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European pharmaceutical journals: Relationship between demand and indexation - the example of the main French document supplier

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Summary

The purpose of the study was to analyse the way in which papers published by European pharmaceutical journals are made available by the main French document supplier, “ Institut National de l’Information Scientifique et Technique ” linked to the “ Centre National de la Recherche Scientifique ” (INIST-CNRS).

After having given a definition and built up a sample of 289 journals, orders for them during 1996-1999 were analysed. Then, the possible relationships between orders to INIST-CNRS and the impact of journals on the scientific community (from Institute for Scientific Information (ISI) data) were examined. Finally, a study was made of relationships between document orders to INIST-CNRS and the indexation of European pharmaceutical journals in bibliographic databases.

Key words

journal, pharmacy, Europe, document supplier

Résumé

Notre travail avait pour objectif d’analyser le processus de fourniture d’articles publiés dans les périodiques pharmaceutiques européens, par le principal fournisseur de documents qu’est l’Institut National de l’Information Scientifique et Technique lié au Centre National de la Recherche Scientifique (INIST-CNRS).

Après avoir donné une définition et constitué un échantillon de 289 périodiques, nous avons analysé les demandes les concernant sur la période 1996-1999. Nous avons envisagé ensuite les relations éventuelles entre ces demandes auprès de l’INIST-CNRS et l’impact des périodiques dans la communauté scientifique (à partir de données issues de l’Institute for Scientific Information (ISI) aux USA).

Enfin, nous avons étudié les relations existant entre les commandes de documents à l’INIST-CNRS et le signalement des périodiques pharmaceutiques européens dans les bases de données bibliographiques.

Mots Clés

périodique, pharmacie, Europe, fournisseur de documents

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Introduction

In the pharmaceutical field, as for most scientific disciplines, journals remain the fundamental means of publication and disclosure of research findings. Journals also make it possible to publish reviews, and articles providing on-going education and regular information for professional pharmacists.

Access to articles published in journals is obtained naturally by direct readers subscriptions. However, in view of the number of journals (estimated at about 25,000 for the biomedical field), it is simply impossible for professionals to subscribe to all the journals in which they might be interested, even within a narrow range of activity. This becomes even more evident when the subscription prices of the majority of journals are taken into account, since these generally range from \$150 to \$5000.

All professionals, whether practitioner, industrial or research pharmacists, will therefore necessarily on some occasion need access to articles available from other document suppliers. These basically consist of public or private information centres, university libraries and the “Institut National de l’Information Scientifique et Technique” linked to the “Centre National de la Recherche Scientifique” (INIST-CNRS¹) in France and the British Library in the United Kingdom.

This article therefore offers an analysis of the way in which articles published by European pharmaceutical journals are made available by the main French document supplier, the INIST-CNRS. After giving a definition and creating a representative sample of these journals, orders for articles from them during 1996-1999 will be analysed. Then, the possible relationships between orders to INIST-CNRS and the impact of journals on the scientific community (from Institute for Scientific Information (ISI) data) will be examined. Finally, a study will be made of relationships between orders to INIST-CNRS and the presence of European pharmaceutical journals in bibliographic databases.

1. Context of the study

1.1 INIST-CNRS, principal French document supplier

The purpose of the INIST-CNRS is to collect, process and diffuse the results of scientific and technical research in France and other countries. Documents collected by the INIST-CNRS cover most scientific and technical research in the world: 27,000 international journals, conference proceedings, grey literature, and so on. To give an idea of the scale, it is to be noted that nowadays the INIST-CNRS supplies 700,000 photocopies of documents per year. The INIST-CNRS supplies two multilingual and multidisciplinary bibliographic databases: Pascal for science, technology and medicine, Francis for human and social sciences.

1.2 Creation of the sample of European pharmaceutical journals

This study is a follow-up to work already done on European pharmaceutical journals (Bador, Picard and Locher, 1994), to work concerning pharmaceutical journals in French (Bador, Grand and Locher, 1996, 74-81 ; Bador, Grand and Locher, 1996, 131-140), and to a study on evaluation of the quality of pharmaceutical journals (Bador and Petit, 1998). The definition of "European pharmaceutical journal" given in article of Bador, Picard and Locher (1994) is therefore retained and adapted.

Thus, for this present study a "European pharmaceutical journal" is considered to be a journal with all of the following characteristics:

- published by a European organisation or publisher, that is to say with at least one agency and an address in Europe,
- publishing articles intended to inform or educate practitioner, hospital, industrial or research pharmacists,
- dealing with pharmacology or pharmacy in the strict sense of these terms, that is to say dealing with allopathic medicines or activities ranging from conception to post-marketing follow-up studies, but excluding related sciences which constitute separate disciplines (biology, chemistry, physiology, haematology, immunology, cosmetology, homeopathy, toxicology, microbiology, dietetics, nutrition, etc.)

The sample of the 1993 article (Bador, Picard and Locher, 1994), consisting of 318 journals, was taken as starting point. Firstly, closed journals since 1993 have been eliminated, then newest journals have been added. So, a sample of 289 European pharmaceutical journals has been constituted for our study. These journals only met the qualitative criteria above. They did not meet quantitative criteria from ISI such as number of citations, impact factor and so on.

