



## Analysis of a database of public domain Brazilian patent documents based on the IPC

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### Abstract

This work addresses the relevance of establishing a Brazilian database consisting of public domain patent documents through the use of the International Patent Classification (IPC). Between 1971 and 2001, a total of 245,225 patent applications have been filed with the Brazilian Patent Office and of those 130,566 (53.24%) were found to be in the public domain.

Public domain patents are defined here as extinct patents as well as patent applications, which are:

- Applications on which the request for examination of the application has not been made;
- Applications under examination, on which requirements made by the examiner were not answered;
- Rejected applications;
- Patents whose annuity has not been paid.

A subset from this public domain set—34,429 patent documents from 1992 to 1995—were analyzed. From these, 40.50% (13,945) were found to be in the public domain. As a result, it was found that, at the broadest level, the highest incidence technological areas for Brazilian public domain patent documents were "Human Necessities" (IPC Section A) and "Chemistry and Metallurgy" (IPC Section C). It is postulated that these areas are of extreme importance for the country. More detailed analyses are also presented, at class, subclass, and subgroup levels.

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### 1. Introduction

This study shows the relevance of elaborating a database (recordable on CD-ROMs or to be made available on the Internet, or other ways) consisting of Brazilian public domain patent documents through a study in which the IPC [1] symbols of each one of these documents was considered. It was thus possible to discover the technological areas where the greatest incidence of these patent documents occurred and it is concluded

that these documents are in strategic and extremely important technological areas to the Brazilian economy.

The value of public domain patent documents in the context of a consideration of technology transfer possibilities for Brazil was touched on briefly in an article by Coaracy [2], while Holanda Cavalcanti [3] has provided a more recent summary of patent information dissemination activities to assist industry at all levels in Brazil.

### 2. Patent documents considered in the public domain

Barroso [4] showed that from 245,225 patent applications filed at the Brazilian National Institute of Industrial Property (INPI), during the period of 1971–2001, 130,566 (53.24%) had fallen in the public domain. This set of documents include patents, the term of which

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had expired, and patent applications which fell in one of four most frequent conditions established by the IP Laws nos. 5,772/71 [5] and 9,279/96 [6], as well as in the Normative Act 127 [7], which transformed them into public domain documents.

These frequent conditions are:

- Withdrawal of the patent application when examination was not requested;
- Withdrawal of the patent application when the applicant did not reply to a requirement;
- The patent application was refused;
- Failure to make payment of the annual fee, shall result in the application being withdrawn or the lapse of the patent.

Thus, for the purpose of this study "public domain patent documents" means patents which period of validity has expired and patent applications that were withdrawn or denied according to Brazilian Industrial Property Law.

In order to study the validity and the relevance of the database of public domain patent documents through the IPC, patent applications that had been filed in the period of 1992–1995 were selected. The total number of patent applications that were filed in this period amounted to 34,429, documents as shown in Table 1.

To verify whether the database of public domain patent documents presented a practical solution, that is to say, whether the reproduction of the described inventions in these documents for industry was useful, the public domain patent documents in the during the period 1992–1995 were chosen. This period was chosen because technologies filed 7–10 years ago are applied nowadays. If these patents had been granted, they would

Table 1  
Patent applications filed in the period of 1992–1995 at the Brazilian INPI

Year	1992	1993	1994	1995	Total
Quantity	7189	7923	8646	10,671	34,429

Table 2  
Database of public domain patent documents

Kind of document	Application year				Total
	1992	1993	1994	1995	
8.6	236	30	10	5	281
9.2	558	588	601	181	1928
11.1	1321	360	1490	2456	5637
11.2	771	779	606	184	2340
11.4	404	406	374	215	1399
11.5	39	19	60	50	168
11.6	4	12	22	8	46
11.30	267	1507	343	1	2118
11.31	13	3	9	3	28
Total	3613 50.26%	3704 46.75%	3515 40.65%	3103 29.07%	13,945 40.50%

Table 3  
Conditions described in the RPI that specify when a patent application is considered to be part of the public domain

