

Appendix 1

Data values of each indicator used in construction of the three parameters: innovation, expertise and creativity, per year and country.

Parameter	Knowledge															
	Share of households with ITC at home (%)								Medium and high-tech product exports (% manufactured exports)							
Country	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
Austria	75	79	81	81	82	85	89	89	60	61	62	62	62	62	61	61
Belgium	77	78	80	83	82	85	86	87	53	53	52	53	55	55	54	53
Bulgaria	45	51	54	57	59	64	67	72	36	35	37	39	42	42	43	45
Croatia	61	66	65	68	77	77	76	82	48	45	44	42	45	45	47	46
Cyprus	57	62	65	69	71	74	79	86	55	51	53	53	44	44	33	28
Czech Republic	67	73	73	78	79	82	83	86	68	68	67	68	69	69	70	71
Denmark	90	92	93	93	92	94	97	93	53	52	53	54	55	55	58	58
Estonia	69	74	79	83	88	86	88	90	45	45	49	50	50	50	50	47
Finland	84	87	89	90	90	92	94	94	46	46	44	46	50	50	50	49
France	76	80	82	83	83	86	86	89	64	65	65	65	66	66	66	66
Germany	83	85	88	89	90	92	93	94	72	72	73	73	74	74	74	74
Greece	50	54	56	66	68	69	71	76	26	23	22	24	28	28	27	25
Hungary	63	67	70	73	76	79	82	83	76	73	74	75	77	77	76	75
Ireland	78	81	82	82	85	87	88	89	54	52	52	52	56	56	60	59
Italy	62	63	69	73	75	79	81	84	54	53	54	54	55	55	55	54
Latvia	64	69	72	73	76	77	79	82	35	35	36	38	42	42	43	43
Lithuania	60	60	65	66	68	72	75	78	38	38	37	41	41	41	43	42
Luxembourg	91	93	94	96	97	97	97	93	38	38	39	40	43	43	47	47
Malta	75	77	78	80	81	81	85	84	43	40	40	39	41	41	42	46
Netherlands	94	94	95	96	96	97	98	98	52	51	51	53	55	55	56	56
Poland	67	70	72	75	76	80	82	84	56	55	55	55	56	56	55	54

Portugal	58	61	62	65	70	74	77	79	40	40	38	39	39	39	41	43
Romania	47	54	58	61	68	72	76	81	54	54	56	56	58	58	61	62
Slovakia	71	75	78	78	79	81	81	81	-	-	-	-	-	-	-	-
Slovenia	73	74	76	77	78	78	82	87	61	62	62	62	63	63	64	64
Spain	63	67	70	74	79	82	83	86	55	54	56	55	57	57	57	55
Sweden	91	92	93	90	91	94	95	93	58	56	57	57	60	60	60	60
United Kingdom	83	87	88	90	91	93	94	95	62	63	64	68	69	69	70	69
SOURCE	Eurostat								World Development Indicators							
LINK	http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_bde15b_h&lang=en								https://data.worldbank.org/indicator/TX.MNF.TECH.ZS.UN							

Parameter Country	Knowledge															
	New doctorate graduates (persons)								Population completed tertiary education (%)							
	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
Austria	1710	1769	1622	1655	1599	1642	1715	1619	24	26	27	40	39	40	41	41
Belgium	1102	1826	1895	1965	1987	2252	2257	2318	43	44	43	44	43	46	46	48
Bulgaria	270	344	423	449	534	580	567	516	27	27	29	31	32	34	33	34
Croatia	365	415	448	462	444	278	299	268	24	23	26	32	31	29	29	34
Cyprus	35	38	38	49	44	67	57	86	46	50	48	53	55	53	56	57
Czech Republic	1778	1915	1698	1714	1698	1617	1673	1662	24	26	27	28	30	33	34	34
Denmark	993	956	1325	1476	1504	1525	1537	1439	41	43	43	44	46	47	48	48
Estonia	153	124	150	132	123	159	162	147	40	40	43	43	45	45	48	47
Finland	818	804	835	885	879	891	790	834	46	46	45	45	46	46	45	44
France	9067	9354	10038	9849	9984	9850	11122	11310	43	43	44	44	45	44	44	46
Germany	21285	22384	22516	22871	23519	23414	22479	21824	31	32	33	31	32	33	34	35
Greece	650.5	665.9	699	592	708	863	813	643	29	31	35	37	40	43	44	44