1.3 Characteristics of the sample

Out of the 289 journals of the sample, 125, or 43.3%, are international journals, 98, or 33.9%, are national journals, the remaining 66 journals, or 22.8%, being difficult to define.

Out of these 289 journals, 130, or 45%, are scientific journals, 39, or 13.5%, are professional journals, 55, or 19% are mixed, both scientific and professional in character, and the remaining 56, or 22.5%, are difficult to classify. It is to be noted that all of the international journals, apart from two exceptions, are scientific journals.

Out of the 289 journals, 227, or 80%, come from seven countries, namely the United Kingdom, France, Germany, Spain, Switzerland, Italy and the Netherlands.

Data were supplied by the INIST-CNRS concerning the circulation of the journals during the four consecutive years 1996, 1997, 1998 and 1999. It is clear that journals themselves did not circulate but photocopies of articles from the journals which were ordered to the INIST-CNRS. Each journal was therefore classified according to the number of orders during these four consecutive periods.

Furthermore, these data were compared to the impact of these journals from the point of view of the rate of citations (data collected in the JCR²). The data supplied by the INIST-CNRS were also compared to those concerning indexation of these journals in the bibliographic databases selected for the purposes of this study.

Out of the 289 journals of the sample, 153, or 52.9%, are at the INIST, and 60, or 20.7%, at the ISI.

The sample was divided into three groups according to orders from the INIST-CNRS:

- Group 1: the five journals most often ordered (over 1500 orders)
- Group 2: the other journals ordered, i.e. 144
- Group 3: the journals never ordered, i.e. 140.

The principal characteristics of the journals of these three groups are as follows:

Group 1

Out of the five journals in Group 1, all are to be found at the INIST-CNRS, all are present at the ISI.

Group 2

Out of the 144 journals in this group, 129, or 89.6%, are to be found at the INIST-CNRS, 55, or 38.2%, are present at the ISI.

Group 3

Out of the 140 journals in this group, 19, or 13.6%, are to be found at the INIST-CNRS, none is present at the ISI.

In order to obtain a better understanding of the indexation of these journals, the extent to which they were covered in the bibliographic data bases was studied.

Presentation of the data bases studied

The six most representative bibliographic data bases were selected, being the most easily accessible and the most widely consulted:

- Index Medicus/Medline, a specialised biomedical bibliography. This system is produced by the National Library of Medicine in the United States and indexes approximately 3100 journals (of which 74 European Pharmaceutical journals).
- Excerpta Medica/Embase, also a specialised biomedical bibliography. It is diffused by the publisher Elsevier in the Netherlands and indexes approximately 3500 journals (of which 119 European Pharmaceutical journals).
- International Pharmaceutical Abstracts/IPA, a specialised bibliography for pharmaceutical science. It is published by the American Society of Health-System Pharmacists (ASHP) in the United States and indexes approximately 800 journals (of which 120 European Pharmaceutical journals).
- Chemical Abstracts, a specialised bibliography for chemistry. It is published by the American Chemical Society in the United States and indexes approximately 10,000 journals (of which 124 European Pharmaceutical journals).
- Biological Abstracts/Biosis, a specialised bibliography for biology. It is published by the Biosciences Information Service in the United States and indexes approximately 9000 journals (of which 81 European Pharmaceutical journals).
- Current Contents, a bibliography of multidisciplinary summaries. It is published by the Institute for Scientific Information (ISI) in the United States and indexes approximately 2200 journals in the fields of life sciences and health (of which 61 European Pharmaceutical journals).

2. Analysis of orders for articles from European pharmaceutical journals at the INIST-CNRS

This analysis takes into account the orders for the articles from our sample journals. The numbers of orders for the last four consecutive years are:

Number of orders 1996	16930
Number of orders 1997	16723
Number of orders 1998	17047
Number of orders 1999	16525

Firstly, indices of linear correlation for each pair of years for orders from the INIST-CNRS were calculated, in order to find out if demand differed significantly from one year to another.

The following results were obtained:

- Orders 96 /97: index of linear correlation = 0.98
- Orders 97/98 : index of linear correlation = 0.98
- Orders 98/99 : index of linear correlation = 0.99

In order to compare the demand in 1998 and 1999, the two order distributions were closely analysed. These are given in the classical form of rank/frequency, then adjusted by the logarithmic model:

Frequency = -A.Log(rank)+ B A>0 and B>0

The results obtained are shown in Figures 1 and 2 below:

“Insert figure 1 and figure 2 here”

The result of this adjustment shows the two distributions to be identical.

Moreover, in both cases the five journals most frequently ordered are the same. All of these considerations clearly demonstrate a stable demand for this sample of journals during these four years.

Once it was observed that the two distributions of orders in 1998 and 1999 presented the same characteristics, studies were made of the total orders for 96-97-98 (see Figure 3) and also of the number of orders in 1998. The essential characteristics of this demand over these three years are as follows:

- The total number of orders for articles is 50,700,
- The five most frequently ordered journals account for 24% of the demand, the ten most frequently ordered for 40%,
- 42 journals, or 28%, account for 80% of the demand,
- 146 journals, or 50%, were ordered at least once between 1996 and 1998.

