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Publication

Golden Age of Hungary

concerning the R&D activities

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Introduction

In this publication, our point will be to find Hungarian Golden Age comparing with the data. First of all, we would like to talk about these data.

Such as (background URL = https://miau.my-x.hu/miau/quilt/057-V2.xls):

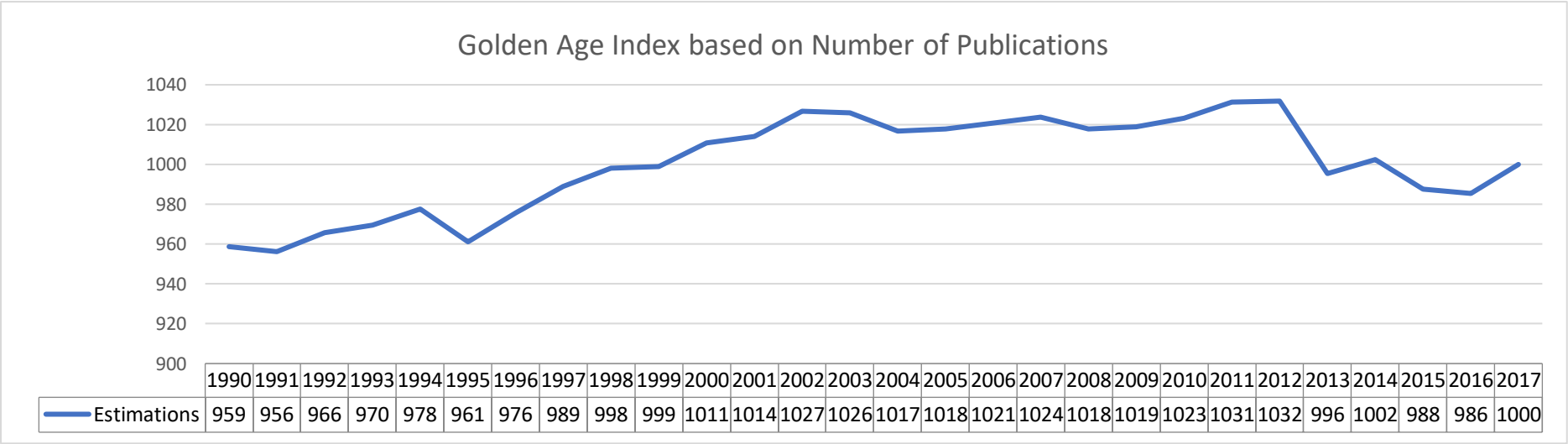
- Number of Publications of R&D units from 1990 till 2017
- Number of R&D units, staff and their education status which is showed with numbers
- Lastly Patent activity

First of all, we started to collect these data. We gathered together these data in to an excel file. While collecting those data we copied the URL which belongs the data.

We started with the number of publications of R&D units. And then we copied that again next to original one. Because we would like to use some formulas. After that we put them in a rank with colours. We used the formulas called „Ranking" (Sorszám). Secondly, we need an online calculation robot system to reach highest true point. So, we used „COCO" online system and we got the data of our estimations.

We did the same steps for our other data which is relevant with our publications.

Here you can see our publication Golden Age charts (source for each figure = own presentation):



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Estimations	959	956	966	970	978	961	976	989	998	999	1011	1014	1027	1026	1017	1018	1021	1024	1018	1019	1023	1031	1032	996	1002	988	986	1000

Figure Nr1

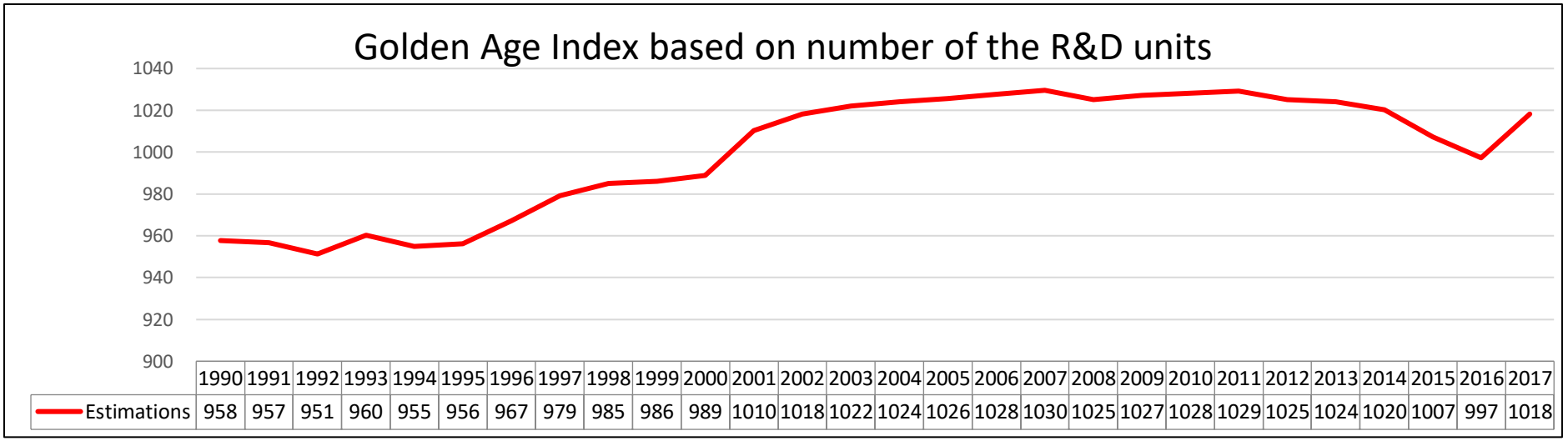
Legend:

X-axis: time

Y-axis: Golden Age Index (GAI) = estimations

Derivation of GAI: https://miau.my-x.hu/myx-free/coco/index.html – anti-discriminative tool (COCO Y0)