Hungary	717	720	667	776	764	768	737	812	28	30	32	34	34	33	32	34
Ireland	1018	1018	1106	1231	909	1049	889	879	51	52	54	55	54	55	55	56
Italy	8099	8194	8046	7842	8223	5717	7713	6641	20	22	23	24	25	26	27	28
Latvia	123	137	141	129	131	106	65	57	36	37	41	40	41	43	44	43
Lithuania	256	278	309	306	288	229	248	256	46	49	51	53	58	59	58	58
Luxembourg	45	45	53	66	91	83	117	110	48	50	53	53	52	55	53	56
Malta	7	5	12	13	11	14	28	25	23	26	29	29	29	32	34	35
Netherlands	3162	3413	3698	3866	3888	4129	3945	3971	41	42	43	45	46	46	48	49
Poland	2766	2523	2959	2680	3064	2923	2566	2733	37	39	41	42	43	45	46	46
Portugal	1064	1352	1057	1054	883	958	914	923	27	28	30	31	32	35	34	34
Romania	3503	3073	3180	837	955	514	417	968	20	22	23	25	26	26	26	25
Slovakia	1220	1688	1587	1598	1407	1344	1216	1076	38	39	40	41	43	44	46	43
Slovenia	363	367	795	585	570	1102	324	289	23	24	27	27	28	32	34	38
Spain	4966	5312	5695	5941	6291	6740	6767	8185	42	42	42	42	41	40	41	42
Sweden	1902	1936	1980	2136	2112	2106	2068	1801	47	48	48	50	50	51	51	52
United Kingdom	13673	13712	15951	15601	16768	17217	17700	18366	46	47	47	48	48	48	48	49
SOURCE	Europa.eu								Eurostat							
LINK	https://rio.jrc.ec.europa.eu/stats/new-doctoral-graduates-thousand-population-aged-25-34								https://ec.europa.eu/eurostat/databrowser/view/sdg_04_20/default/table?lang=en							

Parameter Country	Knowledge							
	Enterprises providing ICT training (%)							
	2011	2012	2013	2014	2015	2016	2017	2018
Austria	37.2	29	32	34	33	37	31	27
Belgium	31.3	30	32	33	32	34	35	36
Bulgaria	13.1	14	15	15	8	8	9	9

[illegible]