Figure 3 below shows the numbers of requests per journal classified in decreasing order. This distribution is in accordance with the classical laws of bibliometrics, which are commonly observed in studies of the processes of circulation of documents (Salaun, Lafouge and Boukacem, 2000) where a small number of journals is sufficient to supply orders. This confirms the famous 80/20 rule – 80% of orders concern 20% of periodicals – (Burrell, 1985) which is customarily observed for distributions in libraries.

“Insert figure 3”

It is interesting to note that more than 70% of the orders for these European pharmaceutical journals emanate from companies. The INSERM (“Institut National de la Santé et de la Recherche Médicale”: National Institute for Health and Medical Research) and the CNRS are the next two leading customers, with 7.7% and 4.4% of orders, respectively. The remaining 18% of orders mainly emanate from hospitals and universities. This observation appears logical inasmuch as the largest part of pharmaceutical research is carried out in industrial pharmaceutical laboratories, which are enormous and highly dynamic private-sector companies. So, in France pharmaceutical research expenditure is essentially self-financed by companies and public financing is less than 1%. Moreover, pharmaceutical industry is the industrial sector which dedicates to research and development the most important budget (Syndicat National de l’Industrie Pharmaceutique, 2002). This result accentuates the tendency observed for all the orders from the INIST-CNRS made during the month of January 1997 where approximately 45% of orders (in this case for all scientific fields) were made by companies (Salaun, Lafouge and Boukacem, 2000).

The five most frequently ordered journals (Group 1) are the following:

- International Journal of Pharmaceutics
- European Journal of Pharmacology
- Biochemical Pharmacology
- British Journal of Pharmacology
- Drugs

These five European pharmaceutical journals are international, published in English, and deal with scientific subjects.

Out of the 144 journals ordered at least once from the INIST-CNRS (Group 2), 89, or 61.8%, are international journals, 31, or 21.5%, are national journals, 21, or 14.6% were not defined. Out of these 144 journals, 91, or 63.2%, are scientific journals, 8, or 5.6%, are professional journals, 22, or 15.3%, are scientific and professional journals.

Finally, out of the 140 journals which were not ordered from the (Group 3), 32, or 22.9%, are international journals, 67, or 47.9%, are national journals. Out of these 140 journals, 35, or 25%, are scientific journals, 31, or 22.1%, are professional journals, 33, or 23.6%, are scientific and professional journals. The majority being national or professional journals, we can think that readers have their own subscription and do not need to order their articles to INIST-CNRS.

3. Relationships between orders and the impact of journals on the scientific community

3.1 Comparison between orders from INIST and indexation by ISI

The preceding analysis showed that half of the journals of the sample were ordered from INIST-CNRS. Table I, below, gives the proportion of journals analysed by ISI and ordered from INIST-CNRS.

“Insert table I”

Out of the 289 journals of the sample, only 60 are indexed by ISI, which gives a coverage rate of 21%. This rate is high inasmuch as all the journals in the sample are European. It is important to note that :

- all these 60 journals are ordered from the INIST-CNRS,
- 87,5% of orders are requested from these journals.

These remarks seem to indicate that there might be a relationship between indexing in ISI and orders from the INIST-CNRS.

If we look at the orders for these European pharmaceutical journals emanating from companies, we observe the same trend (about 90% of orders concerned the 60 journals indexed by ISI).

Next, a finer analysis was attempted, of the relationship between the impact of the journals on the scientific community and the orders for them from the INIST-CNRS. Only the 60 journals analysed by the ISI are taken into account in the following calculations. The list of these 60 journals together with their principal characteristics is given in Appendix 1.

3.2 Correlation between orders from INIST and JCR data

In this part, the question is whether there is a correlation between orders from the INIST-CNRS and the data produced by the ISI. Among the indicators offered by the JCR, the number of citations was selected. The number of citations is relative to journals and not to articles. So, it is well known that one journal may have a high number of citations which is the result from the frequent citations of a very low number of articles. The phenomena has been well studied in scientometry (Garfield, 1998). Our intention here does not take into account this phenomena. We worked on orders of journals and here also a low number of frequently ordered articles of one journal may be at the root of a high number of orders of this journal. For confidentiality reasons, we did not have access to the titles of the ordered articles.

We study here the correlation between orders and the number of citations. For this purpose, 1998 orders and 1997 citations were selected (Figure 4).

“Insert figure 4 “

The correlation index is 0.63 for all of the 60 journals ordered from the INIST-CNRS. There is a significant correlation. At the signification threshold of 0.1% and for a number of 60 degrees of freedom, the test of r gives a theoretical correlation of 0.408.

For Group 1, the correlation is -0.46 . There is therefore no correlation. We can observe that these five leading journals are on the periphery of the scatter plot (see Figure 4).

A detailed study shows us that the three journals *Biochemical Pharmacology*, *European Journal of Pharmacology* and *British Journal of Pharmacology* are both the most highly cited according to ISI and ordered from the INIST-CNRS. These journals are really important in pharmacology which is the main discipline in pharmacy. So, a very great number of researchers in companies and public institutions are interested in these prestigious pharmacological journals and will be likely to order copies of their articles. Moreover, these journals are very frequently published (*European Journal of Pharmacology* is published 52 times per year which gives about 800 articles, *British Journal of Pharmacology* is published 24 times per year which gives about 600 articles, *Biochemical Pharmacology* is published 24 times per year which gives about 400 articles) which leads to a very great number of articles being potentially both cited and ordered.

