

Use of patent statistics

Introduction

- Reference: Griliches, Z. (1998). Patent statistics as economic indicators: a survey. In *R&D and productivity: the econometric evidence* (pp. 287-343). University of Chicago Press.
- Patent data provide a basis to answer questions related to the speed of technological change and how it has changed among industries and in time
- Characteristics:
 - Availability
 - By definition are related to innovation
 - They are based on objective standards

Definitions

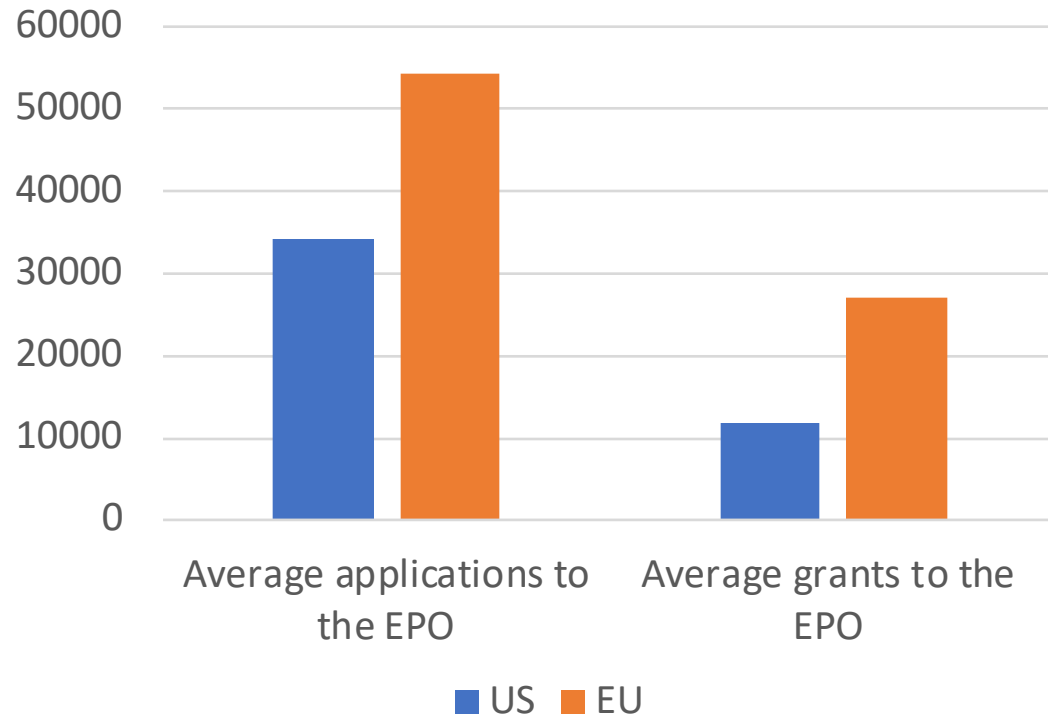
- A patent is a document, issued by an authorized governmental agency, granting the right to exclude anyone else from the production or use of a specific new device, apparatus, or process for a stated number of years (20 years in the EU and US)
- grant is issued to the inventor of this device or process after an examination that focuses on both the novelty of the claimed item and its potential utility
- The right embedded in the patent can be assigned by the inventor to somebody else, usually to his employer, a corporation, and/or sold to or licensed for use by somebody else.
- The stated purpose of the patent system is to encourage invention and technical progress both by providing a **temporary monopoly** for the inventor and by **forcing the early disclosure** of the information necessary for the production of this item or the operation of the new process.

Definitions

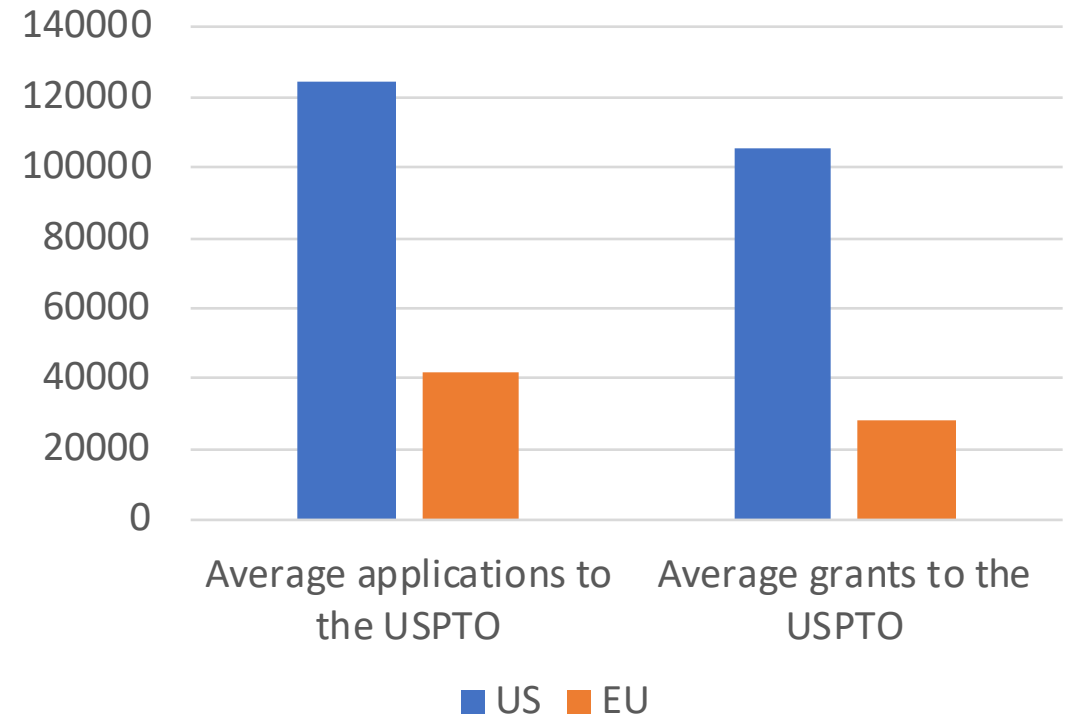
- Codified form of knowledge
- Publicly accessible and searchable information
- Right to deny third parties use of invention
- Territorial right for a predetermined period of time:
 - No «international» patent → but Patent Cooperation Treaty exists (PCT) managed by the WIPO (World Intellectual Property Organization)
 - National patent (validity only in the granting country)
 - Regional Patent Systems (e.g., the European Patent Convention)

Applications and grants (1999 – 2013)