RPI code	Description of the cited codes in the RPI
8.6	WITHDRAWN—Article 86 LPI The patent application will be considered withdrawn when failure to make payment of the annual fee
9.2	DENY THE APPLICATION—Article 37 LPI The patent application will be denied when the applicant does not attend the legal requirements
11.1	WITHDRAWN—Article 33 LPI The patent application will be considered withdrawn when the requirement for examination of the application was not presented
11.2	WITHDRAWN—Article 36 §1° LPI The patent application will be definitively withdrawn if there is no reply to a condition
11.4	WITHDRAWN—Article 38 §2° LPI The patent application will be definitively withdrawn when there is not payment of patent certificate fee
11.5	WITHDRAWN—Article 34 LPI The patent application will be withdrawn if there is no reply to a condition described in Art. 34 LPI
11.6	WITHDRAWN—Article 216 §2° LPI The patent application will be definitively withdrawn if the power of attorney has not been filed
11.30	WITHDRAWN DEFINITIVE—Article 18 §1° LEI 5.772/71 The patent application will be definitively withdrawn when the requirement for examination of the application was not presented
11.31	WITHDRAWN DEFINITIVE—Lack of answers of any one technical reports—LEI 5.772/71 Notification of definitively withdrawal of the patent application when the applicant did not reply to the technical examination report

be in force for 10–13 years. Moreover, as they refer to recent technologies, there has been no time yet for the development of more advanced technologies. The collection of public domain patent documents contained 13,945 documents, which corresponds to 40.50% of the patent applications filed during this period.

The number of patent documents to be introduced in the 1992–1995 database are referred to in Table 2, from which it can be learned that in the year 1992, vis-a-vis the total number of patent applications filed in this year, 50.26% of the documents had fallen in the public domain, in 1993 this value fell to 46.75%, and continued decreasing during the years of 1994 and 1995 to values of 40.65% and 29.07%, respectively.

The reasons for which these patent documents fell in the public domain are indicated in Table 3. The codes referred to are described in the RPI [8] (Brazilian Industrial Property Gazette) published weekly and takes into account the Industrial Property Code no. 5,772171 [5], Industrial Property Law no. 9,279196 [6] and the Normative Act 127 [7].

### 3. Analysis of the database of public domain patent documents according to the IPC

The 13,945 patent documents in the above-mentioned database have been formatted, processed, analysed and

Table 4  
Number of public domain patent documents in each of the highest incidence IPC subgroups