Interpretation: The aggregated time series based on the principle “the more the better” of the diverse sorts of publications has an increasing trend and the golden age could be the year 2012. Publications are products therefore an increasing trend seems to be a good sign.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Estimations	958	957	951	960	955	956	967	979	985	986	989	1010	1018	1022	1024	1026	1028	1030	1025	1027	1028	1029	1025	1024	1020	1007	997	1018

Figure Nr2

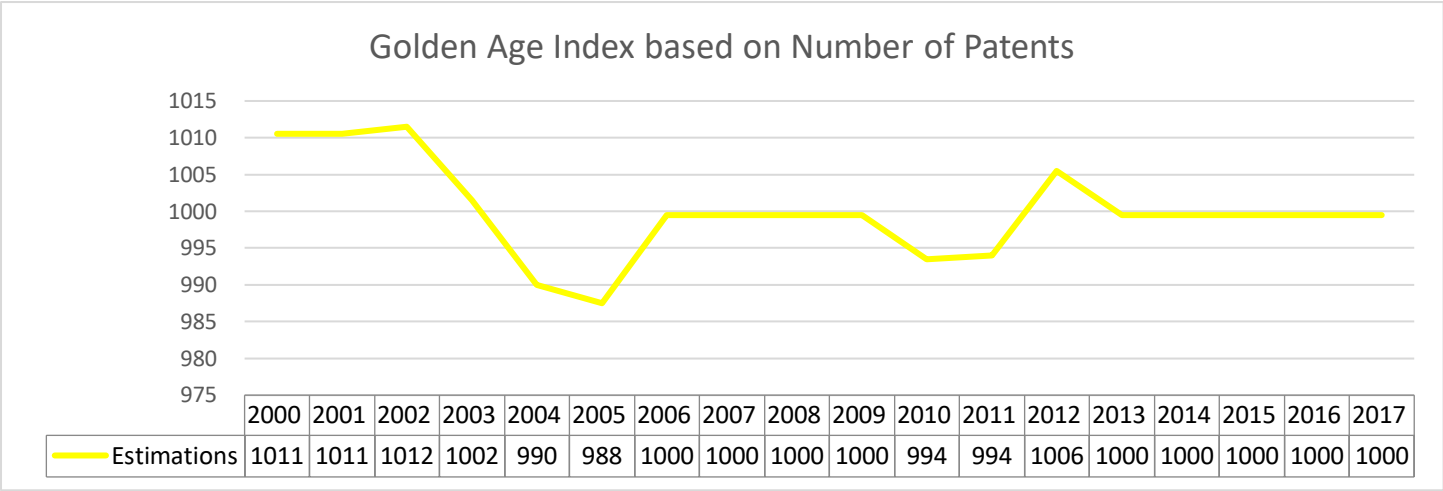
Legend:

X-axis: time

Y-axis: Golden Age Index (GAI) = estimations

Derivation of GAI: https://miau.my-x.hu/myx-free/coco/index.html – anti-discriminative tool (COCO Y0)

Interpretation: The aggregated time series based on the principle “the more the better” of the diverse sorts of R&D units has an increasing trend and the golden age could be the year 2006. Organisation units are resources therefore an increasing trend seems to be probably a bad sign.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Estimations	1011	1011	1012	1002	990	988	1000	1000	1000	1000	994	994	1006	1000	1000	1000	1000	1000

Figure Nr3

Legend:

X-axis: time

Y-axis: Golden Age Index (GAI) = estimations

Derivation of GAI: https://miau.my-x.hu/myx-free/coco/index.html – anti-discriminative tool (COCO Y0)

Interpretation: The aggregated time series based on the principle “the more the better” of the diverse sorts of patents has a decreasing trend and the golden age could be the year 2002. Patents are products therefore a decreasing trend seems to be a real bad sign. This is the first real sign of potential problems in the Hungarian R&D sector (c.f. https://hungarianspectrum.org/2019/02/06/the-agony-of-the-hungarian-academy-of-sciences/)...