On the other hand, the two other journals of Group 1, International Journal of Pharmaceutics and Drugs are not very much cited according to ISI in relation to their very high number of orders from the INIST-CNRS. We can explain this phenomena by the fact that International Journal of Pharmaceutics publishes articles about pharmaceutical formulation and production for which researchers have a very little number of journals. So in this field, orders of articles are concentrated in these few journals. Moreover, International Journal of Pharmaceutics is frequently published (24 times per year which gives about 400 articles) and is very expensive (annual institutional subscription rate is about \$6400). So, copies of the articles of this journal are very often ordered because a very little number of institutions can subscribe it. Finally, as seen in part 2, pharmaceutical companies which represent the great majority (70%) of the demands of articles are very interested in the field of pharmaceutical formulation (manufacturing process of tablets, capsules, perfusions, syrups...^o) which is the step just before the marketing of drugs. For the fifth journal, Drugs, the explanation is different in that the small number of citations, in comparison with the other journals of Group 1, is due to the fact that this journal is not frequently published (15 times per year). So, the number of articles published is much less important (200) which explains that they are less cited than articles of the four other journals of Group 1. This trend is confirmed by the fact that the impact factor of Drugs (about 4) is higher than the impact factor of the other four journals (from 1 to 3,7).

In the pharmaceutical field, and for our sample, it is clear that there is a relationship between orders from the INIST-CNRS and the number of citations given by ISI.

4. Relationships between orders for journals from the INIST-CNRS and their indexation in bibliographic databases

4.1 Indexation of journals in bibliographic databases

It can be seen that the bibliographic databases (see 1.3) which index the highest numbers of European pharmaceutical journals as defined in this study are IPA (120/289, or 41%), Chemical Abstracts (124/289, or 43%) and Embase (119/289, or 41%), well ahead of Biosis (81/289, or 28%), Medline (74/289, or 26%) and Current Contents (61/289, or 21%). These results seem logical since IPA, by definition, is a specifically pharmaceutical database, and it is well-known that Chemical Abstracts covers the pharmaceutical sector very widely. Even though these databases are of American origin (apart from Embase), it can be seen that European journals are certainly not under-estimated. Moreover, it can be seen that Embase, as a European database, largely and logically outclasses Medline for indexation of these journals.

Furthermore, it can also be seen that at least two-thirds of the European pharmaceutical journals listed in each of the bibliographic databases taken into account in this study are ordered from the INIST-CNRS.

The first three databases, which logically supply the highest number of titles ordered from the INIST-CNRS, compared to all of the 149 journals (Groups 1 and 2), are also Embase (101/149, or 68%), Chemical Abstracts (94/149, or 63%) et IPA (77/149, or 52%). This confirms that the INIST-CNRS possesses a stock of documents which corresponds well to these bibliographic databases which are widely used by researchers, and which is summed up in the graphs below.

The two figures 5 and 6 present, in percentages, to make the comparison easier, the two breakdowns arising from the above. There is a correspondence between the coverage of the journals in the databases and the orders from the INIST-CNRS.

“Insert figure 5 and figure 6”

Conversely, if consideration is given to the percentage of journals in these databases which are ordered from the INIST-CNRS, those listed by Current Contents (56/61, or 92%), Medline (64/74, or 86%) and Embase (101/119, or 85%) are proportionately more often ordered from the INIST-CNRS. This shows that these three databases concentrate their indexations on the most significant journals.

The five journals most frequently ordered from the INIST-CNRS (Group 1) are taken into account by all of the databases, except for the IPA database which lists only three out of five. This does indeed confirm that these journals are fundamental for the pharmaceutical field.

Concerning the coverage of the journals of Group 2 by the bibliographic databases, here again two categories can be distinguished: the first category consisting of the bibliographic databases which list more than 50% of the 144 journals ordered at least once from INIST-CNRS (Embase 96/144, or 66,7%, Chemical Abstracts 89/144, or 61,8% and IPA 74/144, or 51,4%); the second category those which list less than 50% of the journals ordered at least once from INIST (Medline 61/144, or 42,4%, Biosis 59/144, or 41,0% et Current Contents 51/144, or 35,4%).

Concerning the bibliographic coverage of the journals of Group 3, IPA (43/140, or 30,7%), Chemical Abstracts (30/140, or 21,4%) and Embase (18/140, or 12,9%) still cover the highest number and thereby demonstrate once again their good coverage of European pharmaceutical journals.

4.2 Relationship between indexation of journals in bibliographic databases and orders from the INIST-CNRS

In order to study this relationship, a count was made of the number of bibliographic databases (from 0 to 6) in which each journal is indexed. In order to know if, for the 149 journals ordered to the INIST-CNRS, there is a relationship between orders and indexation in databases, we first studied the correlation, as in part 3.2, between number of orders and number of indexations in bibliographic databases. There was no correlation. So, we proceeded differently. The 149 periodicals were classified according to the number of indexations in the databases. Then for each value (see Table II) the average number of orders for each category of journals was calculated.

