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Paperless administration and international business integration:

The transition of the patent system from 1960 to 2000

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OBJECTIVE

For hundreds of years, international business cooperation was based on the communication and storage of information on paper. To some extent, the mode of communication changed with the introduction of technical innovations such as the telegraph, the telephone and telex. However, the real change happened when both the communication and the storage of information switched from paper to computers. This upgrade had comprehensive consequences as business partners could now have their companies act as a unit in a hitherto never seen integration of international business despite great geographical distances between its members.
This development is reflected in the history of the administration of the international patent system.

After several years of planning, the new headquarters for the *Institut International des Brevets* (IIB) was inaugurated in 1972. IIB in English, *the International Patent Institute*. The headquarters were located in the Netherlands; however, the office handled patent searching and archiving for other countries, including France, Belgium and Luxembourg.

The building was enormous. In total, the office extended over 55,000 m^2. In the centre of the 24-storey high tower building was stairs allowing the examiners access to the necessary archives. Lorries transported the archives to the building, and the number was expanded each year. The office merged with the European Patent Organisation (EPO) in 1978, and the growth continued. In 1984, the archive contained more than 16,000,000 documents. The building had enforced construction to hold the 800 metric ton weight of the documents.

Since then, the number of patents has skyrocketed. Whereas around 400,000 patent applications worldwide were accepted in 1985, the number today has quadrupled to 1,592,000. At the same time, the description of each patent has become more extensive. An archive for this and other necessary tools for patent examiners would have demanded a tower building more than 100 m high.

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Today, everyone has all this information in their pocket. Thanks to longstanding work, we have mobile phone access to a database with almost all patents issued worldwide. This database includes not only the newest patents, but the oldest ones as well. Free access is given through Espacenet (handled by EPO), through the World Intellectual Property Organization (WIPO), Lens.org and Google Patents. In addition, existing commercial services have an improved registration for the growing content. All technical knowledge described in the patent descriptions is available to everyone. It is free and can be accessed anywhere and at any time with a phone connection and at all times of the day.

This changing access to knowledge is dramatic. From a situation where knowledge was reserved for a very narrow circle of people or at least included a costly fee to a patent agency or travel to a specialised library, now everybody in the world can access the databases for free. Furthermore, they can work with new tools when searching the database. They can search for words in the total archives, rather than look for documents through a cumbersome classification system.

This paper will show some aspects of the transition in the patent business with a specific focus on the years with the most overwhelming development. How was the transition made from paper to bits and bytes in international business? What

were the consequences for work, local organisations and international business integration?

The patent examiner

In the patent creation process, the patent examiner is the most important person next to the inventor. The mentioned archive in The Hague was for him. His job is similar to the job of experts working at patent agencies. Therefore, this chapter will also give a glimpse of this skill.

Examining a patent application is the first step following some bureaucratic registration procedures. This process is to secure that it is a brand new item never seen anywhere in the world. In the patent business, this is referred to as a search for 'prior art'. The second important step in handling an application is to make a judgement on if it is an inventive step. If an experienced person could make this invention independently, it would not be an invention. The third criterion is that it should be applicable. Good ideas on an eternity machine would only be accept-

The patent examiner is the central person in the evaluation of inventers ideas. This picture is from the 1980s, when paper still was the information media (IIB/EPO, The Hague).

ed if this machine could be constructed. When the application gets a positive decision on all three steps, the examiner communicates with the applicant to bring the application into line with the legal requirements. The patent description needs to be written in the precise language and thoroughly enough for a person skilled in the area to carry it out and follow the legal rules, for instance, if similar inventions are close to being applied for.

It is like finding a needle in a haystack to find similar patents among so many documents. It only takes one single similar patent to 'kill' the application. More than 16 million documents (that describe approximately half the number of inventions thanks to duplicate records)[1] is an enormous amount, but an efficient tool has been developed: a classification system. An essential part of the investigation is to decide to which classification group the patent should belong. A thorough analysis of the patent description gives the examiner his best fit in determining the correct group. Several classification systems exist. International Patent Classification (IPC) is an international standard for the classification of patents, and all patents from the connected countries must have such a number.

The examiner finds the correct classification code. The classification system comprises a hierarchical system of language-independent symbols for classifying patents according to the different areas of technology to which they pertain. The present system divides technology into eight sections with approximately 70,000 subdivisions. In the 1980s, there were 65,000 subdivisions, but with the developing technology, new subdivisions constantly needed to be added as new technical fields emerged. To supply this system, an extension, the Cooperative Patent Classification (CPC) was built on the IPC. With 250,000 classification entries, a narrower determination of a topic is now possible.