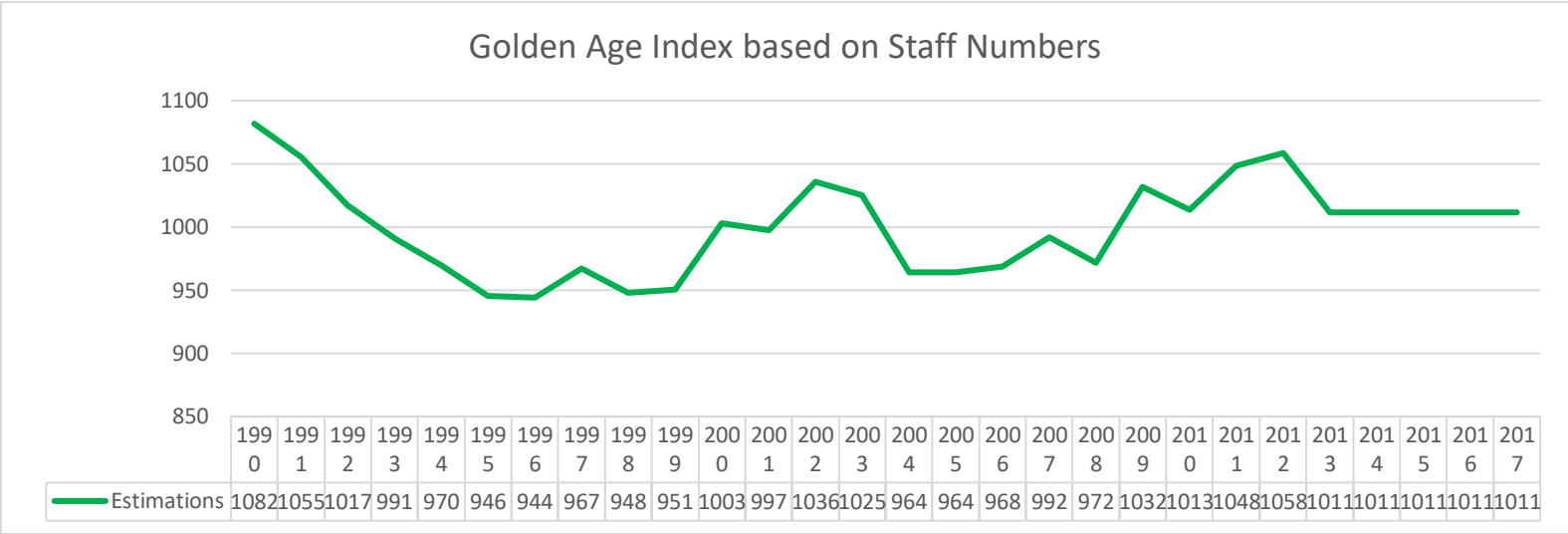


Figure Nr4

Legend:

X-axis: time

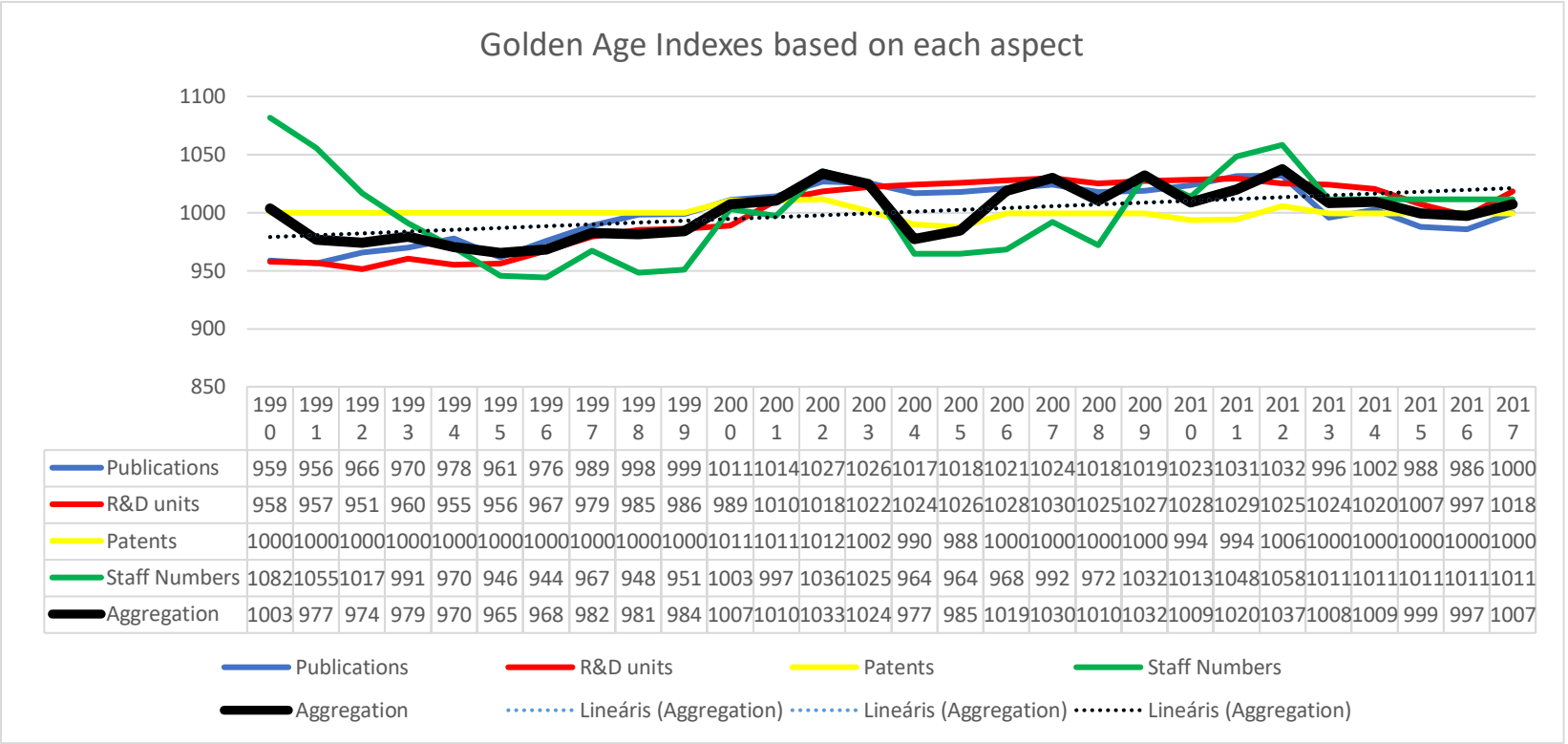
Y-axis: Golden Age Index (GAI) = estimations

Derivation of GAI: https://miau.my-x.hu/myx-free/coco/index.html – anti-discriminative tool (COCO Y0)

Interpretation: The aggregated time series based on the principle “the more the better” of the diverse sorts of HR-categories has a decreasing trend and the golden age could be the year 1990. HR units are resources therefore a decreasing trend seems to be a real good sign (c.f. efficiency).

After this, we reached an aggregation point and we compared/aggregated the first level of aggregations to a second level intuition (you can see below).

