

The Possibility of Using the Google Patents Search Tool in Patentometric Analysis (Based on the Example of the World's Largest Innovative Companies)

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Received July 19, 2011.

Abstract—The possibility of using the Google Patents search tool in patentometric analysis based on the world largest innovative companies is substantiated. Of these companies, the dynamics of issued patents for 2-year intervals over a 10-year period (2001–2010) were analyzed; with this method it was possible to classify these companies according to their patent activity. It is shown that along with the very high patent activity (from 1.0 to 1.2 mln patents in 10 years) of the Sony, Samsung Electronics, Intel, Hewlett-Packard, and Siemens companies, 76% of the most innovative companies of the world that are included in the TOP-50 Business Week 2010 have very low patent activities (from 0 to 0.2 mln patents in 10 years). The conclusion is that most patent active innovation companies have stably growing or established dynamics of patent activity.

Keywords: innovative companies, patentometric analysis, Google Patents, TOP-50 Business Week 2010

DOI: 10.3103/S0147688212020086

The Google company has recently developed two search tools. One, Google Scholar, is assigned to search on the Internet for academic documents and their citations; the second, Google Patents, searches for patents in the database of the US Patent and Trademark Office, which contains more than seven million patents. The former tool is used as an alternative Web of Science and Scopus science metric tool [1]. The latter tool has not yet been used as a patent-metric tool. This can be seen in an extended search for the exact phase of Google Scholar to select the term “Google Patents” with the option “in the title of the article.” In this case we do not receive any results. In the same search but with the option “anywhere in the article” we receive only responses to the patents themselves.

Here we should note that the computation of global indices of competitiveness and innovative development of countries, a specific parameter of patent activity, is included based on the number of patents issued by the US Patent and Trademark Office. These are, for example, indicators of the Global Competitiveness Index (GCI) of the World Economic Forum [2] and the evaluation of the Knowledge Economy Index -KEI) [3].

For examination of the possibility of using the Google Patents search tool in patentometric analysis we tested leading innovative companies of the world that are included in the TOP-50 rating of Business Week 2010. The extended search where the name of the company is given in the line “assignee” allows one to reveal the patents that were issued to this company

(option “issued patents”). Unlike queries made with other Google tools (for example, Google Scholar), in a query to Google Patents the total number of citations is not shown immediately; they have to be sequentially browsed by ten (or more) citations per page. In the process of experiments with this search tool it was found that if the number of citations approaches 500 in a search on a limited time interval it obviously provides an underrated number of citations. Thus, the time interval should be split and the number of citations should be sought by summing up the split intervals. The algorithm for searching for the so-called relevant number of patents is not open via the Google Patents office. In addition to quantitative indicators, it is possible to look through pdf files for the full texts of patents.

Using this search tool, the dynamics of issued patents was analyzed for 50 leading innovative companies worldwide over a decade-long period that was split into 2-year intervals (Table 1). In Table 1 the companies are arranged according to their TOP-50 Business Week 2010 rating.

Additionally, the total number of issued patents over the decade and their increase in this period of time are calculated in this table. If in the first (or in several initial ones) 2-year period not a single patent was issued then the first and earliest 2-year period was taken in order to compute the increase in patents over the period. From each 2-year period one patent was taken that was subjectively the most representative (i.e., the most typical); these names are given in Table 1.

Table 1. Dynamics of the number of issued patents and their topics for the leading innovation companies of the world (according to TOP-50 rating Business Week 2010), the experiments were performed from May 1–10, 2011