Average applications and grants to the EPO

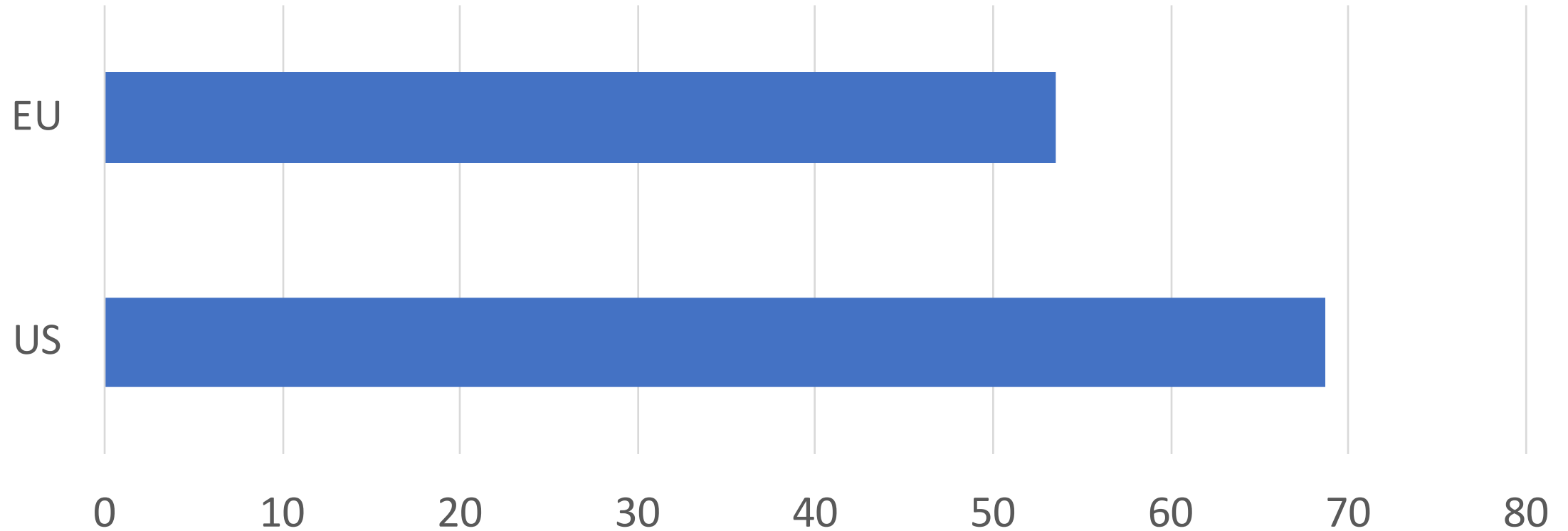


Average applications and grants to the USPTO



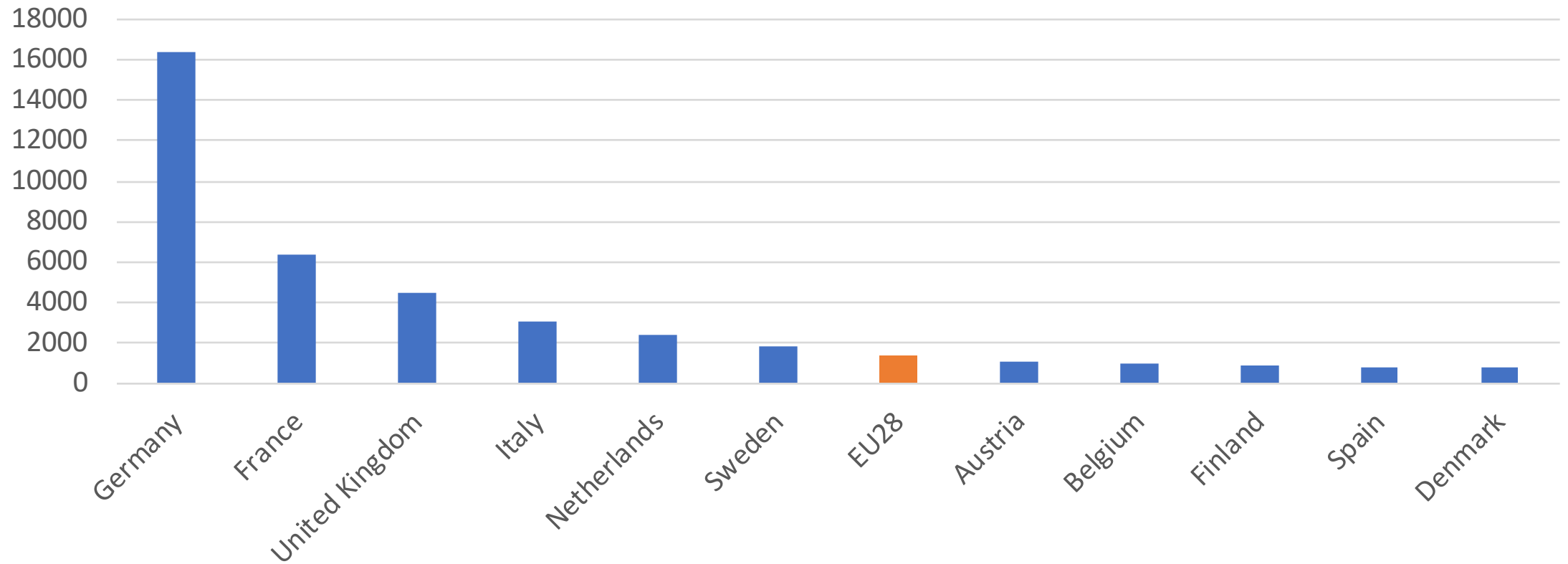
Who got more grants? (1999 – 2013)

Share of granted patents (EPO+USPTO, %)



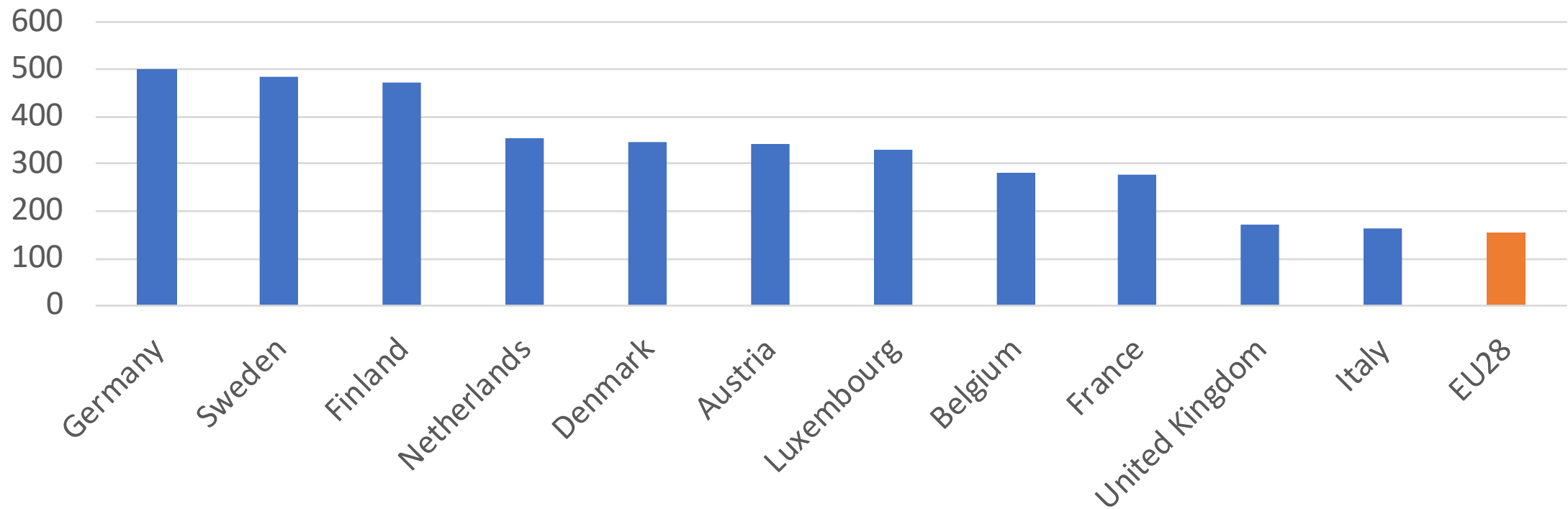
Who applies in the EU?