Parameter Country	Innovation															
	SMEs with product or process innovations (norm)								SMEs with marketing or organisational innovations (norm)							
	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
Austria	0.68	0.71	0.71	0.60	0.60	0.71	0.71	0.80	0.64	0.64	0.64	0.68	0.68	0.71	0.71	0.80
Belgium	0.78	0.86	0.86	0.74	0.74	0.87	0.87	0.85	0.67	0.62	0.62	0.52	0.52	0.69	0.69	0.69
Bulgaria	0.28	0.15	0.15	0.12	0.12	0.13	0.13	0.18	0.14	0.12	0.12	0.14	0.14	0.08	0.08	0.10
Croatia	0.51	0.46	0.46	0.30	0.30	0.38	0.38	0.50	0.44	0.43	0.43	0.40	0.40	0.41	0.41	0.54
Cyprus	0.74	0.58	0.58	0.46	0.46	0.54	0.54	0.45	0.74	0.53	0.53	0.50	0.50	0.41	0.41	0.34
Czech Republic	0.58	0.49	0.49	0.50	0.50	0.50	0.50	0.54	0.71	0.61	0.61	0.39	0.39	0.30	0.30	0.42
Denmark	0.64	0.68	0.68	0.56	0.56	0.58	0.58	0.55	0.59	0.64	0.64	0.60	0.60	0.59	0.59	0.57
Estonia	0.78	0.71	0.71	0.54	0.54	0.21	0.21	0.72	0.47	0.51	0.51	0.41	0.41	0.09	0.09	0.20
Finland	0.73	0.71	0.71	0.70	0.70	0.78	0.78	1.00	0.42	0.57	0.57	0.53	0.53	0.53	0.53	0.69
France	0.52	0.49	0.49	0.53	0.53	0.60	0.60	0.65	0.56	0.65	0.65	0.61	0.61	0.62	0.62	0.69
Germany	0.99	0.88	0.88	0.75	0.75	0.73	0.73	0.72	1.00	1.00	1.00	0.71	0.71	0.77	0.77	0.70
Greece	0.47	0.47	0.47	0.47	0.47	0.58	0.58	0.79	0.69	0.69	0.69	0.69	0.69	0.59	0.59	0.72
Hungary	0.19	0.15	0.15	0.11	0.11	0.16	0.16	0.22	0.20	0.24	0.24	0.30	0.30	0.09	0.09	0.16
Ireland	0.74	0.72	0.72	0.60	0.60	0.82	0.82	0.65	0.62	0.69	0.69	0.78	0.78	0.84	0.84	0.76
Italy	0.51	0.64	0.64	0.67	0.67	0.54	0.54	0.71	0.60	0.65	0.65	0.68	0.68	0.48	0.48	0.57
Latvia	0.20	0.14	0.14	0.17	0.17	0.09	0.09	0.23	0.07	0.24	0.24	0.25	0.25	0.17	0.17	0.22
Lithuania	0.30	0.25	0.25	0.18	0.18	0.56	0.56	0.65	0.22	0.32	0.32	0.29	0.29	0.27	0.27	0.46
Luxembourg	0.73	0.84	0.84	0.76	0.76	0.63	0.63	0.70	0.85	0.96	0.96	0.83	0.83	0.88	0.88	0.83
Malta	0.39	0.39	0.39	0.52	0.52	0.41	0.41	0.32	0.30	0.41	0.41	0.65	0.65	0.41	0.41	0.31
Netherlands	0.51	0.79	0.79	0.71	0.71	0.76	0.76	0.88	0.36	0.53	0.53	0.49	0.49	0.44	0.44	0.42
Poland	0.21	0.12	0.12	0.11	0.11	0.12	0.12	0.15	0.16	0.19	0.19	0.07	0.07	0.02	0.02	0.01
Portugal	0.86	0.79	0.79	0.66	0.66	0.74	0.74	1.00	0.67	0.74	0.74	0.65	0.65	0.55	0.55	0.74
Romania	0.22	0.11	0.11	0.00	0.00	0.00	0.00	0.00	0.31	0.30	0.30	0.15	0.15	0.00	0.00	0.00
Slovakia	0.24	0.38	0.38	0.21	0.21	0.19	0.19	0.25	0.36	0.33	0.33	0.31	0.31	0.24	0.24	0.19

Slovenia	0.50	0.53	0.53	0.45	0.45	0.48	0.48	0.39	0.58	0.54	0.54	0.51	0.51	0.45	0.45	0.33
Spain	0.42	0.38	0.38	0.23	0.23	0.23	0.23	0.22	0.40	0.34	0.34	0.24	0.24	0.30	0.30	0.33
Sweden	0.71	0.78	0.78	0.69	0.69	0.70	0.70	0.66	0.52	0.63	0.63	0.55	0.55	0.49	0.49	0.52
United Kingdom	0.41	0.47	0.47	0.43	0.43	0.53	0.53	0.65	0.41	0.50	0.50	0.57	0.57	0.70	0.70	0.59
SOURCE	Europa.eu								Europa.eu							
LINK	https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en								https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en							