“Insert table II”

“Insert figure 7”

The histogram of figure 7 shows a group of 43 journals indexed in five or six databases, which have a high number of orders. Thirty eight journals out of these 43, or 88%, are journals indexed by the ISI (see Appendix 1), which is not surprising because we know that 87.5% of orders come from the 60 journals of our sample indexed by the ISI (see table I). All these journals are at least one time indexed in one of the six bibliographic databases (see Appendix 1). It must be noted that 22 journals (out of the 60 indexed by the ISI), or 37%, are indexed in four or less than four databases. These two results confirm the predominance of the ISI.

Conclusion

This study shows that there is a possible relationship between impact of the European pharmaceutical journals, as measured by ISI's Journal Citation Reports, and the number of orders from the INIST-CNRS. We have observed that the bulk of the orders or article copies comes from pharmaceutical private laboratories which represent the industrial sector dedicating the most important budget to research in France. So, public financing being less than 1% of all pharmaceutical research financing, this well confirms that pharmaceutical research is not being driven by disinterested academic researchers. This link was previously observed in the case of another important European document supplier, the British Library (Scales, 1976) and more recently at the INIST-CNRS (Salaun, Lafouge and Boukacem, 2000) but in both these cases the sample selected consisted of the 50 most frequently ordered documents.

The link found in this present study is the more significant in that the constitution of the sample of journals analysed is European and thematic. A priori, the constitution of the sample was independent of the selections made by the INIST-CNRS and by the ISI, and the results analysed are unbiased.

The indexation of European pharmaceutical journals indicates that the present sample is well covered by the large bibliographic databases and that the INIST-CNRS has a document stock which corresponds to these.

Without going so far as to say that the present sample is representative, it is well indexed in the great pools, meaning both the document suppliers and the databases. However, although demand and indexation are linked, citation and indexation are not, the logic here being different. To extend this study three directions would be interesting:

- work with editors as the basic entity, instead of individual journals,
- study orders at the level of interlibrary loan ,
- extend our research to the corresponding pharmaceutical e-journals.

¹ INIST-CNRS : 2 allée du Parc de Brabois, 54514 Vandœuvre-lès-Nancy Cedex.

Web : <http://www.inist.fr>

² JCR : Journal Citation Reports of the Science Citation Index produced by the Institute for Scientific Information (ISI). Web : <http://www.isinet.com/>

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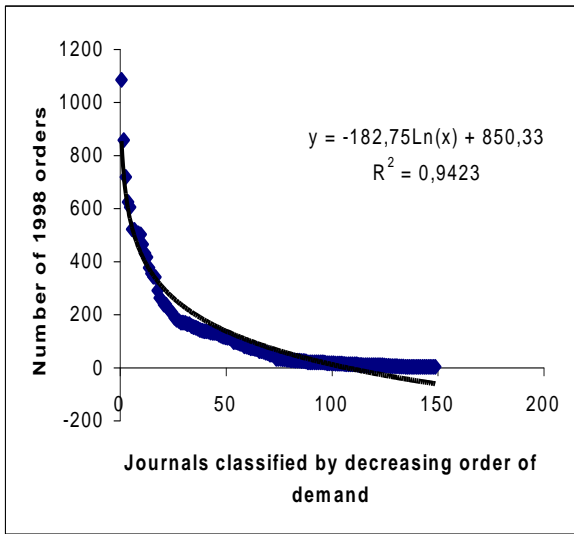


