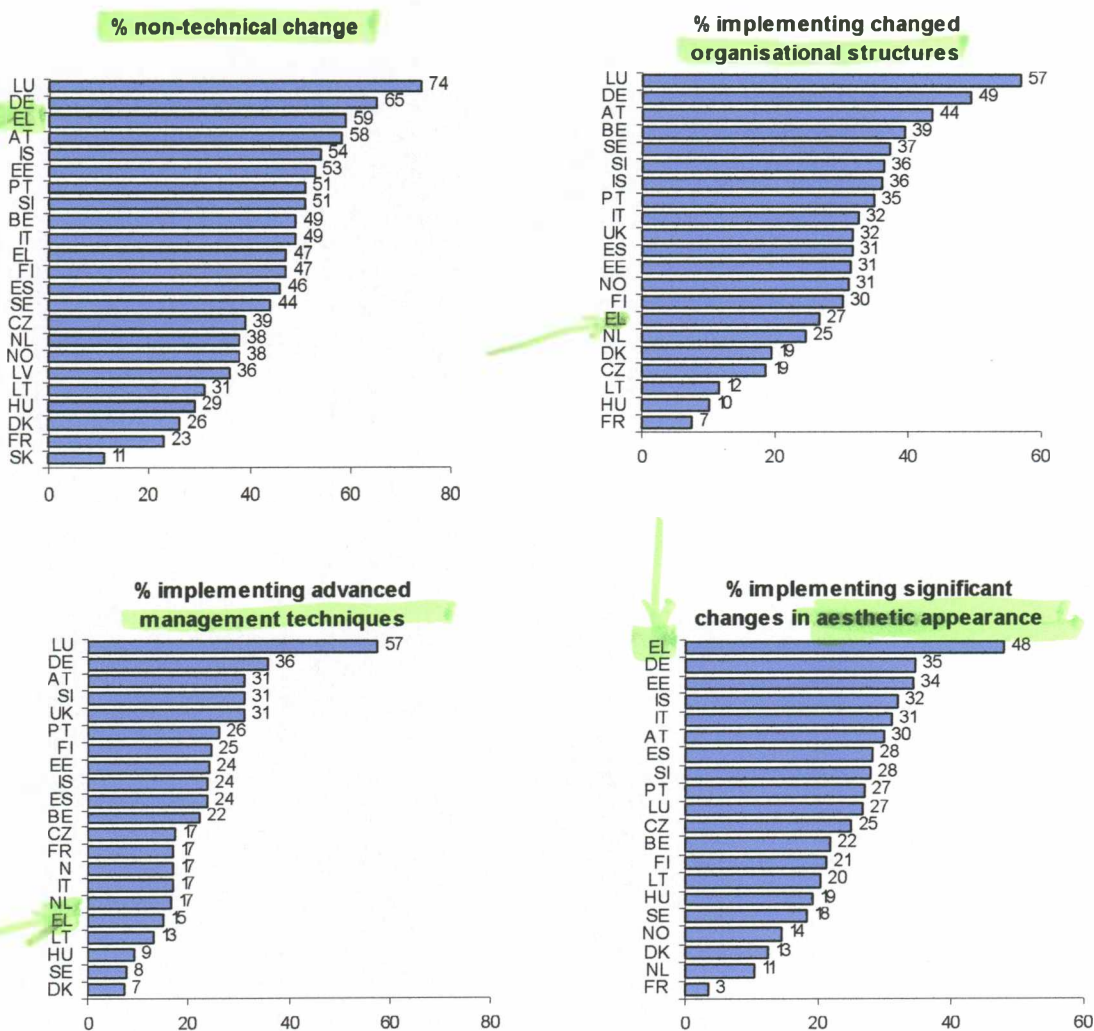
5. INNOVATION PATTERNS

The SII provides an aggregated overview of national innovation performance that does not consider the effect of structural differences in the distribution of manufacturing and service sectors or the methods that firms use to innovate. This section provides a closer look at these aspects and the way they combine into different innovation patterns.