Parameter Country	Innovation															
	SMEs innovating in-house (norm)								Scientific publications among top 10% most cited (norm)							
	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
Austria	0.69	0.74	0.74	0.62	0.62	0.71	0.71	0.79	0.62	0.64	0.65	0.67	0.67	0.70	0.65	0.67
Belgium	0.85	0.80	0.80	0.77	0.77	0.83	0.83	0.83	0.78	0.78	0.81	0.84	0.85	0.82	0.84	0.78
Bulgaria	0.23	0.11	0.11	0.09	0.09	0.08	0.08	0.14	0.07	0.10	0.08	0.03	0.06	0.07	0.06	0.08
Croatia	0.46	0.43	0.43	0.29	0.29	0.34	0.34	0.48	0.09	0.08	0.10	0.09	0.09	0.12	0.12	0.17
Cyprus	0.88	0.88	0.88	0.52	0.52	0.59	0.59	0.53	0.37	0.49	0.64	0.56	0.59	0.65	0.55	0.55
Czech Republic	0.56	0.50	0.50	0.50	0.50	0.52	0.52	0.59	0.23	0.25	0.22	0.23	0.25	0.27	0.27	0.29
Denmark	0.59	0.59	0.59	0.59	0.59	0.53	0.53	0.41	0.88	0.91	0.93	0.97	0.91	0.92	0.91	0.96
Estonia	0.68	0.60	0.60	0.51	0.51	0.20	0.20	0.80	0.38	0.46	0.44	0.39	0.44	0.50	0.55	0.57
Finland	0.80	0.71	0.71	0.75	0.75	0.80	0.80	1.00	0.66	0.70	0.70	0.70	0.72	0.74	0.69	0.75
France	0.57	0.57	0.57	0.54	0.54	0.62	0.62	0.68	0.59	0.58	0.60	0.59	0.60	0.58	0.57	0.58
Germany	1.00	0.97	0.97	0.80	0.80	0.78	0.78	0.76	0.65	0.67	0.68	0.69	0.70	0.69	0.70	0.69
Greece	0.49	0.49	0.49	0.49	0.49	0.61	0.61	0.82	0.47	0.46	0.45	0.48	0.50	0.47	0.52	0.52
Hungary	0.11	0.07	0.07	0.06	0.06	0.09	0.09	0.16	0.22	0.24	0.23	0.29	0.22	0.23	0.26	0.31
Ireland	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.69	0.69	0.67	0.68	0.76	0.74	0.73	0.76	0.75
Italy	0.68	0.70	0.70	0.75	0.75	0.59	0.59	0.81	0.57	0.60	0.60	0.64	0.66	0.69	0.72	0.73
Latvia	0.16	0.16	0.16	0.15	0.15	0.05	0.05	0.18	0.05	0.01	0.04	0.08	0.14	0.10	0.25	0.25

Lithuania	0.29	0.21	0.21	0.15	0.15	0.58	0.58	0.66	0.11	0.11	0.08	0.07	0.19	0.17	0.21	0.23
Luxembourg	0.77	0.85	0.85	0.77	0.77	0.63	0.63	0.71	0.68	0.88	0.70	0.75	0.94	0.81	0.90	0.84
Malta	0.35	0.37	0.37	0.55	0.55	0.41	0.41	0.32	0.16	0.31	0.25	0.24	0.35	0.39	0.48	0.20
Netherlands	0.48	0.80	0.80	0.81	0.81	0.71	0.71	0.71	0.94	0.99	1.00	0.98	0.97	0.95	0.95	0.95
Poland	0.14	0.05	0.05	0.05	0.05	0.00	0.00	0.10	0.12	0.11	0.13	0.16	0.19	0.22	0.25	0.28
Portugal	0.67	0.67	0.67	0.67	0.67	0.46	0.46	1.00	0.61	0.57	0.59	0.60	0.55	0.57	0.53	0.57
Romania	0.22	0.06	0.06	0.06	0.06	0.00	0.00	0.00	0.09	0.12	0.10	0.13	0.12	0.13	0.15	0.20
Slovakia	0.18	0.35	0.35	0.18	0.18	0.15	0.15	0.22	0.09	0.11	0.09	0.14	0.16	0.15	0.17	0.21
Slovenia	0.46	0.46	0.46	0.46	0.46	0.47	0.47	0.37	0.31	0.35	0.31	0.37	0.35	0.36	0.40	0.42
Spain	0.36	0.36	0.36	0.19	0.19	0.16	0.16	0.16	0.55	0.55	0.55	0.56	0.57	0.55	0.55	0.55
Sweden	0.76	0.80	0.80	0.80	0.80	0.71	0.71	0.67	0.77	0.75	0.79	0.80	0.80	0.81	0.79	0.81
United Kingdom	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.41	0.77	0.80	0.82	0.82	0.85	0.85	0.87	0.88
SOURCE	Europa.eu								Europa.eu							
LINK	https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en								https://rio.jrc.ec.europa.eu/stats/highly-cited-publications							