Average patents applications (Top 11 applicants + EU average; 1978 - 2014)

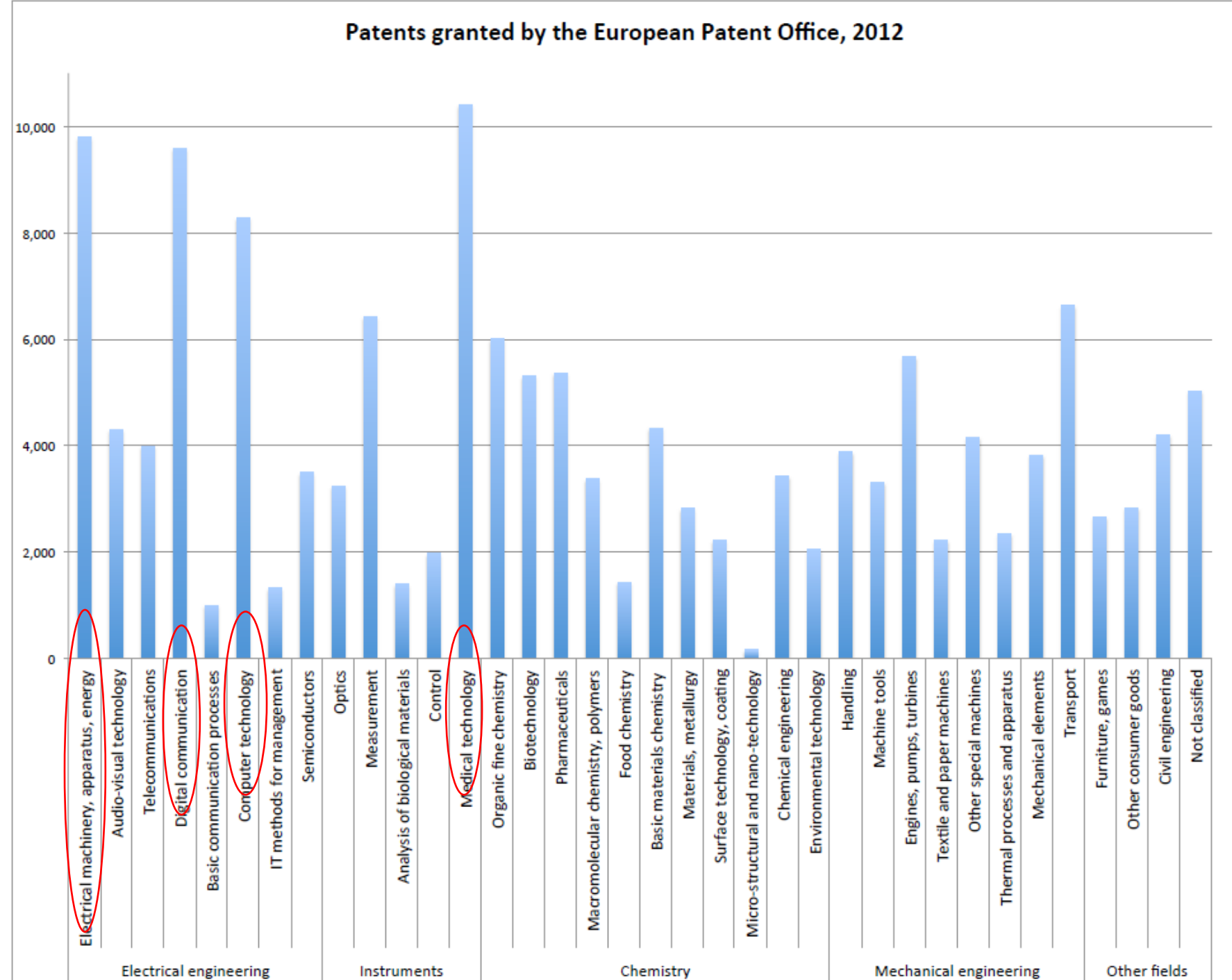


Another perspective...

Average patent applications per millions of active population



Patent at the EPO



What aspects of economic activity do patent statistics actually capture?

Pros

- Represent a minimal unit of knowledge so it has an intrinsic value:
 - Passed the scrutiny of the patent office
 - Represent investment of effort and resources of the inventor
 - Presence of an expectation over its ultimate utility/marketability

Cons

- Not all the inventions are patented
- Not all inventions are patentable
- Difference in quality of inventions and patents
- Difference in the magnitude of inventive output associated (novelty content)