	Number of patent applications	IPC	Title of the subgroups of the IPC
1 <sup>a</sup>	39	B60R 25100	B60R 25100—Vehicle fittings for preventing or indicating unauthorised use or theft of vehicles
2 <sup>''</sup>	35	C11D 17/00	C11D 17100—Detergent materials characterised by their shape or physical properties
2 <sup>''</sup>	35	B42D 15/00	B42D 15100—Printed matter of special format or style not otherwise provided for
3 <sup>''</sup>	32	A61K 7148	A61K 7/00—Cosmetics or similar toilet preparations; 7148—Preparations for the care of the skin
3 <sup>a</sup>	32	AOIN 43/54	A01N43/00 Biocides, pest repellents or attractants, or plant growth regulators containing heterocyclic compounds; 43148—having rings with two nitrogen atoms as the only ring hetero atoms; 43/54—1,3-Diazines; Hydrogenated 1,3-diazines
4 <sup>a</sup>	30	A63F 3/00	A63F 3100—Board games; Raffle games
5 <sup>a</sup>	29	C07D 401/12	C07D 401100—Heterocyclic compounds containing two or more hetero rings, having nitrogen atoms as the only ring hetero atoms, at least one ring being a six-membered ring with only one nitrogen atom; 401112—linked by a chain containing hetero atoms as chain links
6 <sup>a</sup>	27	C08J 5/18	C08J 5100—Manufacture of articles or shaped materials containing macromolecular substances; 5118—Manufacture of films or sheets
6 <sup>a</sup>	27	A61F 13/15	A61F 13115—Absorbent pads, e.g. sanitary towels, swabs or tampons for external or internal application to the body; Supporting or fastening means therefor; Tampon applicators
7 <sup>a</sup>	25	C11D 3/37	C11D 3100—Other compounding ingredients of detergent compositions covered in group C11D 1100; 3116—Organic compounds; 3137—Polymers
7 <sup>a</sup>	25	B60R 25/04	B60R 25100—Vehicle fittings for preventing or indicating unauthorised use or theft of vehicles; 25/04—preventing use of engine
7 <sup>a</sup>	25	A61K 71075	A61K 7/00—Cosmetics or similar toilet preparations; 71075—Preparations specially adapted for washing the hair, e.g. containing hair conditioning substances
7 <sup>a</sup>	25	AOIN 43/40	A01N43/00—Biocides, pest repellants or attractants, or plant growth regulators containing heterocyclic compounds; 43134—having rings with one nitrogen atom as the only ring hetero atom; 43140—six-membered rings
8 <sup>a</sup>	24	D21C 9/10	D21C 9100—After-treatment of cellulose pulp, e.g. of wood pulp, or cotton linters; 9110—Bleaching
9 <sup>a</sup>	23	H04M 11100	H04M 11100—Telephonic communication systems adapted for combination with other electrical systems
9 <sup>a</sup>	23	AOIN 43/90	A01N43/00—Biocides, pest repellants or attractants, or plant growth regulators containing heterocyclic compounds; 43190—having two or more relevant hetero rings, condensed among themselves or with a common carbocyclic ring system
10 <sup>a</sup>	22	C11D 3/39	C11D 3100—Other compounding ingredients of detergent compositions covered in group C11D 1100; 3139—Organic or inorganic per-compounds
10 <sup>a</sup>	22	A61K 7/06	A61K 7/00—Cosmetics or similar toilet preparations; 7106—Preparations, e.g. lotions or powders, for care of the hair; Preparations to promote hair growth or to aid in hair removal, e.g. shaving preparations
11 <sup>a</sup>	20	G07C 15/00	G07C 15100—Generating random numbers; Lottery apparatus
11 <sup>a</sup>	20	A61K 7/50	A61K 7/00—Cosmetics or similar toilet preparations; 7148—Preparations for the care of the skin; 7150—Washing or bathing preparations

grouped according to the IPC symbols allotted to them. Following this, lists of documents were prepared, taking into consideration the IPC symbols up to IPC subgroup level. In Table 4, the 20 (twenty) most frequently cited classification symbols are listed including their definitions according to the 6th edition of the IPC.

Table 4 shows that the majority of the public domain patent documents are in technological areas, accessible to small or medium-sized enterprises (SMEs). In detail, the study showed the importance of patent documents in the public domain in the areas in position 1–5, i.e. technologies that deal with vehicle fittings for preventing or indicating unauthorised use or theft of vehicles, certain detergents, printed matter (for example: newspapers), cosmetics for skin care, certain biocides, games and certain organic compounds. In position 6–10 come patent documents related to shaped film or sheet materials, absorbent pads, polymer ingredients of detergent compositions, vehicle fittings for preventing or indicating unauthorised use or theft of vehicles by preventing use of the engine, cosmetics for washing the hair, certain other biocides, cellulose pulp post-cure, telephonic communication systems, and certain other washing or bathing preparations.

Table 5  
Number of public domain patent documents according to IPC Sections

Sections of IPC	Quantity	Title of sections of the IPC
A	1157	Human Necessities
B	709	Performing Operations; Transporting
C	1382	Chemistry; Metallurgy
D	166	Textiles; Paper
E	101	Fixed Constructions
F	150	Mechanical Engineering; Lighting; Heating; Weapons; Blasting
G	345	Physics
H	227	Electricity
Total	4237	

When considering the IPC symbols on a subset of the documents according to IPC Sections only, (see Table 5), it was shown that the sections of greater frequency are Section C: Chemistry and Metallurgy, with 1382 documents, Section A: Human Necessities, with 1157 documents, and Section B: Performing operations; transporting, with 709 documents.

A graphical representation of the distribution of the said documents according to IPC Sections is given in Fig. 1.