5.1. Non-technical Innovation

Evidence from the European Competitiveness Report and other sources suggest that the advance of the US over Europe in productivity growth is not only a matter of technological innovation. US enterprises also seem to be better in reshaping their organisation and management methods in order to maximise profit from new technologies. In many cases, new business models, innovative delivery modes and integrated product and brand management are crucial elements for the transformation of technological innovation into new markets. Non-technical innovation may well be the “missing link” that prevents Europe from taking full advantage of new technological opportunities. Hence there is renewed interest in the assumption that “technological and social change must go hand in hand”.

Figure 4 Non-technical change

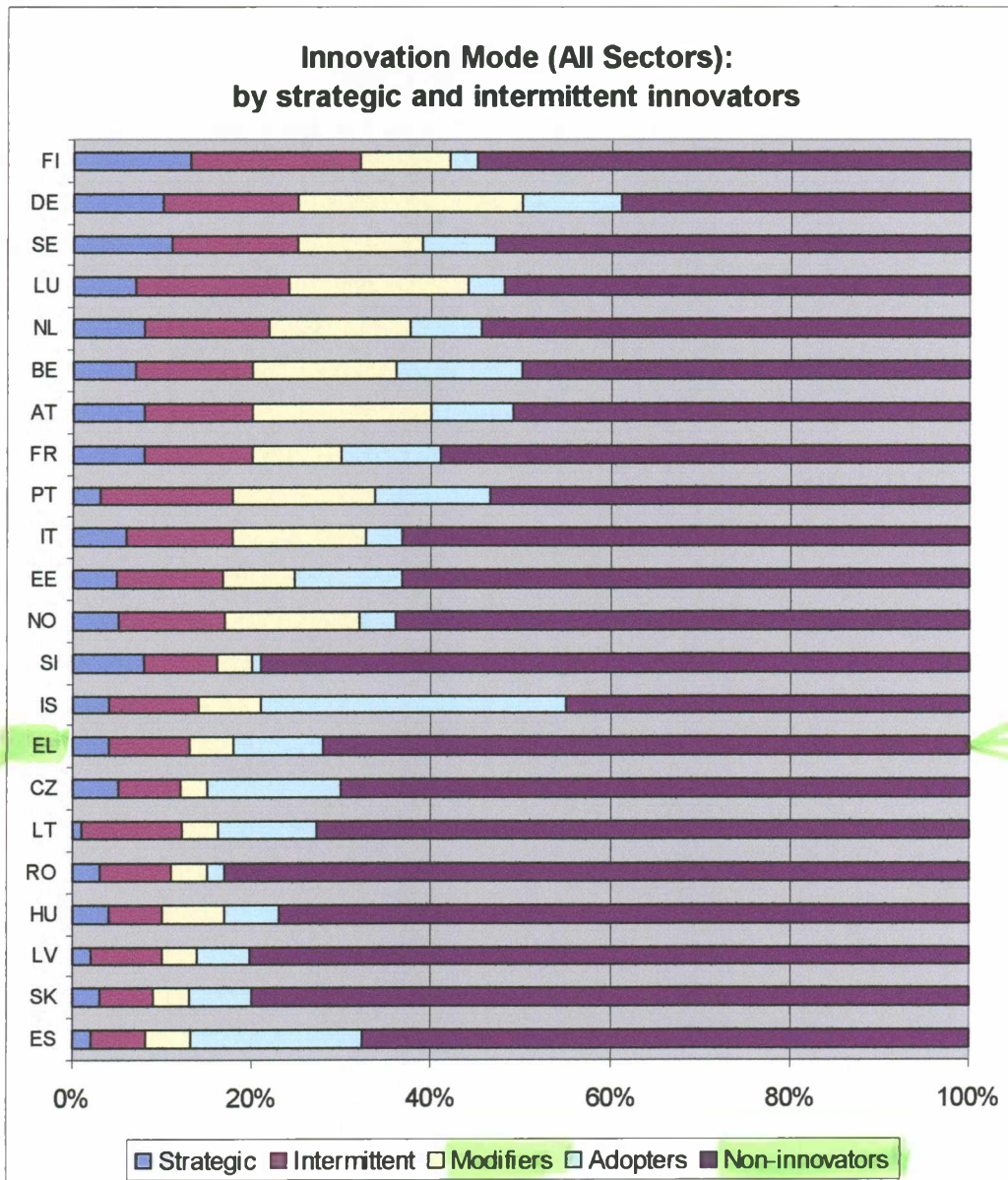


The 2004 EIS features, for the first time, a new indicator for non-technical change and innovation. Using data from CIS3, indicator 3.4 is a composite indicator and reflects the share of SMEs that have either implemented ‘advanced management techniques’, ‘new or significantly changed organizational structures’, or ‘significant changes in the aesthetic appearance or design of at least one product’.

Figure 4 shows this composite indicator and each of the three underlying sub-indicators for 21 countries. This indicator is the only one that is currently available on the subject but it should be interpreted with care. For some countries the results for organisational change are very high and, for most countries, the occurrence of organisational change seems to be significantly higher than the implementation rate of advanced management methods. This raises doubts about the common understanding of the underlying concepts and indicates that the results must be interpreted cautiously.

The results for non-technical change are of interest, however, because of the different pattern across countries for these indicators compared to the SII. In fact, there is virtually no correlation between the indicator for non-technical change and the SII (correlation coefficient

Figure 8



Intermittent innovators (30.7% of all innovative firms): These firms perform R&D and develop innovations in-house when necessary or favourable, but innovation is not a core strategic activity. For some, their R&D efforts focus on adapting new technology developed by other firms to their own needs.

Technology modifiers (26.3% of all innovative firms): These firms modify their existing products or processes through non-R&D based activities. Many firms in this group are essentially process innovators that innovate through production engineering.

Technology adopters (21.0% of all innovative firms): These firms primarily innovate by adopting innovations developed by other firms or organizations.