Large variations in patent value

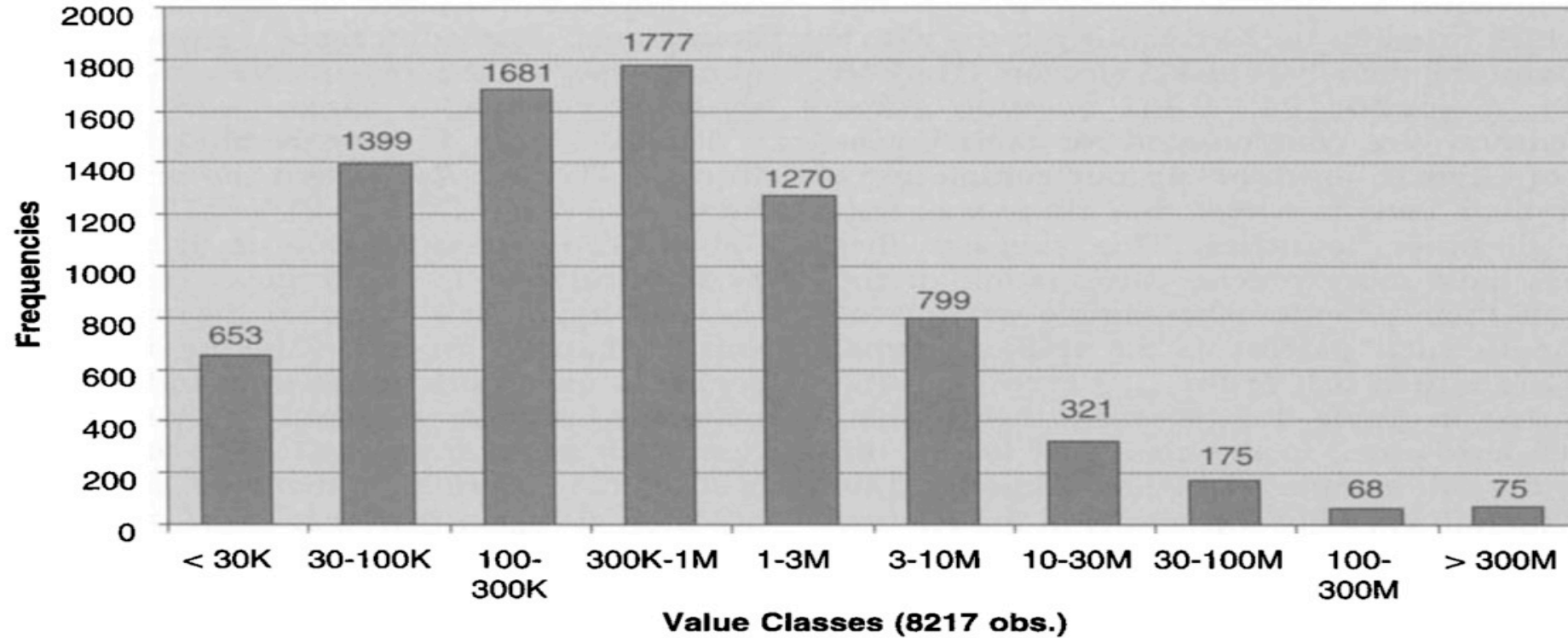


Figure 1 Distribution of VALUE. The figure shows that the PatVal-EU patent VALUE distribution is skewed. Since the difference in the logs of the boundaries of the intervals is roughly constant, the distribution in the figure is an approximation of a log-normal. Even the log-normal distribution looks skewed.

Other biases

- The use of patents has deeply changed in the last few decades, far beyond the sheer protection from imitation and the exchange of knowledge strategic behaviour:
 - companies pay bonuses to staff whose inventions are patented
 - patents are now routinely used to rank companies
 - increasing importance of market (i.e. trade of technologies), defensive (cross-licensing) and reputation strategies (to signal assets and competencies)
- These feature are far from the concept of innovation.....

What aspects of economic activity do patent statistics actually capture?

- Link with TPF, patent to represent a measure of innovative output (Schmookler, 1950s) → increase in inventive output = increase in TPF
- Correlation found to be weak
- Patents are a better measure of inventive input
- Inventive activity= «work specifically directed towards the formulation of the essential properties of a novel product or process» (Schmookler 1966)

What aspects of economic activity do patent statistics actually capture?

- There is ambiguity as to whether patents measure inventions or innovation
- Invention: unique or novel device, method, composition or process
- Innovation: result of a process that brings together various novel ideas in a way that significantly affects society
- Patents protect inventions → but captures some aspects of the innovation process

An example..

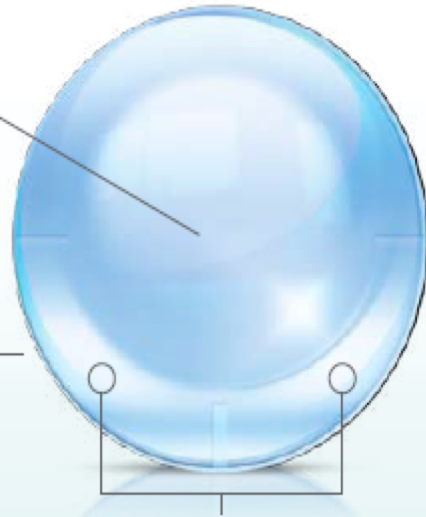
AIR OPTIX for ASTIGMATISM lenses use a breakthrough design

Wide Optic Zone

- Provides excellent acuity[®]
- Low amount of prism in the optic zone to reduce thickness and maximize Dk/t[®]

Constant Contour Edge

- Provides excellent comfort



Three Scribe Marks

- Scribe marks at 3, 6 and 9 o'clock make it easy to observe lens rotation and stability

Precision Balance 8|4 Design

- Thickest points of the lens at 8 and 4 o'clock
 - Minimizes interaction with the lower lid for excellent comfort[®]
 - Maximizes oxygen transmission at 6 o'clock[®]
 - Exceptional stability, consistent rotation and fit performance[†]

- There is not a correspondance between patent and innovation.
- The same patent can be use in several innovations
- This contact is covered by 7 patents:
 - US7847016
 - US7456240
 - US7053133
 - US7040757
 - US6774178
 - US7135521
 - US7078074

Patent data today

- Patents field of technology (IPC):
 - A: human necessities
 - B: performing operation, transporting
 - C: chemistry, metallurgy
 - D: textiles, papers
 - E: fixed constructions
 - F: mechanical engineering, lighting, heating, weapons
 - G: physics
 - H: electricity
- Patents capture very poorly service innovation and new to the firm innovations

Patents from the tertiary sector...



~13,400 patents



~4,800 patents



~1,300 patents



~30 patents



U B E R

~30 patents



~15 patents

[Take a look - uses of patents in the Japanese services sector](#)
[A very clarifying presentation of the topic](#)

Patents importance varies across industries

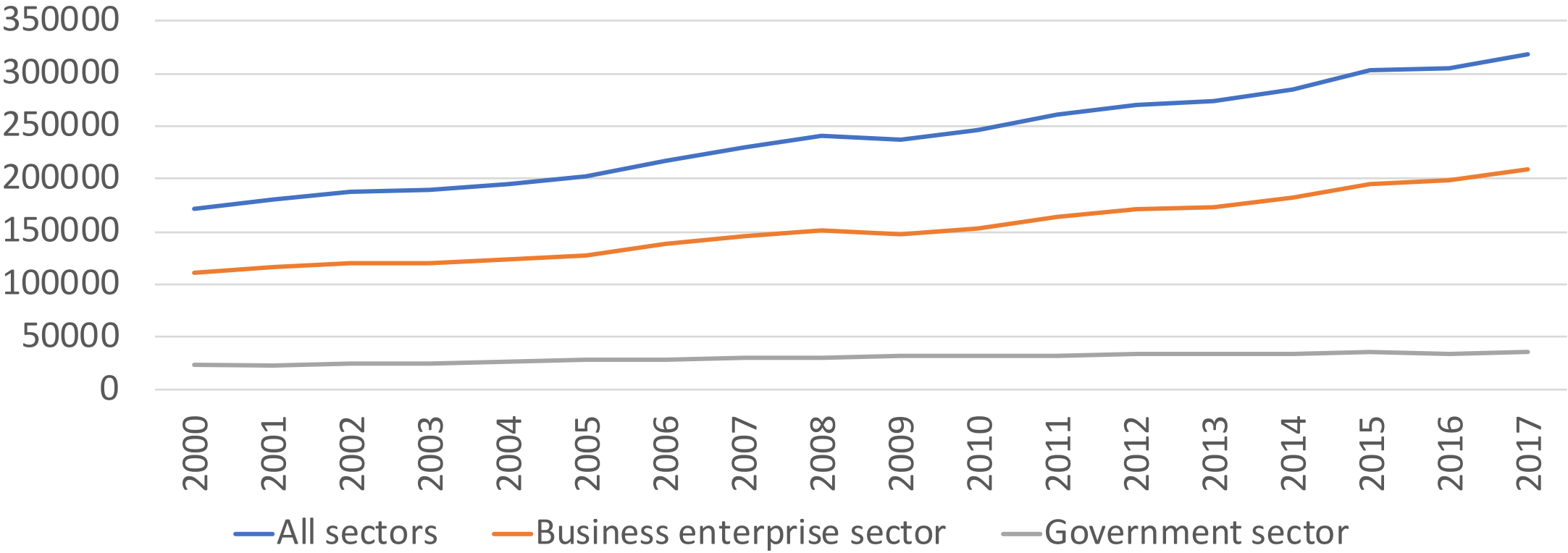
- the effectiveness of patents is linked to the specific characteristics of the technology and of the R&D process as well as on the nature of the market and on the patterns of competition
- technological regimes:
 - opportunities to innovate,
 - the ways in which profits are extracted from innovation,
 - cumulativeness of technical progress,
 - nature of the knowledge base