For a further investigation, Section A: Human Necessities and Section C: Chemical and Metallurgy, were selected, the two IPC Sections that represent a total of 2539 public domain patent documents. These two IPC Sections are responsible for 60% of the total of documents, while the other six IPC Sections represent only 40% of these documents.

The first section analysed was IPC Section A. The classes of IPC Section A, the number and the title of

Table 6  
Number of documents according to IPC classes in Section A

Classes of the IPC	Quantity	Title of the classes of the Section A of the IPC
A01	307	Agriculture; Forestry; Animal Husbandry; Hunting; Trapping; Fishing
A22	11	Butchering; Meat treatment; Processing poultry or fish
A23	6	Foods or foodstuffs; Their treatment, not covered by other classes
A41	5	Wearing apparel
A44	12	Haberdashery; Jewellery
A46	5	Brushware
A47	84	Furniture; Domestic articles or appliances; Coffee mills; Spice mills; Suction cleaners in general
A61	558	Medical or veterinary science; Hygiene
A62	18	Life-saving; Fire-fighting
A63	151	Sports; Games; Amusements

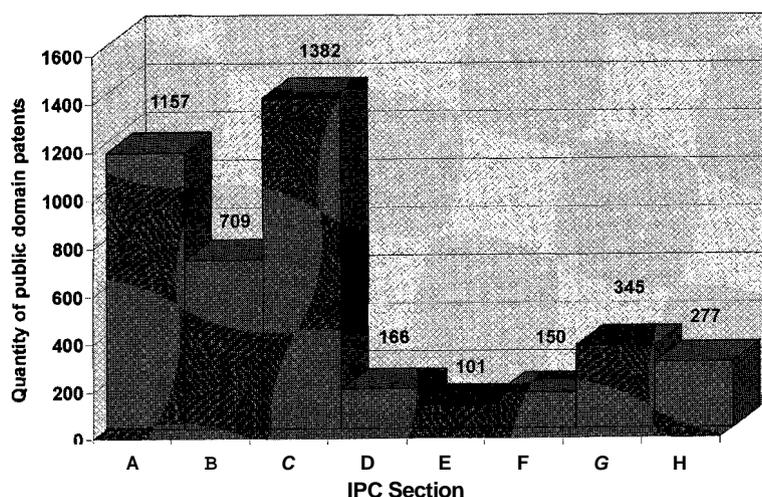


Fig. 1. Number of public domain patent documents according to IPC sections.

Table 7  
Number of public domain patent documents according to IPC subclasses in IPC Section A

Subclass	Quantity	Subclass	Quantity	Subclass	Quantity
A01C	5	A47F	5	A61K	281
A01D	11	A47G	15	A61L	23
A01M	8	A47J	35	A61M	68
A01N	283	A47K	22	A61N	5
A22C	11	A47L	7	A62B	7
A23N	6	A61B	97	A62D	11
A41D	5	A61C	32	A63B	11
A44B	12	A61F	46	A63F	108
A46B	5	A61J	6	A63H	32

Table 8  
Definitions of the four high frequency subclasses in IPC Section A

Subclasses of the IPC	Title of the subclasses of the IPC
A01N	Preservation of bodies of humans or animals or plants or parts thereof; Biocides, e.g. as disinfectants, as pesticides, as herbicides; Pest repellants or attractants; Plant growth regulators
A61B	Diagnosis; Surgery; Identification
A61K	Preparations for medical, dental, or toilet purposes
A61M	Devices for introducing media into, or onto, the body; Devices for transducing body media or for taking media from the body; Devices for producing or ending sleep or stupor
A63F	Card, board, or roulette games; indoor games using small moving playing bodies; Miscellaneous games