In the 'old' paper days without computers, the examiners had to order or go to the archives to retrieve documents within the chosen subdivisions. Some patents could cover several technologies, and therefore there were several subdivisions. Then the title and perhaps the abstract had to be read carefully ; patents close to the patent application should be read closely.

If no single patent in the haystack of patents was close to the patent application, it could still be rejected if the idea had been 'made available to the public anywhere in the world utilising a written or oral description, by use, or in any other way'.[2] This means that mentioning the idea in a book or journal could result in refusal of the application. Therefore, the examiner needs to look for this possibility, and the patent office needs to have a well-stocked library. The annual growth of the EPO library around 1980 was 20,000 books, 1,200 journals, 58,000 articles and 140,000 patent abstracts from Japan and Russia.[3]

Examiners are highly specialised workers. They are specialists in their field with education on a level with a master's degree. In addition to this education, the examiner needs to learn the job through internal courses and intense training. To handle the job is a very narrow specialisation necessary. A full-blown patent office should, therefore, be maintained by a rather large group of workers. The Danish patent office stated in 1989, that it had a minimum staffing of 50-60 examiners.[4]

The following description was used to depict the examiner : 'a skilled person who was easy to classify – a universal mind, a mega genius, a virtuoso for impossible combinations, in short, a sort of E. T., an extraterrestrial with a human face.'[5]

A need for rationalisation

Technical development occurred rapidly in the years after the end of World War II. By 1951, the number of patents had exceeded the highest amount before the war. The growth continued, and in 1967 the number of issued patents doubled that of 1932, the most productive year before the war.

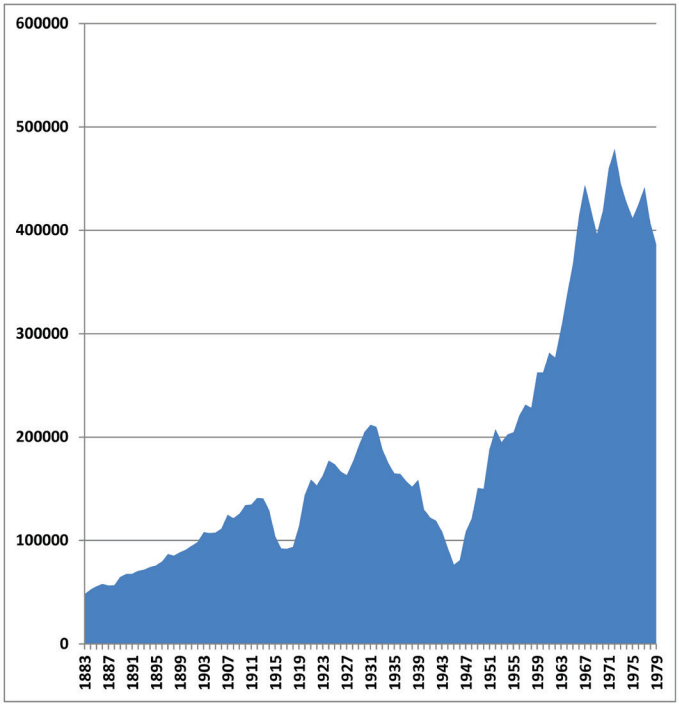
In parallel, the increasing complexity of applications burdened the examiners. One side effect of the growing complexity was that the patent descriptions became longer and increased the need for storage space. In the USA, the average length of a patent was around eight pages in 1966, but after a 'deferred examination' system was introduced in Germany and the Netherlands, these patents expanded to 15 pages. In 1982, the average size of patents had increased to 16 pages, except for those published by Japan and the United Kingdom.[6]

Such growth created challenges for the patent offices and often caused significant delays. In addition, the processing time for a patent was extended, partly because there were built-in deadlines to file an appeal. For instance, in 1986, the Danish patent office had 40,000 applications waiting to be processed. The average time for a patent to be processed was around 7.5 years. The office had only one terminal for online searches, and possible help from the outside was limited.[7]

The growth was caused not only by technical development. The business world had changed due to internationalisation and more extensive production facilities were needed for the larger markets. Therefore, it became necessary for more countries to patent inventions. This development created a new burden to the national patent offices when they needed to process applications that were granted from countries with foreign languages.