No.	Names of companies	Name of 5 representative patents issued in the 2001–2010 period	Dynamics of the number of patents granted for the two-year intervals					Total in 10 years	Increase, number of times
1	Apple	Medical, radiotherapy source vial, Locking system for a portable computer, Light guide panel and method of use, Ear phone, Power source switchover apparatus and method	186	190	210	310	954	1850	5.1
2	Google	Detecting query-specific duplicate documents, Serving advertisements based on content, Hypertext browser assistant, Decentralised web annotation	–	6	26	89	394	515	65.7
3	Microsoft	System and method for facilitating generation and editing of event handlers, Composable roles, Enhancing application performance in dynamic networks, Portion of an electronic mouse, Intelligent backward resource navigation	888	1152	1876	2207	2314	8437	2.6
4	IBM	Signal sensor for rf integrated systems, Dynamic view-dependent texture mapping, Multimedia archive description scheme, Methods and apparatus for representing markup language data, Method of transferring nanoparticles to a surface	16	41	6	7	12	82	0.75
5	Toyota Motor	Child seat, Thermoplastic olefin elastomer composition, Automatic hitch assembly, Method and apparatus for previewing conditions on a highway, Automotive radar system	7	8	16	47	177	255	25.3
6	Amazon	Dynamic determination of item returns during transit, Distributed live auction, Method for creating an information closure model, Increases in sales rank as a measure of interest, Network based user-to-user payment service	16	18	28	53	187	302	11.7
7	LG Electronics	Method for checking disk loading status in optical disk driver, Microwave oven with halogen lamps, Cellular phone, Mobile phone, Packet data service in radio communication system	653	967	1289	1670	2086	6665	3.2
8	BYD	Car dashboard, High-temperature Ni-MH battery and a method for making the same, Cell charger, Car	–	1	1	3	57	62	57
9	General Electric	Method and apparatus for generating electric power, Low emissions combustor, Dynamic seal for a drive shaft, Stationary computed tomography system and method, Electric lamp with heat resistant shade	2248	2100	1942	1806	2109	10205	0.9
10	Sony	Moving image camera, Tape player, Television receiver, Disc player, Mobile phone	2328	2326	2247	2295	2328	11524	1.0
11	Samsung Electronics	Apparatus for recording and/or playing back catalog information, Audio and video multiplexed transmission system, Computer telephony integrated module system, Electrophotographic printer, Optical disc	2379	2370	2317	2195	2319	11580	1.0
12	Intel	Flexible connection system, Ergonomic mouse, Extended stand computer system with retractable keyboard, Network packet processing, Address translation performance in virtualized environments	1757	2384	2379	2364	2393	11277	1.4

Table 1. (Contd.)

No.	Names of companies	Name of 5 representative patents issued in the 2001–2010 period	Dynamics of the number of patents granted for the two-year intervals					Total in 10 years	Increase, number of times
13	Ford Motor	Vehicle wheel cover, Energy control strategy for a hybrid electric vehicle, Electrical machine drive system and method, Vehicle side view mirror, Vehicle roof headliner	48	106	89	103	233	579	4.9
14	Research in Motion	Electrical connector assembly, Hand-held e-mail device, Handheld electronic device keyboard, Wireless router system and method, Electronic mail communications system with client email internet service	26	32	123	304	879	1364	33.8
15	Volkswagen	Operator device with haptic feedback, Bag, Two-battery system, High strength creep resistant magnesium alloys, Flat control element for controlling a vehicle component	93	87	57	66	84	387	0.9
16	Hewlett Packard	Two-stage scraper system for inkjet wipers, Waste ink removal system, Detection of in-flight positions of ink droplets, Printer, Method of allocating computing resources	1957	2369	2382	2359	2390	11457	1.2
17	Tata Group ¹	Method and apparatus for including virtual ads in video presentations, Eco-friendly starch quenchant, Preloaded parabolic dish antenna and the method of making it, Method and apparatus for including virtual ads in video presentations, Breakaway steering system	2	3	5	6	9	25	4.5
18	BMW	Turbomachine rotor blade and disk, Controller input voltage regulation by actuator power modulation, Occupant protection device	2	1	2	–	–	5	1.0
19	Coca-Cola	Beverage dispenser, Hot and cold vending apparatus, Vending machine door, Bottle, Cooler	78	49	18	42	50	237	0.6
20	Nintendo	Game system, Operating device with analog joystick, Video game system, External interfaces for a 3D graphics system, Controller for electronic game machine	86	79	80	88	169	502	2.0
21	Wal-Mart Stores	Convertible shoe box and display platform, Freezer array, Plastic box, Stored value card validation, Live device seizure kit	2	4	4	4	6	20	3.0
22	Hyundai Motor	Passenger seat device for motor vehicles, Rear fog lamp for automobile, Vehicular power window safety device, Activating headrest, Motor-driven power steering system	255	214	246	204	301	1220	1.2
23	Nokia	Front cover for a handset, Network access control, Telescopic telephone, Handset, Resource control	866	1304	1336	1550	1806	6862	2.1
24	Virgin Group ²	High performance low cost MALDI MS-MS, Airplane seating unit, Self-defoliating plant,	1	4	–	5	25	35	25.0
25	Procter & Gamble	Process for preparing potato-based, fried snacks, Bleach compositions, Directional coupler sensor, Box for cosmetics, Set of containers	870	880	664	638	771	3823	0.9
26	Honda Motor	Hybrid vehicle, Oxygen sensor, Motorcycle shift lever, Electric motor control apparatus, Power switchover apparatus for a hybrid vehicle	4	77	828	1407	1828	4144	457.0