Table 9  
Number of documents according to IPC classes in Section C

Classes of IPC	Quantity	Title of the classes of the Section C of the IPC
C01	5	Inorganic Chemistry
C02	42	Treatment of water; Waste water; Sewage; or Sludge
C03	5	Glass; Mineral or slag wool
C04	45	Cements; Concrete; Artificial stone; Ceramics; Refractories
C05	5	Fertilisers; Manufacture thereof
C07	356	Organic Chemistry
C08	395	Organic macromolecular compounds; Their preparation or chemical working-up; Compositions based thereon
C09	111	Dyes; Paints; Polishes; Natural resins; Adhesives; Miscellaneous compositions; Miscellaneous applications of materials
C10	38	Petroleum, gas or coke industries; Technical gases containing carbon monoxide; Fuels; Lubricants; Peat
C11	245	Animal or vegetable oils, fats, fatty substances or waxes; Fatty acids therefrom; detergents; candles
C12	84	Biochemistry: Beer; spirits; Wine; Vinegar; Microbiology; Enzymology; Mutation or genetic engineering
C14	5	Skins; Hides; Pelts; Leather
C22	32	Metallurgy; Ferrous or non-ferrous alloys; Treatment of alloys or non-ferrous metals
C25	14	Electrolytic or electrophoretic processes; Apparatus therefor

Table 10  
Number of public domain patent documents according to IPC subclasses in IPC Section C

Subclass	Quantity	Subclass	Quantity	Subclass	Quantity
C01B	5	C08G	51	C10N	5
C02F	42	C08J	97	C11D	245
C03C	5	C08K	41	C12N	49
C04B	45	C08L	135	C12P	14
C05G	5	C09B	25	C12Q	16
C07C	27	C09D	51	C12R	5
C07D	321	C09J	14	C14C	5
C07F	8	C09K	21	C22B	32
C08B	5	C10L	25	C25B	14
C08F	66	C10M	8		

each one of the classes are listed in Table 6. The classes of bigger incidence are A01 (Agriculture, etc.), A61 (Medical or Veterinary Science; Hygiene) and A63 (Sports; Games; Amusements).

Subclasses A01N (with 283 documents), A61B (with 97), A61K (with 281), A61M (with 68) and A63F (with 108) as shown in Table 7, are the more important ones for public domain patent documents.

Table 8 shows the four high frequency subclasses are in areas of technology which, in many cases, can be reproduced or further developed relatively easily. These are subclasses A01N (283 documents) and A61K (281 documents). They deal with the production of chemical products that are used as insecticide and medicines, respectively, and the others subclasses deal with diagnostics (A61B), and other devices to introduce into or to remove substances from the body (A61M) and games (A63F).

When adopting the same criteria for the classes of IPC Section C, it was observed that the high frequency classes are C07 (with 356 documents), C08 (395), C09 (111) and C11 (245). These data can be consulted in Table 9. Also, the data of the other classes also can be observed in this table.

Table 10 shows three high frequency subclasses, which again are in areas of technology many of which can be reproduced or further developed relatively easily. The subclasses are C07D (with 321 documents), C08L (with 135) and C11D (with 245) and the technologies described in these documents can be easily reproduced by SMEs.

Technologies described in documents that are more difficult to reproduce, as big industries are mostly involved, are in subclasses C03C (glass, with 5 documents), C04B (concrete, with 45 documents), C05G

Table 11  
Definitions of the three high frequency subclasses in IPC Section C

Subclasses of IPC	Title of subclasses of IPC
C07D	Heterocyclic compounds
C08L	Compositions of macromolecular compounds
C11D	Detergent compositions; Use of single substances as detergents; Soap or soap-making; Resin soaps; recovery of glycerol

(fertilisers, with 5 documents), C10L, M, and N (Petroleum, gas or coke industries, with 38 documents) and finally in subclass C22B (Metallurgy, with 32 documents). It is considered that these subclasses contain few documents in the public domain of interest to SMEs.

The definition of the subclasses of high incidence of IPC Section C is shown in Table 11.

#### 4. Examples of patent documents in the public domain

Nine patent documents in the public domain were selected in the 1992–1995 database and are listed in Table 12. These documents have been selected based on the following criteria:

1. Classified in IPC subclass A61K,
2. The patent application had been rejected, and
3. The applicant(s) in the application are independent Brazilian inventors, or a university, government agency or enterprise in Brazil or abroad.