Annex Table B: European Innovation Scoreboard 2004: Current performance

	EU25	EU15	BE	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV	LT	LU	HU	MT	NL
1.1 S&E grads	11.5	12.5	10.5	5.7	12.2	8.1	6.6	–	12.2	20.2	20.5	6.1	3.7	8.1	14.6	1.8	4.8	2.7	6.6
1.2 Work pop w 3rd educ	21.2	21.8	29.0	12.0	31.9	24.3	30.4	17.8	25.2	23.1	26.5	10.8	29.5	18.2	23.2	16.3	15.4	9.0	24.9
1.3 Lifelong learning	9.0	9.7	8.5	5.4	18.9	6.0	6.2	3.7	5.8	7.4	9.7	4.7	7.9	8.1	4.5	6.3	6.0	4.2	16.5
1.4 Emp h-tech manuf	6.60	7.10	6.42	8.71	6.12	11.04	3.35	1.99	5.15	6.50	6.28	7.42	1.24	1.85	3.03	1.36	8.27	8.16	4.06
1.5 Emp h-tech serv	3.19	3.49	3.94	3.18	4.50	3.32	2.32	1.75	2.35	4.07	3.92	2.93	2.00	2.31	1.66	2.94	3.14	3.05	3.72
2.1 Public R&D exp	0.67	0.69	0.57	0.47	0.77	0.77	0.55	0.43	0.47	0.83	0.35	0.55	0.26	0.25	0.54	0.13	0.66	–	0.79
2.2 Business R&D exp	1.27	1.30	1.64	0.75	1.75	1.73	0.22	0.21	0.56	1.36	0.80	0.55	0.06	0.17	0.14	1.58	0.36	0.08	1.03
2.3.1 EPO h-tech pats	26.0	30.9	27.7	0.5	44.9	45.5	2.6	1.4	3.5	31.8	26.8	7.1	0.7	0.5	1.3	7.5	4.0	0.8	93.0
2.3.2 USPTO h-tech pats	9.4	11.2	8.8	0.2	16.4	15.6	1.1	0.2	1.4	12.1	8.1	4.3	0.0	0.3	0.0	0.4	0.5	0.0	15.4
2.4.1 EPO pats	133.6	158.5	148.1	10.9	214.8	301.0	8.9	8.1	25.5	147.2	89.9	74.7	9.9	6.0	2.6	201.3	18.3	17.7	278.9
2.4.2 USPTO pats	59.9	71.3	70.4	3.9	83.8	137.2	2.7	1.9	8.0	68.1	32.4	30.3	2.1	0.3	0.5	96.3	4.9	2.5	86.6
3.1 SMEs innov in-hse	31.7	32.1	38.3	24.6	16.1	46.2	36.9	17.5	24.3	29.2	–	31.0	–	15.9	21.5	39.2	–	–	34.1
3.2 SMEs innov co-op	7.1	6.9	9.6	6.2	15.8	9.2	11.3	6.3	2.7	9.3	–	3.0	–	4.0	12.3	–	11.1	–	9.6
3.3 Innovation exp	2.15	2.17	2.65	1.07	0.54	2.72	1.43	2.08	1.24	2.53	–	1.95	–	2.56	1.74	1.29	1.40	–	1.50
3.4 Non-tech change	49	–	49	39	26	65	53	59	46	23	–	49	–	36	31	74	29	–	38
4.1 Hi-tech venture capital	–	50.8	40.3	27.8	69.8	63.4	–	51.5	44.7	57.4	33.5	33.7	–	–	–	–	8.0	–	34.0
4.2 Early stage VC	0.025	0.025	0.028	0.001	0.063	0.021	–	0.008	0.012	0.029	0.023	0.005	–	0.000	–	–	0.002	–	0.027
4.3.1 New-to-mark prods	5.9	5.9	5.1	7.2	6.6	6.2	4.5	2.9	8.3	5.7	–	9.5	–	–	4.3	2.1	1.4	–	5.6
4.3.2 New-to-firm prods	16.8	17.1	13.9	7.3	13.5	23.4	5.4	8.9	17.0	11.7	–	16.1	–	–	10.6	7.3	4.9	–	12.1
4.4 Internet (comp. ind.)	–	0.57	0.67	–	0.89	0.72	–	0.28	0.37	0.34	0.51	0.43	0.44	0.00	0.07	0.61	–	–	0.77
4.5 ICT exp	6.3	6.2	6.5	9.2	6.5	6.1	11.5	5.0	4.8	5.9	4.6	5.0	–	10.1	8.2	6.9	9.4	–	7.1
4.6 VA h-tech manuf	12.7	14.1	13.1	7.1	15.0	11.9	–	6.3	6.5	18.3	30.6	9.9	4.0	2.8	8.1	3.2	16.0	28.4	12.1

Data in *italic*: MERIT estimate; data in **bold**: national data; data underlined: OECD data.

Annex Table B (continued)