According this aggregation point we can see that 2002 and 2012 are closest to be said Golden Age of Hungarian.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Publications	959	956	966	970	978	961	976	989	998	999	1011	1014	1027	1026	1017	1018	1021	1024	1018	1019	1023	1031	1032	996	1002	988	986	1000
R&D units	958	957	951	960	955	956	967	979	985	986	989	1010	1018	1022	1024	1026	1028	1030	1025	1027	1028	1029	1025	1024	1020	1007	997	1018
Patents	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1011	1011	1012	1002	990	988	1000	1000	1000	1000	994	994	1006	1000	1000	1000	1000	1000
Staff Numbers	1082	1055	1017	991	970	946	944	967	948	951	1003	997	1036	1025	964	964	968	992	972	1032	1013	1048	1058	1011	1011	1011	1011	1011
Aggregation	1003	977	974	979	970	965	968	982	981	984	1007	1010	1033	1024	977	985	1019	1030	1010	1032	1009	1020	1037	1008	1009	999	997	1007

Figure Nr5

Legend:

X-axis: time

Y-axis: Golden Age Index (GAI) = estimations

Derivation of GAI: https://miau.my-x.hu/myx-free/coco/index.html – anti-discriminative tool (COCO Y0)

But we did not finish with that because it will not be correct that if we stuck with these data. So, we compared (as you can see below) the relationships between patents and other variables because just patents can be seen as a kind of fulfilled result from point of view of the Industry 4.0. Publications as such are just e.g. quality assurance steps before patenting.

Then we derived that the trend is decreasing.

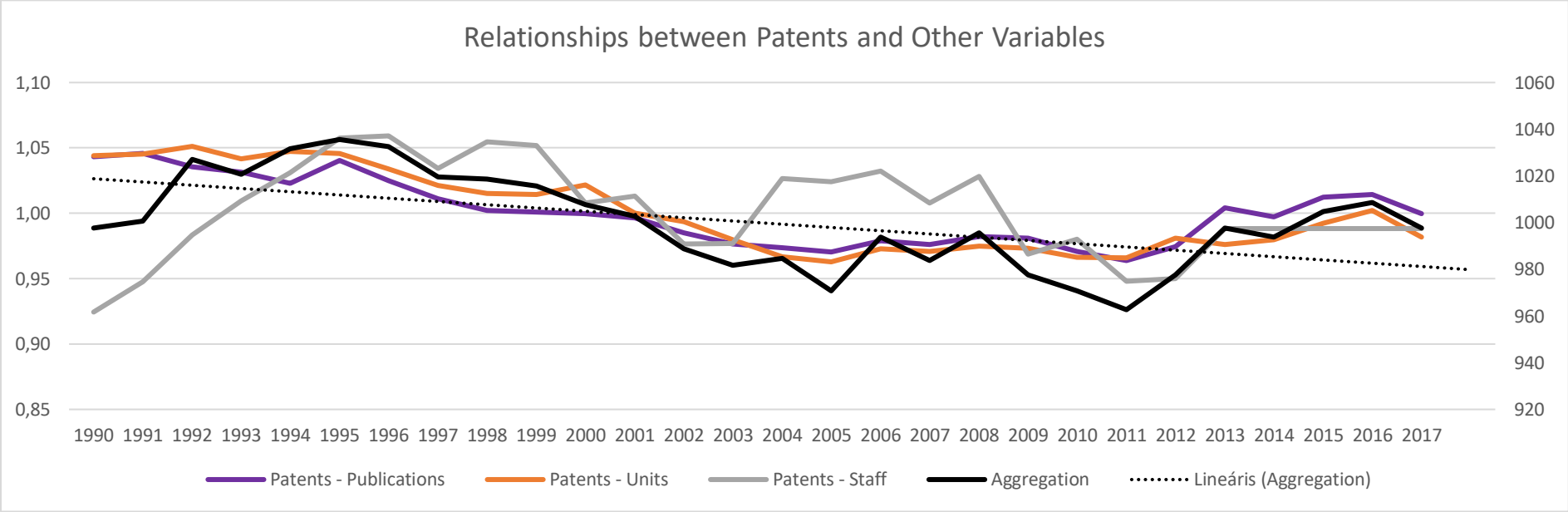


Figure Nr6

Legend:

X-axis: time

Y-axis: Golden Age Index (GAI) = estimations

Derivation of GAI: https://miau.my-x.hu/myx-free/coco/index.html – anti-discriminative tool (COCO Y0)