Main uses of patent data today

- Causes and consequences of innovation
- Features of the innovation process (e.g patent citation as indicator of knowledge spillovers)
- Analysis of aspects related to the IP policies

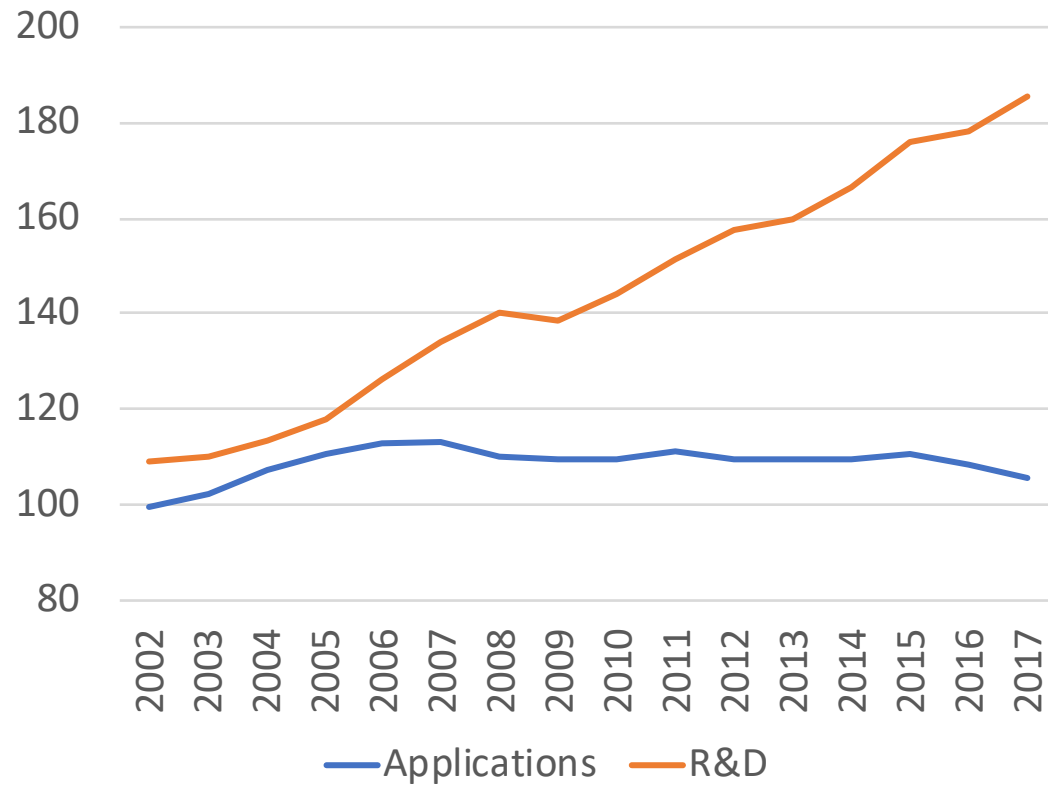
Trend of R&D expenditure

R&D expenditure in Europe (2000 - 2017)