These examples tend to show that many of the patent documents in the public domain can easily be repro-

Table 12  
Relevant bibliographic data of some selected public domain patent documents (rejected patent applications) in IPC Section A

No. Application	IPC	Applicant	Title of the invention
PI9200429-6	A61K 31/405; A61K 31/60	Sebastiano Bianco	Use of steroid anti-inflammatory medicine and the said medicine
PI9201387-2 PI9207109-0	A62B 27/00; A61B 5/08 A61K 31/13; A61K 31/135; A61K 31/275	Armando de Oliveira Fortuna University of Manitoba	Controlled Espirometro for microprocessor Therapeutical composition and process used for treating scar tissue
PI9300853-8	A61C 19/04; A61K 6/10	Lucio Flavio Andreoli	Improved kit for symptomatic and functional diagnostic and diognatostatic techniques
PI9301857-6 PI9302008-2 PI9303217-0	C07C 147/100; A01N 41/10 A01N 23/00 A61K 7/48; A61K 31/35; C07G 13/00	Luiz Eugenio Pedro de Freitas Alberto da Silva Diaz Andre ENB—Extratos Naturais do Brasil Ind. E Com. S.A	Process and toxic agent to exterminate termites Insecticidal bait for exterminating rats Process of extracting and manufacturing substances with anti-oxidant and physiological activity useful in cosmetic products
PI9307235-0	A61K 31/1425	The University Of North Carolina at Chapel Hill	Treatment of Pnawnocystis carinii pneumonia and of Giardia lamblia and useful compounds for the same
PI9400120-0	A61K 35/78	Universidade Federal do Rio de Janeiro	Obtaining juices or extracts of kalanchoe, application of the juice and extracts and its components for imunesuppression and the leishmaniose treatment
PI9405043-0	C07K 4/12; A61K 38/39; C07M 7/00	CNPq and USP	Extracting collagen from animal tissue with solvent organic in alkaline medium
PI9503061-1	A61B 17/00; A61B 19/00	Carlos Roberto Teixeira de Carvalho	Process for the administration of drugs application

duced by SME. Thus, the preparation of a database with patent documents in the public domain would save time and investment in research because the development of products/processes could be started from inventions in the public domain.

However, when a public domain patent document is worked (produced), one must pay attention if not another patent protects the technology in question. It can happen that the patent application in the public domain, was either rejected in view of the prior art (a patent in force that was cited as a reference), or the application was withdrawn because the applicant thought it would be not be viable to continue with the patent application.

## 5. Conclusions

This study allows the following conclusions in relation to the database of public domain patent documents:

- There exist no world-wide database that is specifically directed to furnishing lists of public domain patent documents; <sup>1</sup>
- The furnishing of public domain patent documents to enterprises could be an excellent vehicle for disseminating and using the industrial property system, if such a database would be available on CD-ROMs. Institutions like SEBRAE and SENAI, which support SMEs in Brazil, could play an important role in this field;
- Currently, the survey and the analysis of this volume of data is possible because of the present advanced technology in information retrieval through computers with raised capacity of storage of memory, search strategies and equipment for writing and reading of data;
- The various development stages in the elaboration of products and processes in the SMEs can be shortened as they should be able to start developments from a technology which is in the public domain;
- The dissemination of information on Brazilian public domain patent documents could provide a social, technological and economical profit to Brazil, benefiting the society, as long as the inventions described

in these patent documents could be worked or be improved, by national enterprises, technological research institution and universities;

- One of the major problems of research centres and national enterprises, such as SMEs, is to establish the status of patent applications filed in Brazil, and more particularly, which of these applications are in the public domain. Thus, a collection of CD-ROMs containing this information should contribute to the public availability of this information;
- Most technology areas and human knowledge in such basic areas as chemistry, pharmaceuticals, electric, electronic, mechanics, textiles for instance, described in patent documents that are in the public domain, could be made available on CD-ROMs.

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<sup>1</sup> *Editor's note:* But much information of this kind can be retrieved from separate national patent databases and from databases such as Inpadoc that include legal status information for a large number of countries around the world.