	EU25	EU15	AT	PL	PT	SI	SK	FI	SE	UK	CH	IS	NO	BG	RO	TR	US	JP
1.1 S&E grads	11.5	12.5	5.3	8.1	7.4	9.5	7.8	17.2	13.3	19.5	7.2	9.2	7.7	11.7	5.8	--	10.2	13.0
1.2 Work pop w 3rd educ	21.2	21.8	16.5	13.8	11.0	17.8	11.8	33.2	27.2	30.6	26.9	25.7	31.4	21.3	9.6	9.3	38.1	36.3
1.3 Lifelong learning	9.0	9.7	7.9	5.0	3.7	15.1	4.8	17.6	34.2	21.3	24.8	24.0	21.3	1.4	1.3	--	--	--
1.4 Emp h-tech manuf	6.60	7.10	6.21	--	3.14	8.94	8.00	6.85	7.03	6.27	7.09	2.02	4.53	4.66	5.32	--	4.65	--
1.5 Emp h-tech serv	3.19	3.49	3.32	--	1.43	2.67	2.54	4.68	4.85	4.40	4.04	4.81	3.85	2.69	1.45	--	--	--
2.1 Public R&D exp	0.67	0.69	0.65	0.46	0.61	0.62	0.26	1.04	0.95	0.61	0.67	1.32	0.71	0.40	0.15	0.43	0.86	0.80
2.2 Business R&D exp	1.27	1.30	1.13	0.13	0.32	0.91	0.31	2.37	3.32	1.26	1.90	1.77	0.96	0.09	0.23	0.21	1.90	2.32
2.3.1 EPO h-tech pats	26.0	30.9	23.6	0.3	0.8	3.4	0.9	120.2	74.7	32.0	56.9	42.6	23.0	0.6	0.2	0.0	48.4	40.4
2.3.2 USPTO h-tech pats	9.4	11.2	6.5	0.0	0.1	1.5	0.0	51.4	38.1	14.0	18.3	21.5	6.3	0.1	0.0	0.0	76.4	75.4
2.4.1 EPO pats	133.6	158.5	174.8	2.7	4.3	32.8	4.3	310.9	311.5	128.7	460.1	121.8	131.3	3.7	0.9	1.0	154.5	166.7
2.4.2 USPTO pats	59.9	71.3	65.4	0.4	1.3	8.4	1.9	158.6	187.4	64.5	188.3	58.0	55.1	0.8	0.2	0.2	301.4	273.9
3.1 SMEs innov in-hse	31.7	32.1	35.5	12.5	36.2	18.3	12.5	37.6	35.2	22.4	54.8	46.5	28.8	--	--	--	--	--
3.2 SMEs innov co-op	7.1	6.9	8.8	5.0	7.0	7.6	3.3	20.0	13.4	7.7	10.4	12.5	12.5	--	2.9	--	--	--
3.3 Innovation exp	2.15	2.17	--	1.84	2.62	1.28	8.09	2.50	--	1.83	3.48	1.70	1.22	--	1.32	--	--	--
3.4 Non-tech change	49	--	58	--	51	51	10	47	44	--	--	54	38	--	77	--	--	--
4.1 Hi-tech venture capital	--	50.8	34.9	6.6	50.5	--	50.0	49.0	48.1	45.7	32.4	35.8	32.8	--	--	--	--	--
4.2 Early stage VC	0.025	0.025	0.013	0.007	0.026	--	0.002	0.065	0.081	0.038	0.039	0.048	0.032	--	0.003	--	0.072	--
4.3.1 New-to-mark prods	5.9	5.9	4.6	--	10.8	5.3	6.6	14.5	--	1.9	--	1.7	1.2	--	7.8	--	--	--
4.3.2 New-to-firm prods	16.8	17.1	13.2	--	15.1	4.9	6.2	17.5	--	15.1	20.5	3.2	7.2	--	1.6	--	--	--
4.4 Internet (comp. ind.)	--	0.57	0.53	0.27	0.27	0.45	--	0.69	1.00	0.69	--	1.08	0.73	--	--	--	--	1.02
4.5 ICT exp	6.3	6.2	6.1	7.7	6.3	6.8	8.9	6.6	8.2	7.5	--	--	5.6	11.2	6.4	3.2	6.3	6.1
4.6 VA h-tech manuf	12.7	14.1	11.5	5.7	6.5	13.3	5.2	24.9	15.9	18.8	34.0	--	10.3	8.6	5.2	6.6	23.0	18.7

Data in *italic*: MERIT estimate; data in **bold**: national data; data underlined: OECD data.