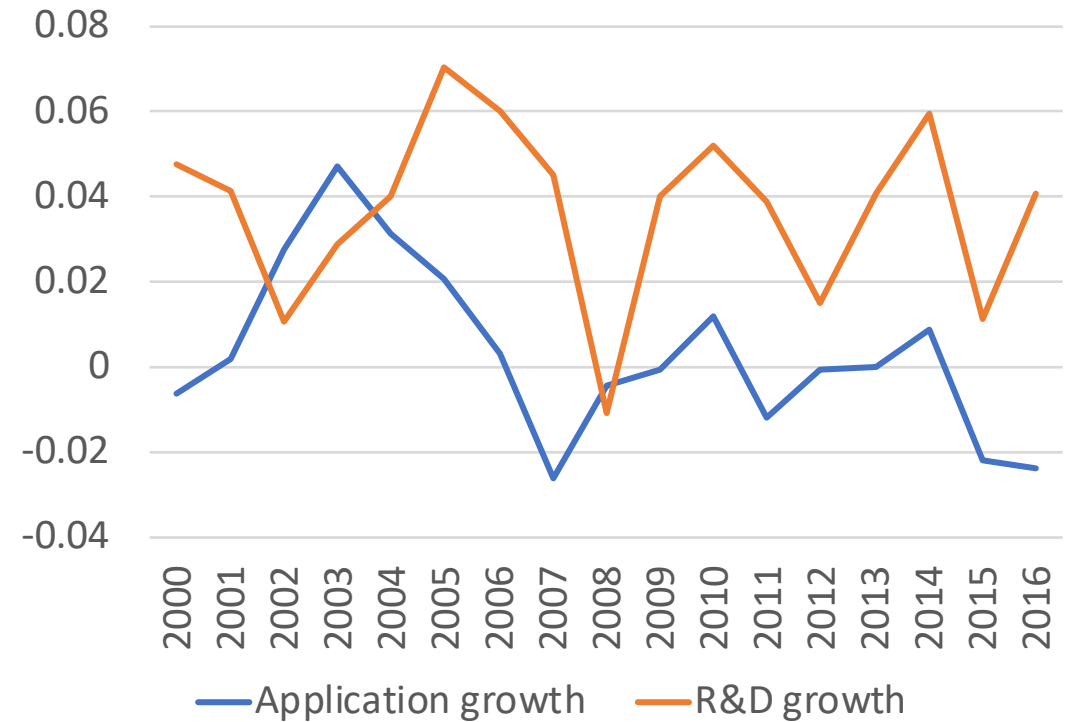


Patents application & R&D expenditure

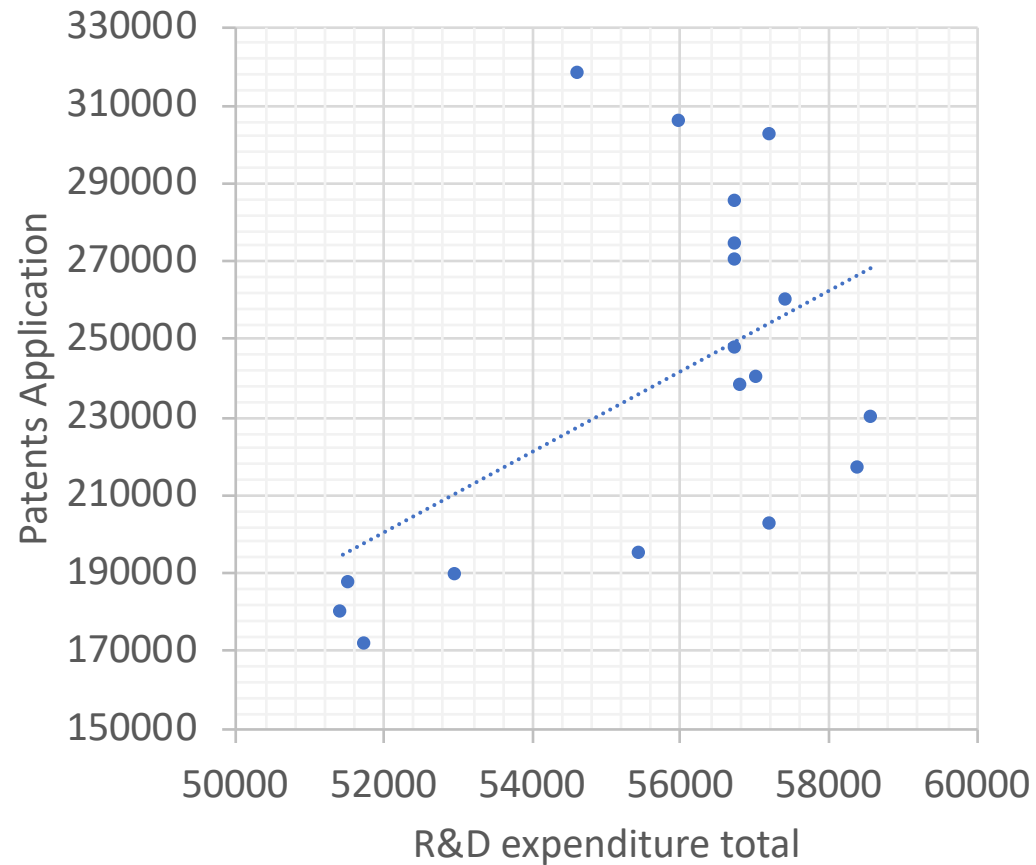
Trend of innovation inputs (2000 - 2017)



Growth of innovation inputs (2000 - 2017)



Patent applications & R&D expenditure



- Because the bulk of R&D expenditures are spent on development, most of the time-series variance must come from the differential success in the further development of existing projects rather than from the initiation of new ones.
- The relatively low correlations in the time dimension should, therefore, not be all that surprising, but they imply that patent numbers are a much poorer indicator of short-term changes in the output of inventive activity or the “fecundity” of R&D
- Evidence is quite strong that when a firm changes its R&D expenditures, parallel changes occur also in its patent numbers



US005184830A

- [54] COMPACT HAND-HELD VIDEO GAME SYSTEM
[75] Inventors: Satoru Okada; Shin Koje, both of Kyoto, Japan
[73] Assignee: Nintendo Company Limited, Kyoto, Japan
[21] Appl. No.: 899,179
[22] Filed: Jan. 15, 1992

4,865,321 9/1989 Nakagawa et al. 273/85 G
4,890,832 1/1990 Konaki 273/435

FOREIGN PATENT DOCUMENTS

58-136192 9/1983 Japan
57989 9/1984 Japan
60-21784 2/1985 Japan
2033763 5/1980 United Kingdom
8302566 8/1983 World Int. Prop. O. 273/85 G

OTHER PUBLICATIONS

Worley, Joyce "Spitball Sparky", Electronic Games, Nov. 1984, p. 86.

Primary Examiner—Jessica J. Harrison
Attorney, Agent, or Firm—Nixon & Vanderhye

[57] ABSTRACT

A hand-held electronic game machine for use with attachable/detachable memory game packs wherein the game machine includes a case of a size which may be held by a hand and capable of being sandwiched by both hands with a first switch disposed at a position such that during a game it can be operated by one thumb on a front surface of the case, a second switch disposed at a position such that during a game it can be operated by the other thumb on the first surface of the case and a third operation switch means provided in a region of said front surface where imaginary loci of both thumbs intersect with each other on the front surface, and wherein the game machine can be connected with others for simultaneous multiple player competition.

21 Claims, 12 Drawing Sheets

Related U.S. Application Data

[63] Continuation of Ser. No. 462,400, Jan. 8, 1990, abandoned.

[30] Foreign Application Priority Data

Apr. 20, 1989 [JP] Japan 1-101028
Oct. 1, 1989 [JP] Japan 1-4452

[51] Int. Cl.⁷ A63F 9/22
[52] U.S. Cl. 273/433; 273/434; 273/435; 273/85 G

[58] Field of Search 273/433, 434, 435, 437, 273/85 R, 85 G, DIG. 28; 364/410

[56] References Cited
U.S. PATENT DOCUMENTS

4,359,222 11/1982 Smith, III et al. 273/85 G
4,395,780 7/1983 Soski et al. 364/410
4,438,826 3/1984 Yokoi et al. 273/85 G
4,572,509 2/1986 Strick 273/85 G
4,589,699 5/1986 Yokoi et al. 273/1 GC
4,729,563 3/1988 Yokoi 273/1 E
4,745,478 5/1988 Nakagawa 356/181
4,783,812 11/1988 Kaszoka 381/61
4,815,733 3/1989 Yokoi 273/1 E

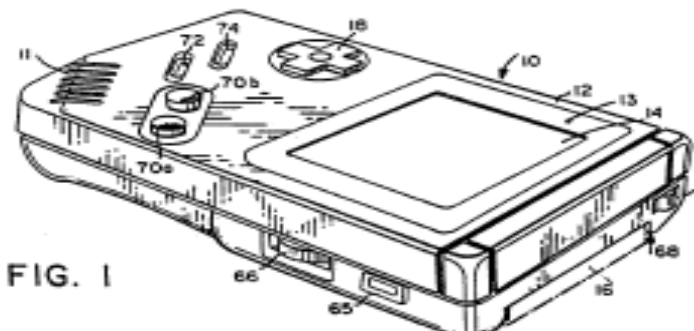
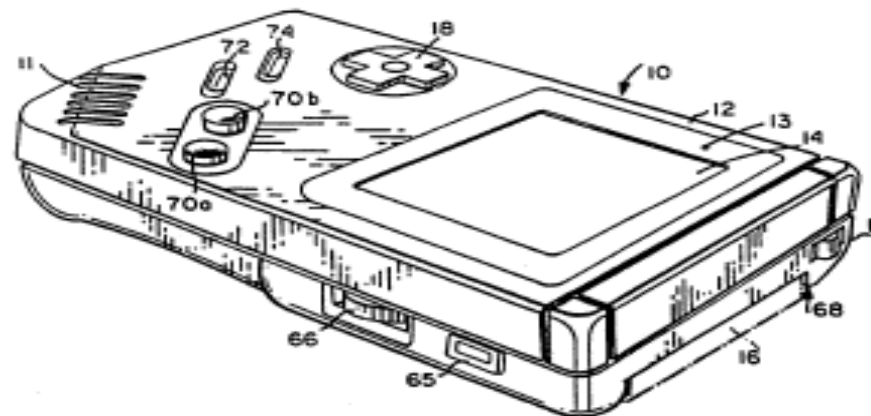