Figure 1: Distribution and adjustment of orders from INIST-CNRS in 1998

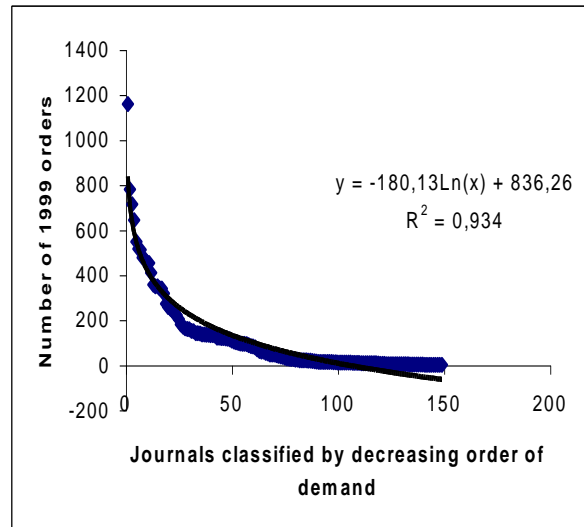


Figure 2: Distribution and adjustment of orders from INIST-CNRS in 1999

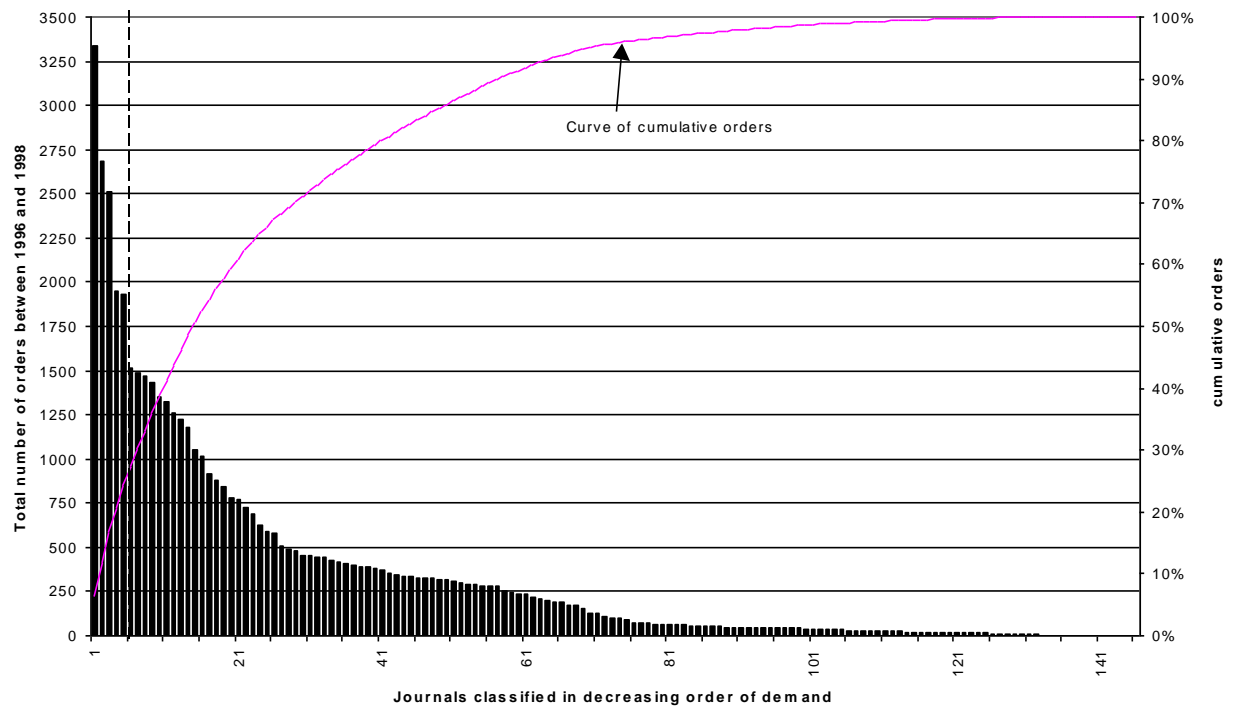


Figure 3: Total numbers of orders of our European pharmaceutical journals sample. Data are issued from the INIST-CNRS for 1996, 1997 and 1998.

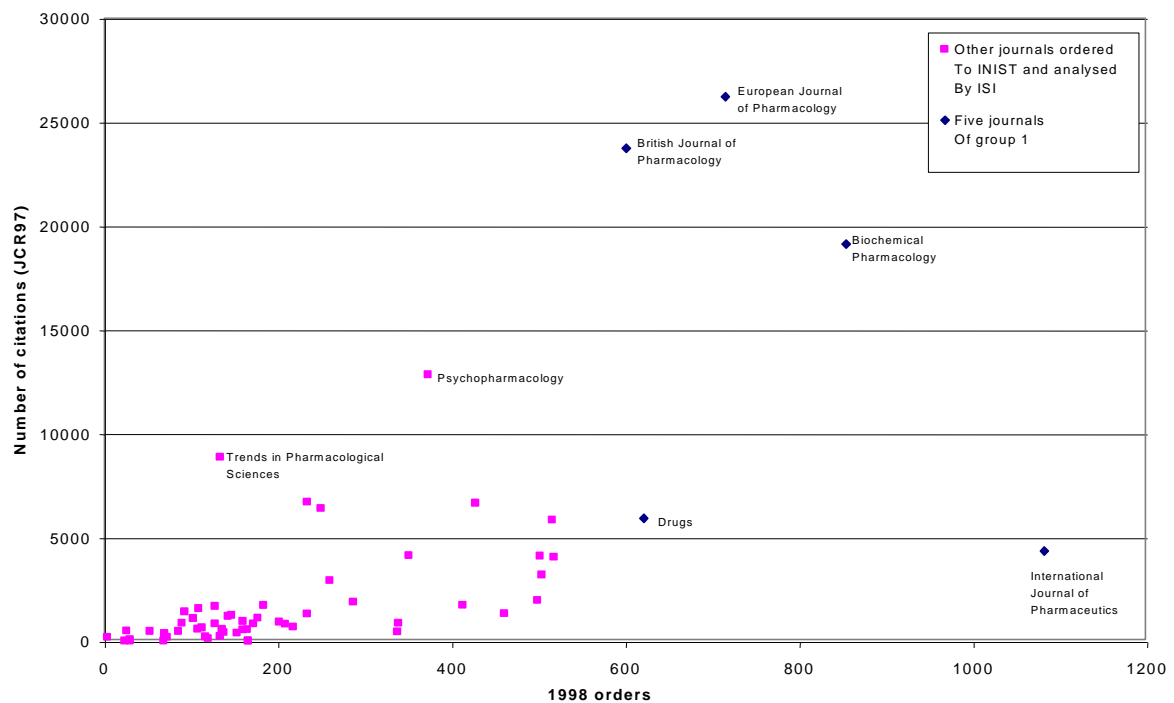


Figure 4 : Correlation between 1998 orders of our European pharmaceutical journals sample and number of citations in JCR 1997; Data are issued from the INIST-CNRS and ISI.