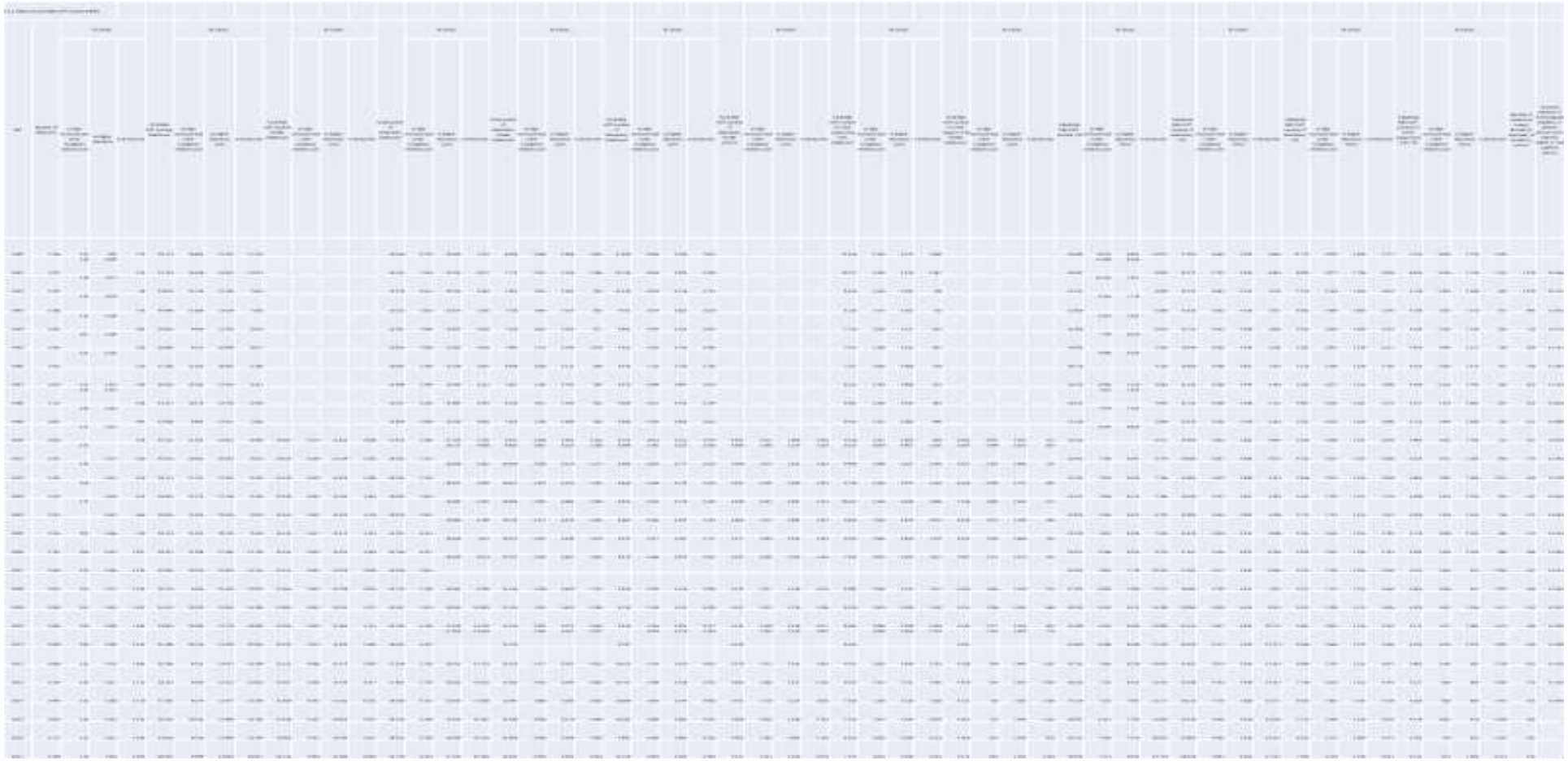


Figure Nr7 - The structure of the raw data from KSH

3.4.5. Number of publications of R&D units (1990–) [pieces]				
Year	Published books and chapters	Articles	Published books and chapters	Articles
	in Hungarian		in foreign language	
1990	1 266	13 217	396	9 186
1991	1 185	12 841	377	9 666
1992	1 226	13 637	504	9 792
1993	1 396	13 321	513	10 300
1994	1 655	13 764	603	10 402
1995	1 651	12 808	516	10 102
1996	1 735	13 979	475	11 464
1997	2 411	15 429	579	11 569
1998	2 780	17 437	775	12 332
1999	2 828	16 810	799	12 891
2000	3 428	19 263	850	13 722
2001	3 457	20 590	936	13 607
2002	3 888	21 472	1 018	13 950
2003	3 835	20 441	1 024	14 154
2004	4 002	19 814	970	13 221
2005	3 796	19 510	949	13 902
2006	4 337	18 856	1 091	13 703
2007	6 026	17 402	1 720	13 799
2008	5 975	16 054	2 234	13 628
2009	6 484	16 466	2 326	13 079
2010	7 052	14 918	2 584	14 225
2011	7 476	15 040	3 082	14 282
2012	7 724	13 008	3 389	14 806
2013	7 356	12 035	3 241	15 215
2014	7 716	11 718	3 406	15 803
2015	7 363	11 106	3 135	14 703
2016	6 824	9 707	3 047	14 872
2017	7 415	10 674	3 311	16 463

Figure Nr8: Visible raw data – Part I.

3.4.5. Number of publications of R&D units (1990–) [pieces]							
Year	Published books and chapters	Articles	Published books and chapters	Articles			
	in Hungarian		in foreign language		fact		Estimations
1990	26	20	27	28		1000	959
1991	28	22	28	27		1000	956
1992	27	18	25	26		1000	966
1993	25	19	24	24		1000	970
1994	23	17	21	23		1000	978
1995	24	23	23	25		1000	961
1996	22	16	26	22		1000	976
1997	21	13	22	21		1000	989
1998	20	8	20	20		1000	998
1999	19	10	19	19		1000	999
2000	18	6	18	13		1000	1011
2001	17	2	17	16		1000	1014
2002	14	1	14	10		1000	1027
2003	15	3	13	9		1000	1026
2004	13	4	15	17		1000	1017
2005	16	5	16	11		1000	1018
2006	12	7	12	14		1000	1021
2007	10	9	11	12		1000	1024
2008	11	12	10	15		1000	1018
2009	9	11	9	18		1000	1019
2010	7	15	8	8		1000	1023
2011	3	14	6	7		1000	1031
2012	1	21	2	5		1000	1032
2013	6	24	4	3		1000	996
2014	2	25	1	2		1000	1002
2015	5	26	5	6		1000	988
2016	8	28	7	4		1000	986
2017	4	27	3	1		1000	1000