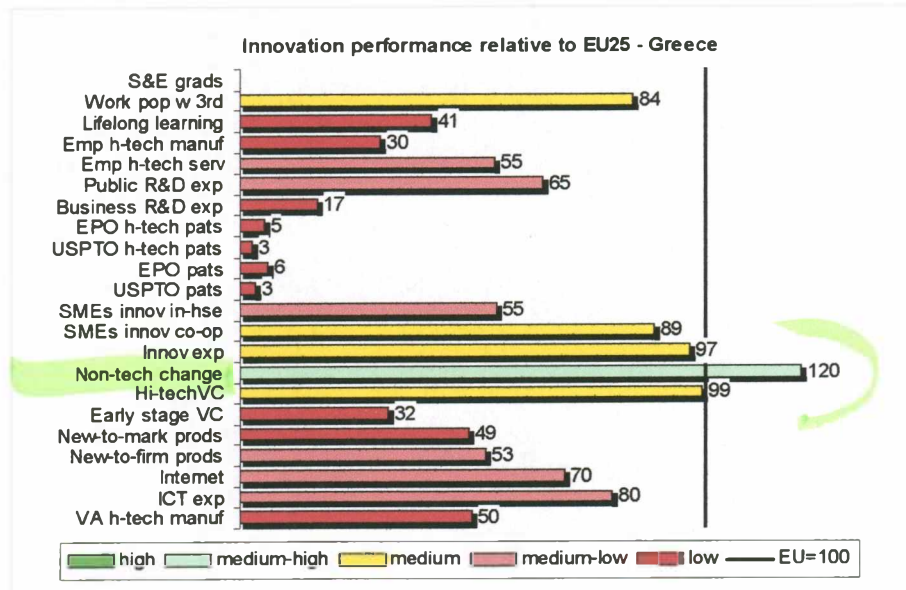
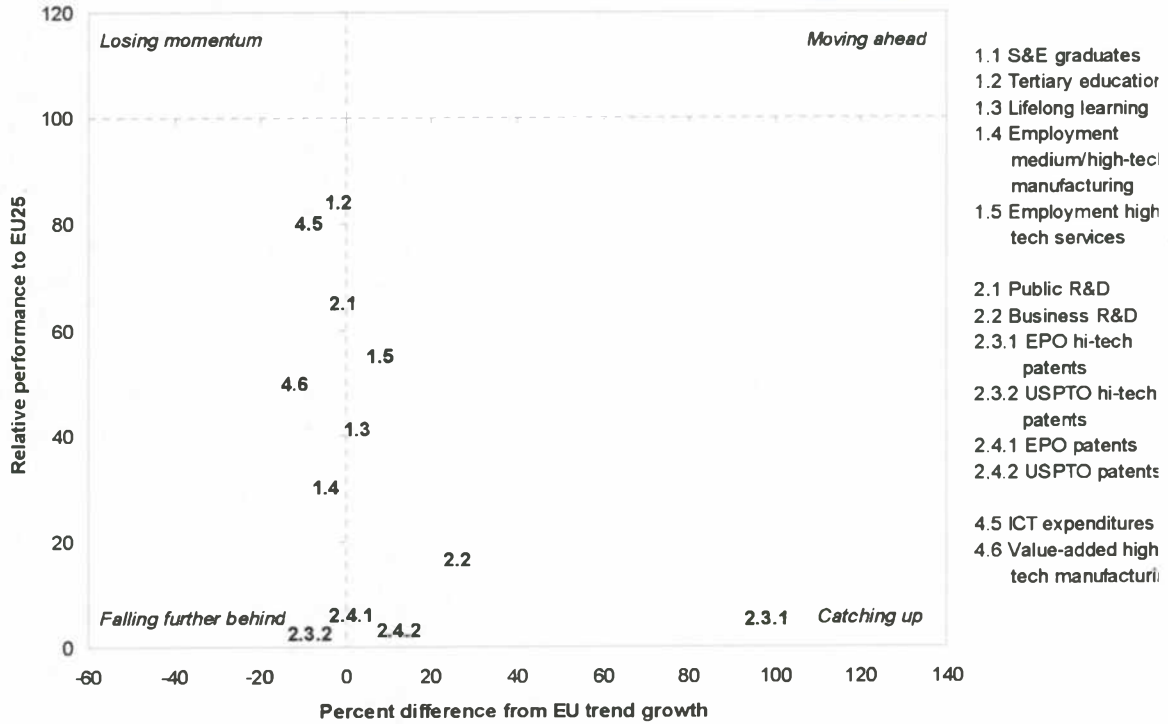
Annex Table D: European Innovation Scoreboard 2004 – Trend performance