FIG. 1

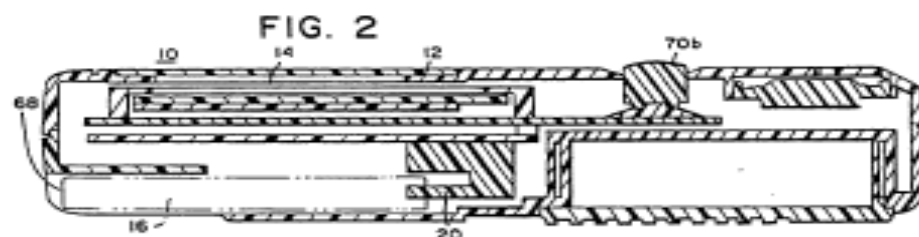


FIG. 2

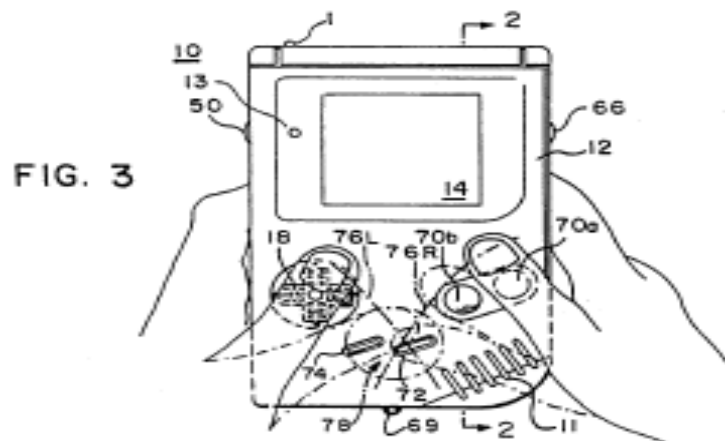


FIG. 3

COMPACT HAND-HELD VIDEO GAME SYSTEM

This is a continuation of application Ser. No. 07/462,900, filed Jan. 8, 1990, now abandoned.

CROSS-REFERENCES TO RELATED APPLICATIONS

The subject application is related to the following copending commonly-assigned U.S. patent applications filed concurrently herewith:

U.S. Ser. No. 07/462,891, now U.S. Pat. No. 5,095,798 entitled "METHOD AND APPARATUS FOR GENERATING PSEUDO-STEREO SOUND"

U.S. Ser. No. 07/462,397 entitled "SYSTEM FOR PREVENTING THE USE OF AN UNAUTHORIZED EXTERNAL MEMORY"

FIELD OF THE INVENTION

The present invention generally relates to a hand-held electronic game which utilizes a pluggable external memory and includes several operational control switches disposed in such a manner that the game can be conveniently held in both hands with the switches being operated by the thumbs. More specifically, the invention relates to a compact, hand-held video game system of the above noted nature wherein attachable/detachable game pack external memories can be utilized for individual play or simultaneous multiple player competition via linking cable.

BACKGROUND AND SUMMARY OF THE INVENTION

As evidenced by Japanese Utility Model No. 57989/1986 laid open on Apr. 18, 1988, games using a liquid crystal display are known. In this game, a game cartridge, attachable to a main body, incorporates a game program and an operating system program to be executed by a central processing unit within the body. The main body also includes a liquid crystal display ("LCD") system.

The present invention provides a uniquely compact video game system for portable hand-held video action involving interchangeable game packs. The game packs are in the form of pluggable memory devices including game programs involving one or more players. Where the game involves two players, for example, a linking cable is pluggably connected between two game machines with identical game program memory packs attached to each machine. Each machine case additionally includes uniquely placed operation switches allowing the machine to be sandwiched by the player's hands and operated by the thumbs.

In one exemplary embodiment, the information processing apparatus is constructed as a hand-held electronic game machine which is intended to be operated while the machine is sandwiched by the player's hands. Such a hand-held electronic game machine includes a hand-held case; a first operation switch disposed at a position where it can be operated by the thumb of the left hand on a front surface of the case; a second operation switch disposed at a position where it can be operated by the thumb of the right hand on the front surface of the case; and a third operation switch provided in a region where an imaginary loci of the thumbs of the left hand and right hand intersect with each other on the front surface of the case.

A direction designating switch (specifically, a cross-key switch) which is utilized for designating a moving direction of a game character is arranged as the above described first operation switch, and an action key (specifically, a push-button switch) for designating one of various kinds of action or motion of the game character. For example, the depression of such a push-button switch may cause a game character to jump, use a weapon, throw a ball or the like. These first and second operation switches are usually operated during the game. The first and second operation switches are arranged at positions where they can be easily operated during game play.

The above-described third operation switch, may, for example, be a start switch for designating the start of the game and/or a select switch for selecting a mode of operation of the game. Such a third operation switch is arranged in a region where the imaginary loci of the thumbs of the both hands intersect each other. Therefore, the third operation switch is disposed to be readily operated by the thumb on either hand. Thus, the third switch may be operated during game play without requiring the user to change the position of the hands during the game.

These and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the embodiments of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing an exemplary exterior housing of a game machine in accordance with an exemplary embodiment of the present invention;

FIG. 2 is an illustrative view showing a cross-section along a line II—II in FIG. 1;

FIG. 3 is an illustrative view showing an arrangement of switches or keys such as a start switch, select switch, and so on in the FIG. 1 embodiment;

FIG. 4 is a block diagram showing the electronic components of the FIG. 1 embodiment;

FIG. 5 is a block diagram showing a major portion of FIG. 4 in further detail;

FIG. 6 is a circuit diagram showing an exemplary memory selecting circuit such as shown generally in FIG. 5;

FIGS. 7(A) through 7(D) are a memory map showing address spaces to which CPU core can access;

FIGS. 8(A) and 8(B) are illustrative views showing examples of character data to be displayed;

FIG. 9 is a flowchart showing a sequence of authenticating operations controlled by the processing system shown in FIG. 4;

FIG. 10 is a flowchart showing a sequence of operations for comparing first character data with second character data;

FIG. 11 is a flowchart showing a sequence of operations in an inhibiting process when a first character data and a second character data are inconsistent with each other;

FIG. 12 illustrates a key-matrix for detecting a key or switch input;

FIG. 13 is an exemplary character RAM memory map;

FIG. 14 is an exemplary VRAM memory map; and
FIGS. 15(A) through 15(L) are exemplary embodiments of various addressable registers associated with the LCD controller.



US005184830A

United States Patent [19]

Okada et al.