¹ Tata America International Corporation, Tata Consultancy Services, Tata Institute of Fundamental Research, Tata Motors Limited.

² Virgin instruments Corporation, Virgin Atlantic Airways Limited, Virgin Cotton Company, Virgin Valley Custom Guns, LLC, etc.

Table 1. (Contd.)

No.	Names of companies	Name of 5 representative patents issued in the 2001–2010 period	Dynamics of the number of patents granted for the two-year intervals					Total in 10 years	Increase, number of times
			—	—	—	—	1		
27	Fast Retailing	Brassiere	—	—	—	—	1	1	—
28	Haier Electronics ³	Television, Dishwasher, Top-load sink/laundry combo, Refrigerator	17	12	—	6	4	39	0.2
29	McDonald's	Automated grill, Food safety administration system	—	1	2	—	—	3	2.0
30	Lenovo	Floating connector spring and assembly, Ad-hoc radio communication verification system, Cooling systems	—	—	87	166	145	398	1.7
31	Cisco System ⁴	Test information management system, Virtual network device, System and methods for network path detection, Guaranteed air connection, Multiple-level internet protocol accounting	381	1006	1130	1304	2018	5839	5.3
32	Walt Disney	System and method for enhanced broadcasting and interactive, System and method for enhanced broadcasting and interactive television	—	—	—	1	1	2	1.0
33	Reliance Industries	Twin retractable for fall arrest, Process and apparatus for particle size reduction and homogeneous blending, Single step process for the preparation of lower α -alkene polymerization	1	—	2	1	2	6	2.0
34	Siemens	Wordline driver circuit using ring-shaped devices, Propelling and driving system for boats, Audio broadcast in cordless digital system, Customer extranet portal, Generator ready load center	2276	2331	2334	2358	2379	11678	1.1
35	Dell	Game transportation apparatus, EMI shielding ventilation structure, Fanless power supply, Cable management flip tray assembly, Print cartridge ordering system	239	261	252	313	441	1506	1.9
36	Nestle	Coffee machine, Jar, Cat litter box, Twisted pet chew product, Confectionery dispenser	5	13	21	34	47	120	9.4
37	British Sky Broadcasting	Receivers for television signals, Remote control, Radio receiver, Set-top box	1	2	3	3	4	13	4.0
38	Vodafone	Fuel cell system, Debiting device for deducting tolls, Recording system for vehicles with CPS, Mobile communication terminal, Multimedia message service apparatus	2	3	8	13	12	38	6.0
39	JP Morgan Chase	Integrated trading platform architecture, Secured session sequencing proxy system and method therefore, Apparatus for forming a spliced yarn, Automated credit application system	—	1	6	23	31	61	31.0
40	Oracle	Multiple pitch zipper, Indexing key ranges, Component stager, Progressive relaxation of search criteria, Document date as a ranking factor for crawling	152	188	276	363	1017	1996	6.7

⁴ Cisco Technology⁵ Haier Group Corporation, Haier America Trading, LLC, Haier America Refrigerators Company, Ltd.

Table 1. (Contd.)