	EU25	EU15	BE	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV	LT	LU	HU	MT	NL
1.1 S&E grads	18.5	16.5	8.2	13.2	49.7	-5.1	-5.7	--	33.6	10.2	-10.1	18.1	-2.6	23.4	27.0	28.6	-1.4	107.7	12.5
1.2 Work pop w 3rd educ	6.6	3.4	8.3	4.4	17.8	3.9	3.4	4.9	12.3	6.7	20.7	10.7	17.9	1.2	3.8	-10.5	8.4	--	8.8
1.3 Lifelong learning	2.8	2.8	21.4	--	-10.6	13.2	5.1	5.4	15.2	1.9	--	-12.4	--	--	--	22.7	8.3	--	8.8
1.4 Emp h-tech manuf	-5.4	-6.7	-6.8	-3.0	-7.4	-0.4	-23.1	-10.2	-5.5	-9.8	-12.6	-1.8	13.8	7.6	-4.7	-18.7	-1.8	--	-8.8
1.5 Emp h-tech serv	0.2	2.6	8.4	2.0	-6.8	10.2	-22.0	8.2	-0.7	3.8	-3.1	1.3	20.7	5.5	-17.4	-5.3	3.7	--	-9.9
2.1 Public R&D exp	0.5	2.0	4.3	6.0	2.2	3.1	10.7	0.0	10.2	2.0	0.0	2.5	30.0	-16.7	13.3	--	54.7	--	-12.2
2.2 Business R&D exp	5.2	4.8	16.3	1.4	25.9	-0.2	17.9	31.3	17.5	-1.7	-10.4	3.1	38.5	54.5	20.0	--	21.3	--	-6.4
2.3.1 EPO h-tech pats	35.1	34.6	30.1	-10.7	47.3	32.2	77.3	133.0	35.7	29.4	67.3	20.2	-18.8	78.5	--	--	97.0	--	69.1
2.3.2 USPTO h-tech pats	--	22.5	0.7	--	3.8	36.8	--	13.9	42.9	12.1	123.1	23.1	--	--	--	--	--	--	2.2
2.4.1 EPO pats	14.5	14.1	4.7	1.2	30.2	12.8	42.1	15.5	17.5	11.2	24.4	11.3	22.6	54.2	--	--	30.3	23.8	32.6
2.4.2 USPTO pats	--	12.6	5.6	6.0	5.7	17.5	1.1	24.8	14.4	5.8	29.1	8.1	63.8	-67.7	--	--	24.9	-3.5	5.9
4.5 ICT exp	-2.9	-3.9	-4.4	4.0	-5.1	-3.9	-7.3	-11.5	-10.3	-0.8	-14.8	-2.9	--	4.7	24.2	-5.5	-2.1	--	-4.1
4.6 VA h-tech manuf	--	12.0	16.0	--	12.1	17.6	--	0.1	-6.1	11.1	0.3	9.7	--	--	--	6.5	--	--	8.9
Country average	5.9	5.4	8.2	3.5	10.0	6.3	1.0	8.3	9.4	3.8	3.4	4.4	20.0	12.4	9.5	2.6	14.8	--	2.5

For EU25 country average, EU15 trend data for indicators 2.3.2, 2.4.2 and 4.6 have been used as proxies for EU25 trend data