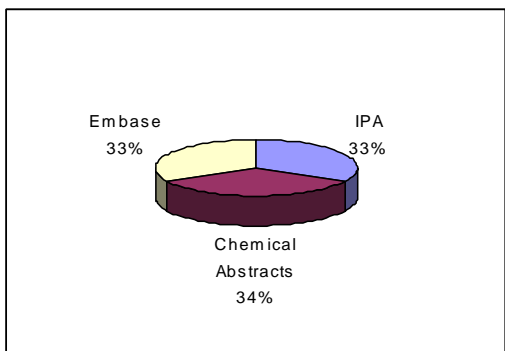


Figure 5: Breakdown of the coverage of the 289 European pharmaceutical journals of our sample by the three leading bibliographic databases

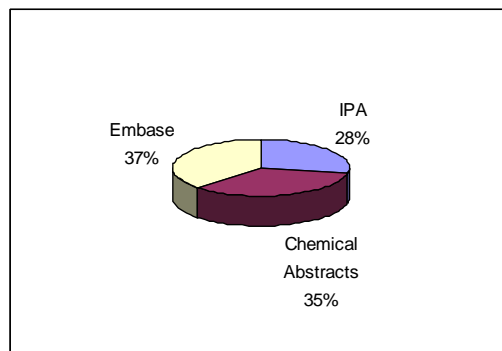


Figure 6: Breakdown of the coverage of the 149 European pharmaceutical journals ordered from INIST-CNRS by the three leading bibliographic databases

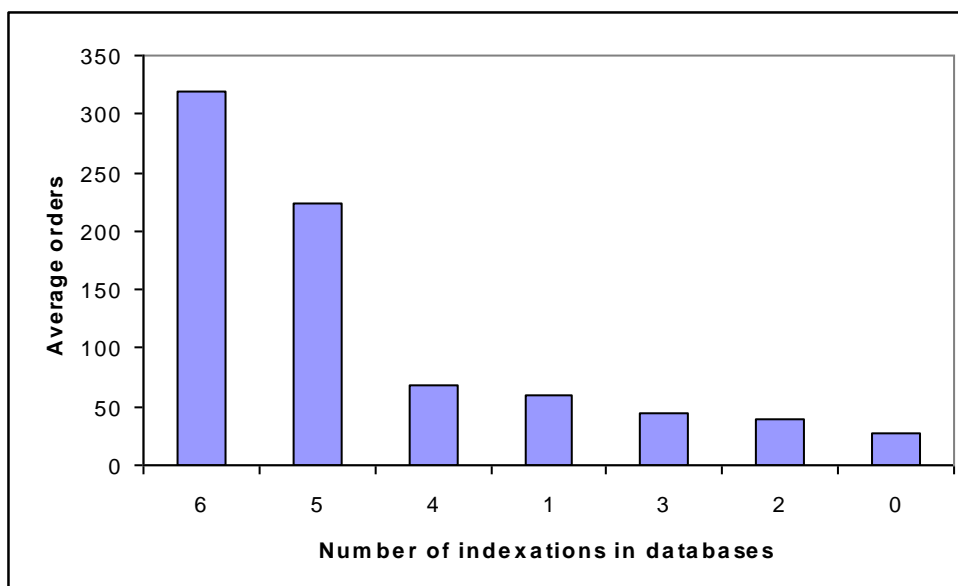


Figure 7: Average of orders for European pharmaceutical journals as a function of, indexation in databases

Table I: Comparison “ordered from INIST-CNRS indexed by ISI”

	Indexed by ISI	Not indexed by ISI	Total
Ordered from INIST-CNRS	60	89	149
Not ordered from INIST-CNRS	0	140	140
Total	60	229	289

Table II: Average orders in 1998 for all of the journals ordered from INIST as a function of numbers of indexations in bibliographic databases

Number of Indexations in databases	Journals Total 149	Average orders
0	18	27.8
1	22	59.3
2	19	39.2
3	25	44.2
4	22	67.7
5	24	223.2
6	19	319.7

Appendix 1
Main characteristics of the 60 European pharmaceutical journals
analysed by ISI and arranged by number of orders