No.	Names of companies	Name of 5 representative patents issued in the 2001–2010 period	Dynamics of the number of issued patents and their topics for the leading innovative companies of the world (TOP-50 rating Business Week 2010), experiments were performed from May 1–10, 2011					Total in 10 years	Increase, number of times
			21	15	9	17	22		
41	Petrobras	Retractable igniter, Modular multisize bidirection scraping device, Gas lift valve with central body venture, Gas flow control device, Stripping apparatus and process	21	15	9	17	22	84	u
42	Banco Santander	Office furniture	–	–	–	1	1	2	1.0
43	Fiat	Servo-brake system in an Otto cycle engine, Gear change for a commercial vehicle, Device for the reception of GPS position signals, Car including toy-car, motor car, replica car and scale-model car, Crankshaft for a v-type internal combustion engine	7	13	3	2	4	29	0.6
44	Chine Mobile	Preparation method of functional master batch of polyolefin and its application	–	–	–	–	1	1	–
45	Goldman Sachs	Bond issue risk management, Order centric tracking system, Modeling option price dynamics, Method for structuring a transaction	–	4	11	33	31	79	7.8
46	Nike	Ice skate runner, Portion of ashoe upper, Leg pad with a strap, Ice skate boot, Article of footwear with a perforated midsole	129	170	302	266	260	1127	2.0
47	HTC	Handheld electronic device, Holder, Fence, Grinding tool, Tool mounting bracket with light fixture	1	2	8	11	83	105	83.0
48	Facebook	Systems and methods for automatically locating web-based social network members	–	–	–	–	7	7	–
49	HSBC	Method for improving sensitometric response of photosensitive imaging media, Biometric identification system, method and medium for point of sale environment, User selectable functionality facilitator	–	1	–	1	2	4	2.0
50	Verizon Communications	Congestion and thru-put visibility and isolation, Traffic queueing for remote terminal DSLAMs, Enhanced voice mail caller ID, Integrated telephony service, Vertical services integration enabled content distribution mechanisms	1	5	10	14	9	39	9.0

Table 2. Classification of leading innovative companies of the world by level of patent activity over a 10-year period (2001–2010)

Level of patent activity, thousand patents	Sizes of levels	Names of companies
0–2	Very low	Apple, Google, IBM, Toyota Motor, Amazon, BYD, Ford Motor, Research in Motion, Volkswagen, Tata Group, BMW, Coca-Cola, Nintendo, Wal-Mart Stores, Hyundai Motor, Virgin Group, Fast Retailing, Haier Electronics, McDonald's, Lenovo, Walt Disney, Reliance Industries, Dell, Nestle, British Sky Broadcasting, Vodafone, JP Morgan Chase, Oracle, Petrobras, Banco Santander, Fiat, Chine Mobile, Goldman Sachs, Nike, HTC, Facebook, HSBC, Verizon Communications
2–4	Low	Procter & Gamble
4–6	Below average	Cisco System, Honda Motor
6–8	Above average	LG Electronics, Nokia
8–10	High	Microsoft
10–12	Very high	General Electric, Sony, Samsung Electronics, Intel, Hewlett-Packard, Siemens

Table 3. Innovation companies with increase of patent activity by neighboring 2-year intervals more than three times

Name of company	2003–2004	2005–2006	2007–2008	2009–2010
Apple				3.1
Google	–	4.3	3.4	4.4
Toyota Motor				3.8
Amazon				3.5
BYD				19.0
Research in Motion		3.8		
Honda Motor	19.3	10.8		
Virgin Group	4.0			5.0
JP Morgan Chase		6.0		
HTC		4.0		7.6
Verison Communications	5.0			

This shows the substantive character of the patent activities of leading innovative companies.

From Table 1 we see the range of changes in the number of patents that were issued in 10 years by company:

Fast Retailing, one patent; Siemens, 11678 patents. Accordingly, it is logical to take a six-level uniform classification scale with a step of 2000 patents and to classify all these companies according to it (Table 2).

From Table 2 we see that 76% of the most innovative companies of the world that are included in the TOP-50 Business Week 2010 have very low patent activities.

Table 3 shows innovation companies with an increase of patent activity by more than three-fold in neighboring 2-year intervals. For example, for the Apple company we obtain $954/310 = 3.1$. Most patent-active innovation companies have stably increasing (Microsoft, Toyota Motor, LG electronics,

Nokia, Honda Motor, Cisco System, Dell, Nestle, Oracle, and HTC) or established (General Electric, Sony, Samsung, Electronics, Intel, Volkswagen, Hewlett Packard, and Siemens) patent activity dynamics.

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