Parameter Country	Innovation							
	Sales of new-to-market and new-to-firm product innovations (norm)							
	2011	2012	2013	2014	2015	2016	2017	2018
Austria	0.46	0.50	0.50	0.38	0.38	0.50	0.50	0.53
Belgium	0.36	0.52	0.52	0.46	0.46	0.25	0.25	0.71
Bulgaria	0.63	0.25	0.25	0.06	0.06	0.09	0.09	0.16
Croatia	0.64	0.42	0.42	0.39	0.39	0.10	0.10	0.28
Cyprus	0.73	0.65	0.65	0.47	0.47	0.08	0.08	0.52
Czech Republic	0.88	0.69	0.69	0.58	0.58	0.65	0.65	0.56
Denmark	0.47	0.67	0.67	0.61	0.61	0.22	0.22	0.13
Estonia	0.40	0.52	0.52	0.26	0.26	0.42	0.42	0.45

[illegible]

Parameter Country	Creativity															
	Patent applications (number)								Trademark applications (number)							
	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
Austria	1734	1874	1993	1964	1989	2024	2209	2281	2,631	2,873	2,935	2,897	2,966	2,531	2,780	2,772
Belgium	2014	1886	1882	1927	2041	2211	2152	2348	1,825	1,751	1,936	2,061	2,239	1,829	2,101	2,147
Bulgaria	16	13	23	34	33	20	32	31	433	489	463	667	652	548	669	705
Croatia	18	19	10	12	9	16	10	14	47	41	125	128	132	138	175	196
Cyprus	55	56	41	44	39	36	49	49	403	418	382	426	599	536	586	622
Czech Republic	162	140	151	167	213	189	206	248	749	919	860	899	992	926	1,005	1,038
Denmark	1782	1605	1942	1983	1920	1855	2089	2385	1,335	1,377	1,430	1,529	1,742	1,560	1,727	1,794
Estonia	28	41	41	38	32	43	54	47	188	233	255	302	355	316	380	410
Finland	1548	1851	1894	2182	1993	1796	1797	1728	989	1,056	1,081	1,037	1,372	1,331	1,406	1,480
France	9617	9897	9835	10614	10760	10484	10619	10468	7,414	7,326	7,399	7,475	7,899	6,433	7,013	6,924
Germany	26202	27249	26510	25633	24807	24932	25539	26663	19,887	20,010	19,926	18,661	20,400	16,557	17,566	17,087
Greece	78	79	68	95	91	75	102	120	424	450	710	781	771	755	917	994
Hungary	96	105	103	114	97	107	95	118	353	348	470	532	565	475	589	627
Ireland	653	609	566	622	614	727	660	826	795	822	1,049	1,037	1,067	954	1,106	1,149
Italy	3970	3744	3706	3649	3986	4154	4360	4404	8,095	8,089	8,756	9,246	9,930	9,758	10,412	10,821
Latvia	28	25	80	8	30	11	14	13	102	115	117	159	157	128	159	168
Lithuania	14	19	22	24	39	26	24	37	137	210	254	226	271	262	305	327
Luxembourg	393	449	429	454	425	556	533	431	1,085	1,050	1,200	1,257	1,233	1,093	1,218	1,236
Malta	30	24	43	62	94	74	69	51	173	260	365	386	418	314	439	474
Netherlands	5627	5067	5852	6874	7147	6860	7043	7142	3,910	3,951	3,864	3,977	4,532	3,787	4,128	4,163
Poland	246	383	372	482	566	393	446	519	1,944	2,152	2,735	3,223	3,663	2,953	3,785	4,073
Portugal	81	76	95	113	141	157	150	221	1,006	993	1,096	1,279	1,331	1,227	1,386	1,451
Romania	20	35	33	28	30	31	52	50	635	570	462	590	650	596	601	606