It became a mantra for the national patent offices to rationalise the situation. Typically, the leading officers from some of the largest patent offices (EPO, United States Patent and Trademark Office and the Japanese Patent Office) would present their respective office's plan for an 'automation program'[8] at conferences.

As explained later, classification is the central tool in the world of patents. There was a vast amount of work could be saved as a result of international cooperation. The preparation was organised through the International Patent Classification (IPC) after an agreement in 1971 and administered by WIPO.



The number of patents in the world increased dramatically after the 1940s. It presented challenges and a desire for rationalization in the patent system (WIPO database).

The central building in the modern patent office in The Hague enaugurated in 1972 was the 24 story tall tower. It was filled with paper archives for the many patent examiners (IIB/EPO).

The classification system was updated regularly after intensive committee discussions. In 1982 the system had over 55,000 subdivisions, but the technical development continued; however, the updating process was delayed. Therefore, several patent offices invented their own unofficial subdivisions for their search files in areas of newly emerging technologies. The leading officer in WIPO asked at that time for a faster monthly update instead of the more extended total revision.[9]

In parallel there was a development to strengthen international cooperation, and this cooperation provided a rationalisation. In continuation of a large number of conventions, the European Patent Convention (EPC) in 1973 provided the basis for the EPO. This patent office was given an autonomous legal system to assign European patents. The patent system in Europe is still based on the national patent offices, and if the national law of the State permits, EPO can take effect. Since 1977, EUropean patents have been granted via a single, harmonised procedure. In 2022 almost all European countries have accepted this convention.

The general rationalisation of offices

The patent business benefitted from the general improvement of the office work. The transition from typewriters to word processing on computers is obviously a big improvement. The gain from this was probably 60% on the printing of patents.[10]

Another essential part of the patent office work was the record filing. The introduction of computers represented an enormous savings in work. The Japanese patent office is a fine example of this rationalisation. Before the use of computers, record filing was written on paper in 'adjust books'. One book was 3 cm thick and could handle 3,000 applications. One hundred of those books had to be maintained and updated. The number of applications reached 600,000 in 1984, and without computers, 1,600 books were needed to keep track of all the applications. The total thickness of the books would have reached 48 m. Registering incoming and outgoing papers would have resulted in 15,000 actions a day.[11]

Thanks to a very detailed classification system, the employees of a patent office were able to find the right patent descriptions. Today, everyone around the world has patents in their pockets, as there is free access to advanced databases via their mobile (IIB/EPO)..

Finding patents through the classification

The justification was, to a large extent, based on the technical development within the office sector. The following description shows how the relatively wealthy patent business was often a forerunner in using new technology. In spite of this, the transition to complete digitalisation took around 40 years and several generations of computer technology. Sometimes legal issues or national political protections hindered the fast development of specific areas.

The first use of computers at patent offices is unknown. In the Netherlands, punch cards were used when the physical interior design of the computer room was sparse. The examiners were disturbed by the noise from the mechanical sorting of punch cards. An examiner remembers this pioneering time: 'The card sorter in our little room made such a noise that we had to cover the walls and ceiling with egg boxes to absorb the noise'.[12] In Japan, the first computer system was introduced in the Japanese Patent Office in 1964.[13] For many years the processing of punch cards and later accessing the information on magnetic tape was made through a batch process. The task was described to the computer team, and after some hours or days, the result on a paper printout could be returned.

This batch process was expected when the EPO building was planned in the 1970s. It was not planned that the examiners would have terminals. This situation had changed when the building was built in the 1980s.[14] Even in the most significant administrations, the internal use of computers was for a long time left to central computers. At WIPO, the use of computers was entirely a batch system until 1986, with questions answered the following working day, and it took many more years before a fully interactive online system was introduced.[15]

The US Patent Office conducted very early experiments with developing techniques of data manipulation and file organisation. Still, their point of view did not coincide with that of their collaboration partners in private industry and academia. Systems developed for examiners in one discipline were unusable in other areas. At the same time, the task was enormous. In most areas, the procedure only handled tens of thousands of documents, while a patent office deals with hundredfold that amount. The US system had a rather complex classification system with 300 major classes and about 60,000 subclasses, which targeted their specific issues.[16]

The problems were too many and too great for the US Patent Office. When other national patent offices experienced the same problems, the US Patent Office proposed a cooperative effort. In 1961, the International Patent Office Workshop on Information Retrieval took place in Washington. Many patent offices agreed with the idea of a permanent institution. In 1962, the Committee for International Cooperation in Information Retrieval Among Examining Patent Offices (ICIREPAT) was established as an informal organisation with members from patent offices around the world. They were to act as experts rather than authorised representatives from their respective countries.