Figure Nr9: Ranked raw data with visual support

Year	Total number of researchers, headcount	Total number of researchers, female, headcount	Total R&D staff number of technicians, headcount	Total R&D staff number of other supporting staff, headcount	Calculated R&D staff number, FTE	Calculated R&D staff number of researchers, FTE	Calculated R&D staff number of technicians, FTE	Calculated R&D staff number of other supporting staff, FTE	Number of researchers staying abroad (as empoyees, as students), person
1990	30 256	8 489	17 849	11 618	36 384	17 550	11 711	7 123	1 300
1991	26 763	7 711	14 238	10 217	29 397	14 471	8 903	6 023	1 249
1992	24 110	7 361	11 449	8 320	24 192	12 311	7 152	4 729	1 079
1993	23 012	7 338	9 761	8 226	22 609	11 818	6 003	4 788	894
1994	22 401	7 328	9 691	7 718	22 008	11 752	5 922	4 334	720
1995	20 859	7 092	9 612	7 617	19 585	10 499	5 207	3 879	589
1996	20 485	6 649	9 244	7 557	19 776	10 408	5 114	4 254	766
1997	21 999	7 367	9 375	8 252	20 758	11 154	5 205	4 399	654
1998	23 547	8 129	9 209	8 561	20 315	11 731	4 907	3 677	556
1999	24 609	7 554	9 036	8 443	21 329	12 579	5 037	3 713	511
2000	27 876	9 537	8 313	9 136	23 534	14 406	5 166	3 962	557
2001	28 351	9 363	8 098	9 227	22 942	14 666	4 752	3 524	570
2002	29 764	10 039	8 965	9 998	23 703	14 965	4 936	3 802	569
2003	30 292	10 647	8 659	9 730	23 311	15 180	4 641	3 490	531
2004	30 420	10 484	8 873	10 322	22 826	14 904	4 713	3 209	412
2005	31 407	10 731	8 663	9 653	23 239	15 878	4 591	2 770	413
2006	32 786	10 973	8 441	9 184	25 971	17 547	4 943	3 481	388
2007	33 059	11 077	8 474	7 952	25 954	17 391	5 141	3 422	437
2008	33 739	11 139	8 456	8 084	27 403	18 504	5 237	3 662	386
2009	35 267	11 323	8 739	8 516	29 795	20 064	5 527	4 204	454
2010	35 700	11 418	9 329	8 962	31 480	21 342	5 967	4 171	398
2011	36 945	11 729	9 797	8 644	33 960	23 019	6 506	4 435	435
2012	37 019	11 453	10 216	9 251	35 732	23 837	6 993	4 902	422
2013	37 803	11 462	11 247	9 187	38 163	25 038	7 748	5 377	373
2014	39 190	11 897	10 069	7 926	37 329	26 213	6 833	4 283	355
2015	38 418	11 848	10 303	7 514	36 847	25 316	7 112	4 419	363
2016	38 915	11 969	9 097	6 624	35 757	25 804	6 252	3 701	287
2017	42 729	13 024	10 729	7 474	40 432	28 426	7 495	4 511	245

Figure Nr10: Visible raw data – Part II.

Figure Nr11: Ranked raw data with visual effects – Part II.

Year	Total number of researchers, headcount	Total number of researchers, female, headcount	Total R&D staff number of technicians, headcount	Total R&D staff number of other supporting staff, headcount	Calculated R&D staff number, FTE	Calculated R&D staff number of researchers, FTE	Calculated R&D staff number of technicians, FTE	Calculated R&D staff number of other supporting staff, FTE	Number of researchers staying abroad (as employees, as students), person
1990	16	19	1	1	5	11	1	1	1
1991	20	21	2	3	11	19	2	2	2
1992	22	24	3	17	15	22	5	6	3
1993	24	25	10	19	22	23	11	5	4
1994	25	26	11	23	23	24	13	11	6
1995	27	27	12	24	28	27	16	17	8
1996	28	28	15	25	27	28	20	13	5
1997	26	23	13	18	25	26	17	10	7
1998	23	20	16	14	26	25	24	21	12
1999	21	22	18	16	24	21	21	19	14
2000	19	17	27	11	17	20	18	16	11
2001	18	18	28	8	20	18	25	23	9
2002	17	16	19	4	16	16	23	18	10
2003	15	14	23	5	18	15	27	24	13
2004	14	15	20	2	21	17	26	27	20
2005	13	13	22	6	19	14	28	28	19
2006	12	12	26	10	13	12	22	25	22
2007	11	11	24	21	14	13	19	26	16
2008	10	10	25	20	12	10	15	22	23
2009	9	9	21	15	10	9	14	14	15
2010	8	8	14	12	9	8	12	15	21
2011	7	5	9	13	8	7	9	8	17
2012	6	7	7	7	7	6	7	4	18
2013	5	6	4	9	2	5	3	3	24
2014	2	3	8	22	3	2	8	12	26
2015	4	4	6	26	4	4	6	9	25
2016	3	2	17	28	6	3	10	20	27
2017	1	1	5	27	1	1	4	7	28

		Estimations
1000	1990	1082
1000	1991	1055
1000	1992	1017
1000	1993	991
1000	1994	970
1000	1995	946
1000	1996	944
1000	1997	967
1000	1998	948
1000	1999	951
1000	2000	1003
1000	2001	997
1000	2002	1036
1000	2003	1025
1000	2004	964
1000	2005	964
1000	2006	968
1000	2007	992
1000	2008	972
1000	2009	1032
1000	2010	1013
1000	2011	1048
1000	2012	1058
1000	2013	1011
1000	2014	1011
1000	2015	1011
1000	2016	1011
1000	2017	1011

3.4.6. Patent activity (2000–)					
	Number of national patent applications	Of wich:		Number of granted patents	Number of valid patents
Year		domestic patent applications	foreign patent applications		
2000	4 883	810	4 073	1 627	11 084
2001	5 451	919	4 532	1 306	10 927
2002	5 906	842	5 064	1 555	10 784
2003	4 810	756	4 054	1 379	10 385
2004	2 657	738	1 919	977	9 525
2005	1 275	699	576	1 243	9 224
2006	924	715	209	1 916	9 338
2007	791	686	105	2 216	10 306
2008	772	682	90	2 212	11 462
2009	821	756	65	2 688	12 749
2010	696	646	50	3 031	13 853
2011	698	660	38	3 195	15 390
2012	748	689	59	3 278	16 988
2013	708	641	67	4 965	19 130
2014	619	546	73	3 718	20 426
2015	633	569	64	3 947	21 851
2016	665	616	49	4 366	23 782
2017	532	490	42	5 366	26 225

Figure Nr12: Visible raw data – Part III.