[11] **Patent Number:** **5,184,830**[45] **Date of Patent:** **Feb. 9, 1993**Inventor
names and addresses[54] **COMPACT HAND-HELD VIDEO GAME SYSTEM**[75] Inventors: **Satoru Okada; Shin Kojo**, both of
Kyoto, Japan[73] Assignee: **Nintendo Company Limited**, Kyoto,
JapanAssignee
names and addresses[21] Appl. No.: **899,179**[22] Filed: **Jun. 15, 1992**

Family identification

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Technological field

[51] Int. Cl.⁵ **A63F 9/22**
[52] U.S. Cl. **273/433; 273/434;**
273/435; 273/85 G[58] **Field of Search** 273/433, 434, 435, 437,
273/85 R, 85 G, DIG. 28; 364/410

References

[56] **References Cited****U.S. PATENT DOCUMENTS**4,359,222 11/1982 Smith, III et al. 273/85 G
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4,729,563 3/1988 Yokoi 273/1 E
4,745,478 5/1988 Nakagawa 356/181
4,783,812 11/1988 Kaneoka 381/61
4,815,733 3/1989 Yokoi 273/1 E4,865,321 9/1989 Nakagawa et al. 273/85 G
4,890,832 1/1990 Komaki 273/435**FOREIGN PATENT DOCUMENTS**58-136192 9/1983 Japan .
57989 9/1984 Japan .
60-21784 2/1985 Japan .
2033763 5/1980 United Kingdom .
8302566 8/1983 World Int. Prop. O. 273/85 G**OTHER PUBLICATIONS**Worley, Joyce "Spitball Sparky", Electronic Games,
Nov. 1984, p. 86.*Primary Examiner*—Jessica J. Harrison*Attorney, Agent, or Firm*—Nixon & Vanderhye[57] **ABSTRACT**

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Abstract
(and full text)**21 Claims, 12 Drawing Sheets**

Number of claims

Bonuses on the Game Boy

- [First Game Boy commercial](#)
- [Kids react to Game Boy](#)

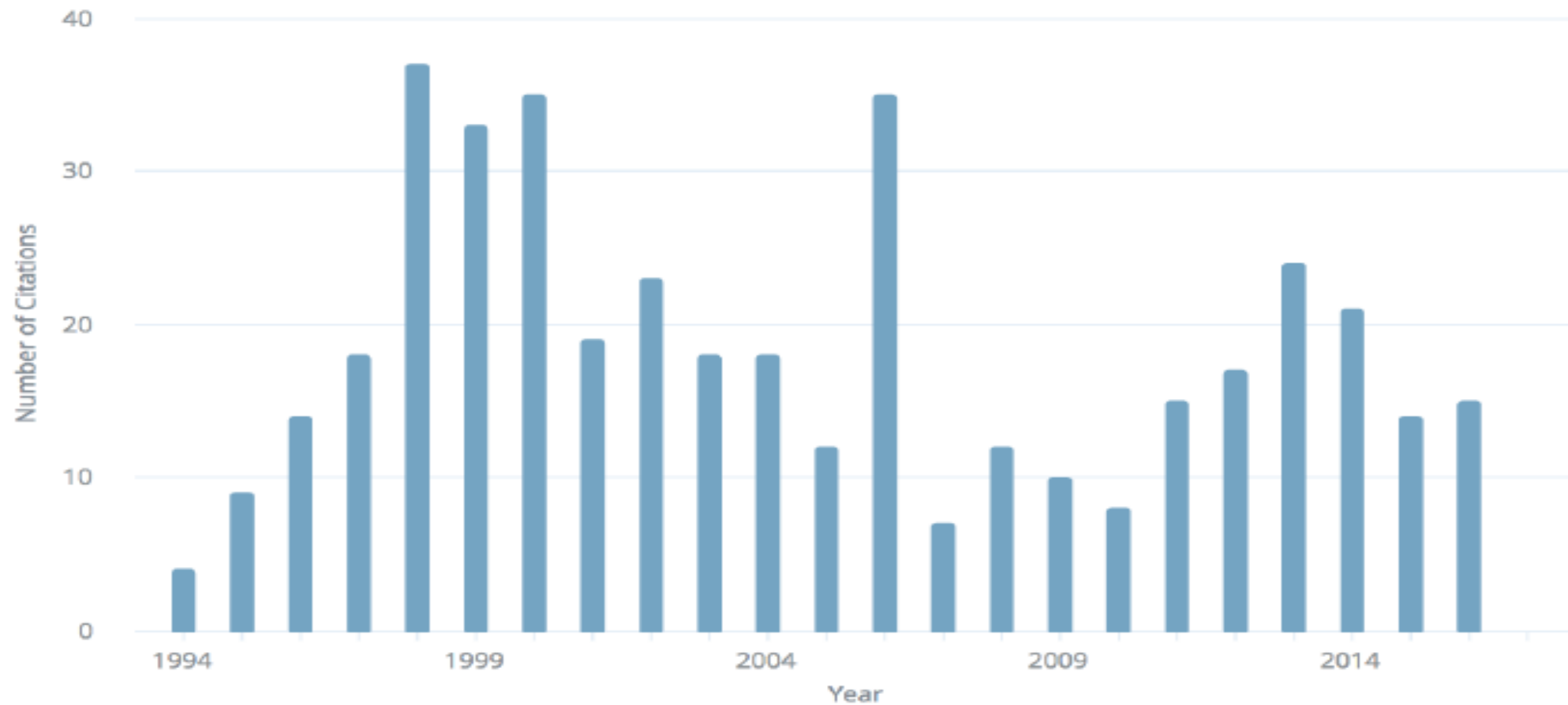
Patent citation

- References to prior technology, either patents or other scientific literature on which the current patent builds or which it uses
- Some added to avoid infringement (limit scope, defense against suits)
- Some added by the USPTO examiner (not used by inventor)
- USPTO: need to include all relevant citations
- EPO: minimum number needed to cover prior art
- Defensible as a partial measure of knowledge transfer
- Suggest spillover localization in region and country

Issues in using citations to measure spillovers

- Link between two inventions:
 - spillovers accompanied by citations (Jaffe et al. 1993)
 - citations that occur where there was no spillover
 - spillovers that occur without generating a citation
- A citation might occur without being a spillover (e.g. contracted development)
- Citation added by the examiner (as in USPTO) of which the inventor was unaware
- there are an enormous number of spillovers with no citations, since only a small fraction of research output is ever patented

Citations over time of the Game Boy patent



Source: patentsview.org

Origin of citations for the Game Boy patent



Source: patentsview.org

Other available sources of data on innovation

- **Other forms of IP rights**, especially trademarks and copyrights.
- **Other tangible manifestations of “findings”**, especially scientific publications.
- **Alternative manifestations of innovation**, especially information on new products (trade fairs, product catalogues, ...) and start-up firms (crunchbase.com).
- **Survey** data, the best known example being the Community Innovation Survey.
<http://ec.europa.eu/eurostat/web/microdata/community-innovation-survey>
- You can also search for **sector-specific sources** (e.g., software released on GitHub). <https://github.com/>
- **Input to the innovation process**: R&D expenditures, R&D employees.
<http://ec.europa.eu/eurostat>
- Patent data can always be used in conjunction with those sources

Don't miss out!

{ Friday 30/11 → we'll meet to the computer lab
8.30 to 12! }