Slovakia	43	35	29	26	47	44	41	51	269	277	275	333	363	322	365	381
Slovenia	129	108	135	125	118	113	98	100	149	200	268	350	294	296	369	401
Spain	1404	1544	1504	1471	1518	1574	1671	1781	7,975	8,032	8,484	8,768	9,405	8,042	8,925	9,060
Sweden	3638	3518	3674	3873	3839	3547	3783	4055	2,322	2,278	2,431	2,589	2,888	2,571	2,836	2,929
United Kingdom	4746	4716	4587	4764	5051	5175	5321	5761	9,547	10,236	10,854	11,787	12,526	9,646	11,596	11,833
SOURCE	Eruostat								Eruostat							
LINK	https://ec.europa.eu/eurostat/databrowser/view/sdg_09_40/default/table?lang=en								https://ec.europa.eu/eurostat/databrowser/view/ipr_ta_tot/default/table?lang=en							

Parameter Country	Creativity															
	Design applications (number)								Athor's roaylties collected euro / capita							
	2011	2012	2013	2014	2015	2016	2017	2018	2011	2012	2013	2014	2015	2016	2017	2018
Austria	447	472	484	501	427	389	413	401	130.9	128.3	151.3	123.7	136.5	150.2	159.3	156.3
Belgium	361	341	376	386	377	301	339	334	240.9	302.5	296.3	286.5	336.9	340.8	384	390.6
Bulgaria	62	105	112	108	124	114	135	144	3.094	3.647	4.49	6.905	7.002	7.361	12.51	11.88
Croatia	2	4	16	18	27	20	31	35	6.895	5.644	6.13	10.75	12.42	12.89	15.21	16.53
Cyprus	16	14	29	24	14	17	19	19	0.207	0	0	0	0	0	0	-0.059
Czech Republic	259	281	237	257	216	183	183	167	33.58	37.01	46.9	44.26	42.27	39.9	46.85	47.39
Denmark	394	420	384	439	454	376	418	420	407.2	414.8	445.7	371.2	429.2	561.1	578.9	571.3
Estonia	40	36	46	33	38	56	49	51	14.52	7.606	9.675	9.041	8.735	15.36	12.11	12.05
Finland	234	280	315	314	294	232	281	282	619.2	654.2	483.1	450.2	553.8	621.6	623.9	575.1
France	1741	1820	1912	1786	1663	1336	1447	1373	196.1	201.7	221.7	231.2	232.9	252.4	250.9	266.3
Germany	3462	3508	3513	3491	3242	2734	2879	2752	128.3	168.8	191.7	198.8	231.2	254.8	294.3	311
Greece	44	38	66	46	65	51	61	64	7.381	4.962	9.805	4.952	7.172	7.009	8.907	8.032
Hungary	47	56	58	70	70	83	87	94	203.6	209.1	210.4	158.5	182.1	171.7	180.4	163.3
Ireland	70	70	87	102	76	88	94	98	1093	1154	1379	1766	1798	2202	2910	2895

[illegible]