3.4.6. Patent activity (2000–)					
	Number of national patent applications	Of wich:		Number of granted patents	Number of valid patents
Year		domestic patent applications	foreign patent applications		
2000	3	3	3	13	11
2001	2	1	2	16	12
2002	1	2	1	14	13
2003	4	4	4	15	14
2004	5	6	5	18	16
2005	6	8	6	17	18
2006	7	7	7	12	17
2007	9	10	8	10	15
2008	10	11	9	11	10
2009	8	4	12	9	9
2010	14	13	15	8	8
2011	13	12	18	7	7
2012	11	9	14	6	6
2013	12	14	11	2	5
2014	17	17	10	5	4
2015	16	16	13	4	3
2016	15	15	16	3	2
2017	18	18	17	1	1

		Estimations
1000	2000	1011
1000	2001	1011
1000	2002	1012
1000	2003	1002
1000	2004	990
1000	2005	988
1000	2006	1000
1000	2007	1000
1000	2008	1000
1000	2009	1000
1000	2010	994
1000	2011	994
1000	2012	1006
1000	2013	1000
1000	2014	1000
1000	2015	1000
1000	2016	1000
1000	2017	1000

Figure Nr13: Ranked raw data with visual effects– Part III.

Year	Total number of researchers, headcount	Total number of researchers, female, headcount	Total R&D staff number of technicians, headcount	Total R&D staff number of other supporting staff, headcount	Calculated R&D staff number, FTE	Calculated R&D staff number of researchers, FTE	Calculated R&D staff number of technicians, FTE	Calculated R&D staff number of other supporting staff, FTE	Number of researchers staying abroad (as empoyees, as students), person
1990	30 256	8 489	17 849	11 618	36 384	17 550	11 711	7 123	1 300
1991	26 763	7 711	14 238	10 217	29 397	14 471	8 903	6 023	1 249
1992	24 110	7 361	11 449	8 320	24 192	12 311	7 152	4 729	1 079
1993	23 012	7 338	9 761	8 226	22 609	11 818	6 003	4 788	894
1994	22 401	7 328	9 691	7 718	22 008	11 752	5 922	4 334	720
1995	20 859	7 092	9 612	7 617	19 585	10 499	5 207	3 879	589
1996	20 485	6 649	9 244	7 557	19 776	10 408	5 114	4 254	766
1997	21 999	7 367	9 375	8 252	20 758	11 154	5 205	4 399	654
1998	23 547	8 129	9 209	8 561	20 315	11 731	4 907	3 677	556
1999	24 609	7 554	9 036	8 443	21 329	12 579	5 037	3 713	511
2000	27 876	9 537	8 313	9 136	23 534	14 406	5 166	3 962	557
2001	28 351	9 363	8 098	9 227	22 942	14 666	4 752	3 524	570
2002	29 764	10 039	8 965	9 998	23 703	14 965	4 936	3 802	569
2003	30 292	10 647	8 659	9 730	23 311	15 180	4 641	3 490	531
2004	30 420	10 484	8 873	10 322	22 826	14 904	4 713	3 209	412
2005	31 407	10 731	8 663	9 653	23 239	15 878	4 591	2 770	413
2006	32 786	10 973	8 441	9 184	25 971	17 547	4 943	3 481	388
2007	33 059	11 077	8 474	7 952	25 954	17 391	5 141	3 422	437
2008	33 739	11 139	8 456	8 084	27 403	18 504	5 237	3 662	386
2009	35 267	11 323	8 739	8 516	29 795	20 064	5 527	4 204	454
2010	35 700	11 418	9 329	8 962	31 480	21 342	5 967	4 171	398
2011	36 945	11 729	9 797	8 644	33 960	23 019	6 506	4 435	435
2012	37 019	11 453	10 216	9 251	35 732	23 837	6 993	4 902	422
2013	37 803	11 462	11 247	9 187	38 163	25 038	7 748	5 377	373
2014	39 190	11 897	10 069	7 926	37 329	26 213	6 833	4 283	355
2015	38 418	11 848	10 303	7 514	36 847	25 316	7 112	4 419	363
2016	38 915	11 969	9 097	6 624	35 757	25 804	6 252	3 701	287
2017	42 729	13 024	10 729	7 474	40 432	28 426	7 495	4 511	245

Figure Nr14: Visible raw data – Part IV. AND Figure Nr15: Ranked raw data with visual effects– Part IV.

Year	Total number of researchers, headcount	Total number of researchers, female, headcount	Total R&D staff number of technicians, headcount	Total R&D staff number of other supporting staff, headcount	Calculated R&D staff number, FTE	Calculated R&D staff number of researchers, FTE	Calculated R&D staff number of technicians, FTE	Calculated R&D staff number of other supporting staff, FTE	Number of researchers staying abroad (as empoyees, as students), person
1990	16	19	1	1	5	11	1	1	1
1991	20	21	2	3	11	19	2	2	2
1992	22	24	3	17	15	22	5	6	3
1993	24	25	10	19	22	23	11	5	4
1994	25	26	11	23	23	24	13	11	6
1995	27	27	12	24	28	27	16	17	8
1996	28	28	15	25	27	28	20	13	5
1997	26	23	13	18	25	26	17	10	7
1998	23	20	16	14	26	25	24	21	12
1999	21	22	18	16	24	21	21	19	14
2000	19	17	27	11	17	20	18	16	11
2001	18	18	28	8	20	18	25	23	9
2002	17	16	19	4	16	16	23	18	10
2003	15	14	23	5	18	15	27	24	13
2004	14	15	20	2	21	17	26	27	20
2005	13	13	22	6	19	14	28	28	19
2006	12	12	26	10	13	12	22	25	22
2007	11	11	24	21	14	13	19	26	16
2008	10	10	25	20	12	10	15	22	23
2009	9	9	21	15	10	9	14	14	15
2010	8	8	14	12	9	8	12	15	21
2011	7	5	9	13	8	7	9	8	17
2012	6	7	7	7	7	6	7	4	18
2013	5	6	4	9	2	5	3	3	24
2014	2	3	8	22	3	2	8	12	26
2015	4	4	6	26	4	4	6	9	25
2016	3	2	17	28	6	3	10	20	27
2017	1	1	5	27	1	1	4	7	28