N°	ISSN	Title of journal	1998 Orders	1997 Citations	NB BIBLIO DB ³
1	0378-5173	INTERNATIONAL JOURNAL OF PHARMACEUTICS	1082	4347	6
2	0006-2952	BIOCHEMICAL PHARMACOLOGY	854	19121	5
3	0014-2999	EUROPEAN JOURNAL OF PHARMACOLOGY	715	26224	5
4	0012-6667	DRUGS	621	5914	6
5	0007-1188	BRITISH JOURNAL OF PHARMACOLOGY	601	23729	6
6	0031-6970	EUROPEAN JOURNAL OF CLINICAL PHARMACOLOGY	518	4028	5
7	0306-5251	BRITISH JOURNAL OF CLINICAL PHARMACOLOGY	516	5816	5
8	0004-4172	ARZNEIMITTEL-FORSCHUNG (DRUG RESEARCH)	504	3173	6
9	0022-3573	JOURNAL OF PHARMACY AND PHARMACOLOGY	502	4088	6
10	0269-2813	ALIMENTARY PHARMACOLOGY AND THERAPEUTICS	499	1950	4
11	0031-7144	PHARMAZIE (DIE)	461	1311	6
12	0305-7453	JOURNAL OF ANTIMICROBIAL CHEMOTHERAPY	428	6633	1
13	0731-7085	JOURNAL OF PHARMACEUTICAL AND BIOMEDICAL ANALYSIS	413	1724	6
14	0033-3158	PSYCHOPHARMACOLOGY (BERLIN, GERMANY)	373	12812	5
15	0163-7258	PHARMACOLOGY AND THERAPEUTICS	351	4116	6
16	0169-409X	ADVANCED DRUG DELIVERY REVIEWS	339	857	3
17	0040-5957	THERAPIE	338	435	6
18	0306-3623	GENERAL PHARMACOLOGY	287	1875	5
19	0344-5704	CANCER CHEMOTHERAPY AND PHARMACOLOGY	260	2909	4
20	0028-1298	NAUNYN-SCHMIEDEBERG'S ARCHIVES OF PHARMACOLOGY	250	6375	5
21	0028-3908	NEUROPHARMACOLOGY	234	6691	6
22	0268-1315	INTERNATIONAL CLINICAL PSYCHOPHARMACOLOGY	234	1295	2

³ NB BIBLIO DB: number of bibliographic databases analysing the journal.

23	1043-6618	PHARMACOLOGICAL RESEARCH	218	666	5
24	0378-8741	JOURNAL OF ETHNOPHARMACOLOGY	209	805	6
25	0365-6233	ARCHIV DER PHARMAZIE	202	907	6
26	0901-9928	PHARMACOLOGY AND TOXICOLOGY	184	1710	5
27	0955-8810	BEHAVIOURAL PHARMACOLOGY	177	1101	1
28	0959-4973	ANTICANCER DRUGS	172	819	3
29	0031-6865	PHARMACEUTICA ACTA HELVETIAE	166		4
30	0261-2048	JOURNAL OF MICROENCAPSULATION	166		5
31	0142-2782	BIOPHARMACEUTICS AND DRUG DISPOSITION	165	540	5
32	0379-0355	METHODS AND FINDINGS IN EXPERIMENTAL AND CLINICAL PHARMACOLOGY	160	538	5
33	0176-3679	PHARMACOPSYCHIATRY	160	935	4
34	1011-0283	SKIN PHARMACOLOGY	153	379	3
35	0031-7012	PHARMACOLOGY	147	1237	5
36	0278-5846	PROGRESS IN NEURO-PSYCHOPHARMACOLOGY AND BIOLOGICAL PSYCHIATRY	143	1192	5
37	0378-7966	EUROPEAN JOURNAL OF DRUG METABOLISM AND PHARMACOKINETICS	138	411	6
38	0014-827X	FARMACO	136	555	6
39	0165-6147	TRENDS IN PHARMACOLOGICAL SCIENCES	134	8842	4
40	0867-5910	JOURNAL OF PHYSIOLOGY AND PHARMACOLOGY	134	228	1
41	0009-3157	CHEMOTHERAPY	128	821	5
42	0960-314X	PHARMACOGENETICS	128	1671	3
43	0928-1231	PHARMACY WORLD & SCIENCE	120	107	1
44	0269-4727	JOURNAL OF CLINICAL PHARMACY AND THERAPEUTICS	117	199	6
45	0269-8811	JOURNAL OF PSYCHOPHARMACOLOGY	113	633	1
46	0003-9780	ARCHIVES INTERNATIONALES DE PHARMACODYNAMIE ET DE THERAPIE	109	1547	5
47	0767-3981	FUNDAMENTAL AND CLINICAL PHARMACOLOGY	108	567	5
48	0223-5234	EUROPEAN JOURNAL OF MEDICINAL CHEMISTRY	103	1071	1
49	0192-0561	INTERNATIONAL JOURNAL OF IMMUNOPHARMACOLOGY	93	1399	5

50	0362-4803	JOURNAL OF LABELLED COMPOUNDS AND RADIOPHARMACEUTICALS	90	854	3
51	0753-3322	BIOMEDECINE AND PHARMACOTHERAPY	86	458	5
52	1157-1497	STP PHARMA PRATIQUES	73	183	1
53	0885-6222	HUMAN PSYCHOPHARMACOLOGY	70	347	3
54	0251-1649	INTERNATIONAL JOURNAL OF CLINICAL PHARMACOLOGY RESEARCH	69		5
55	0931-8771	QUANTITATIVE STRUCTURE-ACTIVITY RELATIONSHIPS	53	461	4
56	0378-0619	ACTA THERAPEUTICA	30	73	3
57	0952-0600	PULMONARY PHARMACOLOGY	30		4
58	0144-1795	JOURNAL OF AUTONOMIC PHARMACOLOGY	26	485	5
59	0379-8305	DEVELOPMENTAL PHARMACOLOGY AND THERAPEUTICS	24		5
60	0736-0118	MEDICAL ONCOLOGY AND TUMOR PHARMACOTHERAPY	4	183	5