GREECE

2004 European Innovation Scoreboard - GREECE



GREECE									Latest (EU25 =100)	Rank among EU25	Current (1)	Trend (2)	
	1996	1997	1998	1999	2000	2001	2002	2003					
Human resources													
1.1	S&E graduates	--	--	--	--	--	--	--					
	<i>relative to EU15</i>	--	--	--	--	--	--	--					
1.2	Work pop w 3rd educ	--	--	16.8	16.7	17.0	17.2	17.6	17.8	84	15	0	0
	<i>relative to EU15</i>	--	--	97	82	80	80	81	--				
1.3	Lifelong learning	0.9	0.9	1.0	1.2	1.1	1.4	1.2	3.7	41	24	--	0
	<i>relative to EU15</i>	16	16	--	15	13	17	14	38				
1.4	Employment hi-tech manuf	--	2.20	2.41	2.21	2.22	2.22	2.20	1.99	30	21	--	0
	<i>relative to EU15</i>	--	29	31	29	29	29	30	28				
1.5	Employment hi-tech serv	--	1.43	1.49	1.53	1.62	1.70	1.76	1.75	55	22	-	0
	<i>relative to EU15</i>	--	49	50	48	48	47	49	50				
Knowledge creation													
2.1	Public R&D exp	--	0.38	--	0.48	--	0.43	--	--	65	19	-	0
	<i>relative to EU15</i>	--	56	--	72	--	63	--	--				
2.2	Business R&D exp	0.12	0.13	--	0.19	--	0.21	--	--	17	20	--	++
	<i>relative to EU15</i>	10	11	--	15	--	16	--	--				
2.3.1	EPO hi-tech patents	0.3	0.4	0.6	0.9	0.8	2.1	1.4	--	5	17	--	++
	<i>relative to EU15</i>	2	3	3	4	3	6	4	--				
2.3.2	USPTO hi-tech patents	0.5	0.1	0.3	0.2	0.3	0.4	0.2	--	3	18	--	0
	<i>relative to EU15</i>	9	2	4	2	3	3	2	--				
2.4.1	EPO patents	4.6	5.3	7.1	8.1	6.1	8.3	8.1	--	6	20	--	0
	<i>relative to EU15</i>	5	5	5	6	4	5	5	--				
2.4.2	USPTO patents	1.6	1.3	1.6	2.0	1.7	2.5	1.9	--	3	20	--	+
	<i>relative to EU15</i>	4	3	3	3	3	3	3	--				
Transmission and application of knowledge													
3.1	SMEs innov in-house	--	--	--	--	17.5	--	--	--	55	17	-	
3.2	SMEs innov co-operation	--	--	--	--	6.3	--	--	--	89	15	0	
3.3	Innovation expenditures	--	--	--	--	2.08	--	--	--	97	8	0	
3.4	SMEs non-tech innov	--	--	--	--	59	--	--	--	120	3	+	
Innovation finance, output and markets													
4.1	Hi-tech venture capital	--	--	--	--	1	50	52	--	99	5	0	(3)
	<i>relative to EU15</i>	--	--	--	--	2	99	99	--				
4.2	Early stage venture capital	0.005	0.006	0.005	0.011	0.012	0.016	0.017	0.008	32	13	--	(3)
	<i>relative to EU15</i>	91	69	30	36	21	26	45	32				
4.3.1	New-to-market products	--	--	--	--	2.9	--	--	--	49	16	--	
4.3.2	New-to-firm products	--	--	--	--	8.9	--	--	--	53	13	-	
4.4	Internet (comp. indicator)	--	--	--	--	--	--	0.28	--	--	16		
4.5	ICT expenditures	--	--	--	--	5.7	5.6	5.2	5.0	80	20	-	0
	<i>relative to EU15</i>	--	--	--	--	88	88	85	81				
4.6	Value-added hi-tech manuf	5.9	6.2	6.5	6.2	6.2	6.3	--	--	50	19	--	-
	<i>relative to EU15</i>	50	51	52	47	45	45	--	--				
Macro-economic indicators													
	GDP per capita (EU25=100)	--	--	72	72	73	74	78	80				
	Productivity per hour (EU15=100)	66	70	66	66	68	69	73	74				
	Employment rate	55	55	56	55	56	55	57	58	92			

Value in **bold**: break in series. (1) Current strength “++” if relative to EU25 performance above 150, “+” if above 120, “0” if between 80 and 120, current weakness “-” if below 80, “--” if below 50. (2) Trend strength “++” if relative to EU25 trend above 25, “+” is above 10, “0” if between -10 and 10, trend weakness “-” if below -10, “--” if below -25. (3) Trend data for both venture capital indicators have not been used as these data suffer from high year-to-year fluctuations and are considered to be less reliable.