		Estimations
1000	1990	1082
1000	1991	1055
1000	1992	1017
1000	1993	991
1000	1994	970
1000	1995	946
1000	1996	944
1000	1997	967
1000	1998	948
1000	1999	951
1000	2000	1003
1000	2001	997
1000	2002	1036
1000	2003	1025
1000	2004	964
1000	2005	964
1000	2006	968
1000	2007	992
1000	2008	972
1000	2009	1032
1000	2010	1013
1000	2011	1048
1000	2012	1058
1000	2013	1011
1000	2014	1011
1000	2015	1011
1000	2016	1011
1000	2017	1011

	Publications	R&D units	Patents	Staff Numbers	Aggregation
1990	959	958	1000	1082	1003
1991	956	957	1000	1055	977
1992	966	951	1000	1017	974
1993	970	960	1000	991	979
1994	978	955	1000	970	970
1995	961	956	1000	946	965
1996	976	967	1000	944	968
1997	989	979	1000	967	982
1998	998	985	1000	948	981
1999	999	986	1000	951	984
2000	1011	989	1011	1003	1007
2001	1014	1010	1011	997	1010
2002	1027	1018	1012	1036	1033
2003	1026	1022	1002	1025	1024
2004	1017	1024	990	964	977
2005	1018	1026	988	964	985
2006	1021	1028	1000	968	1019
2007	1024	1030	1000	992	1030
2008	1018	1025	1000	972	1010
2009	1019	1027	1000	1032	1032
2010	1023	1028	994	1013	1009
2011	1031	1029	994	1048	1020
2012	1032	1025	1006	1058	1037
2013	996	1024	1000	1011	1008
2014	1002	1020	1000	1011	1009
2015	988	1007	1000	1011	999
2016	986	997	1000	1011	997
2017	1000	1018	1000	1011	1007

Figure Nr16: Estimation before new aggregation

	Publications	R&D units	Patents	Staff Numbers	
1990	27	24	7	1	1000
1991	28	25	7	3	1000
1992	25	28	7	8	1000
1993	24	23	7	18	1000
1994	22	27	7	20	1000
1995	26	26	7	27	1000
1996	23	22	7	28	1000
1997	19	21	7	22	1000
1998	17	20	7	26	1000
1999	16	19	7	25	1000
2000	13	18	2	15	1000
2001	12	15	2	16	1000
2002	3	13	1	5	1000
2003	4	11	5	7	1000
2004	11	9	27	23	1000
2005	9	6	28	23	1000
2006	7	4	16	21	1000
2007	5	1	16	17	1000
2008	9	7	16	19	1000
2009	8	5	16	6	1000
2010	6	3	26	9	1000
2011	2	2	25	4	1000
2012	1	7	4	2	1000
2013	18	9	16	10	1000
2014	14	12	16	10	1000
2015	20	16	16	10	1000
2016	21	17	16	10	1000
2017	15	13	16	10	1000

Figure Nr17: Ranked estimation before aggregation

	Patents - Publications	Patents - Units	Patents - Staff	
1990	1,04	1,04	0,92	1000
1991	1,05	1,05	0,95	1000
1992	1,04	1,05	0,98	1000
1993	1,03	1,04	1,01	1000
1994	1,02	1,05	1,03	1000
1995	1,04	1,05	1,06	1000
1996	1,03	1,03	1,06	1000
1997	1,01	1,02	1,03	1000
1998	1,00	1,02	1,05	1000
1999	1,00	1,01	1,05	1000
2000	1,00	1,02	1,01	1000
2001	1,00	1,00	1,01	1000
2002	0,99	0,99	0,98	1000
2003	0,98	0,98	0,98	1000
2004	0,97	0,97	1,03	1000
2005	0,97	0,96	1,02	1000
2006	0,98	0,97	1,03	1000
2007	0,98	0,97	1,01	1000
2008	0,98	0,98	1,03	1000
2009	0,98	0,97	0,97	1000
2010	0,97	0,97	0,98	1000
2011	0,96	0,97	0,95	1000
2012	0,97	0,98	0,95	1000
2013	1,00	0,98	0,99	1000
2014	1,00	0,98	0,99	1000
2015	1,01	0,99	0,99	1000
2016	1,01	1,00	0,99	1000
2017	1,00	0,98	0,99	1000

Figure Nr18: Relationships between patents and “resources”

	Patents - Publications	Patents - Units	Patents - Staff		Aggregation
1990	2	5	28	1000	998
1991	1	4	27	1000	1001
1992	4	1	20	1000	1027
1993	5	6	12	1000	1021
1994	7	2	7	1000	1032
1995	3	3	2	1000	1036
1996	6	7	1	1000	1033
1997	10	9	5	1000	1020
1998	12	10	3	1000	1019
1999	13	11	4	1000	1016
2000	14	8	14	1000	1008
2001	17	13	11	1000	1003
2002	18	14	23	1000	989
2003	22	18	22	1000	982
2004	25	25	9	1000	985
2005	27	28	10	1000	971
2006	21	23	6	1000	994
2007	23	24	13	1000	984
2008	19	21	8	1000	996
2009	20	22	24	1000	978
2010	26	26	21	1000	971
2011	28	27	26	1000	963
2012	24	17	25	1000	978
2013	11	20	15	1000	998
2014	16	19	15	1000	994
2015	9	15	15	1000	1005
2016	8	12	15	1000	1009
2017	15	16	15	1000	998

Figure Nr19: Ranked relationships between patents and “resources”

Conclusion

A robot minister should be active to increase the efficiency of patenting?! The paper (quasi in form of a storyboard) does not contain any analyses about the characteristics of this activities. The paper just derives a kind of data driven diagnosis at first without any therapy…