Uniform procedures and standards were necessary to secure the exchange of information. Among the many issues were rules for numbers to identify various types of bibliographic data appearing on the first page of patents.

Standards for the technical tools were developed too. The first media was the 80-column punch card. The experts recommended the system in a standard layout using direct coding, standard procedures for revising and updating decks of cards and standard coding sheets.

The magnetic tapes with both 7 and 9 tracks tapes got standards too—this standard described tape characteristics, labelling, file organisation, etc.

One of the more specialised tasks was a standard for the so-called 8-up aperture card. They looked like the standard punch card but had a place for a microform with eight photographic images. Later came to a discussion about the standardisation of other microforms to investigate the possibility of replacing paper copies of patent documents with those microforms to secure an international interchange.

The unofficial status did not last long. In 1967, the World Intellectual Property Organization (WIPO) was established. This global forum for intellectual property services was located in Geneva, and established as a self-funding agency of the United Nations. INPADOC was transformed into a committee of experts and was administered through a secretariat at WIPO. The name was unaltered.

The project, 'Shared Use Program', went into detail about specific fields of technology. In 1978, there were 30 fields of technology in development, and each field was anchored in a country. For example, the topic Lasers and Masers originated in Great Britain, Analog and Digital Convertors centred in the Netherlands and Organometallics was coordinated from the United States.

Distribution of information

For generations, the distribution of knowledge had been on paper. Each week the national patent offices received cases with patents from selected countries. In addition, their libraries received reference books and abstracts of patents and articles in scientific journals.

The new technologies gave ideas of systematic distribution of other media from the late 1960s. This was systematised in 1972 with the establishment of International Patent Documentation (INPADOC). The vision was to distribute all of the patent documents in the world. In practice, not all patent offices delivered the complete text, while some only gave the main data. Because of language barriers, patents from the Soviet Union and Japan were distributed only with their main data in English.[17] After some years the most important patent offices and even those in small countries delivered magnetic tape with the data to Austria.[18]

INPADOC was situated in Austria because the Austrian government, thanks to an agreement with WIPO, took the initiative to make INPADOC act as a commercial business. The database was not only helpful for all the national patent offices but for private business as well. The largest companies who applied for many patents and patent agencies received a subscription to the service. INPADOC became a significant company. It became integrated into the EPO in 1991, and its 50 workforces were included in the organisation.[19]

In principle INPADOC provided information access for free. The users had to pay only marginal costs for distribution and administration. From the late 1980s, CD-ROMs were used as the distribution media. In those years, governments in many countries' initiatives promoted better and more extensive use of IP rights and patent information as an integral part of business development and strategy. A network of patent information centres were established (PATent LIBrary) in Europe, and in the late 1980s, around 300 centres received two CD-ROMs each week.[20]

The CD-ROM was an acceptable medium for distribution, but it had one bottleneck: its limited storage space of 550 MB. It could not handle the large databases on one disk. For instance, 35,000 German patent descriptions with drawings led to some 5.5 GB of data. With the CD-ROM technology in 1987, this database would need 25 CD-ROMs.[21]

Distribution of full text

The distribution of drawings was essential for the serious handling of patent investigations. Databases on CD-ROM or online could only carry text for a long time.

The mentioned standard for 8-up aperture cards was around 1966, and this was seen as the only suitable 'unit document record' for patents. Many countries introduced the system.[22]

In the USA, the national patent office could send out its patents on microfilm. The space savings made it possible to include a significant number of libraries into the offices' program for the distribution of knowledge. In the same year, chosen libraries received free access to the patent office's search database named Classification and Search Support Information System (CASSIS). Keyword searching in the titles of classifications provided the current classifications of any US patent issued dating back to 1790. The search was cumbersome through a dump terminal and a coupler modem. The use was a success, but the program's growth halted as the additional cost of offering the service for free could no longer be sustained by the patent office. Instead a distribution of the system on CD-ROM was developed in 1988. This enabled the libraries to use the CD-ROM on a personal computer.[23]

The online system from the US patent office dated back to 1995 using a fee-based scenario. The libraries could now access the Automated Patent System (APS) in a text-only version.

In 1989, the EPO issued its first Electronic Storage of Patent Applications from EPO on CD-ROM (ESPACE CD).[24] Six times a year subscribers received the CD-ROM containing bibliographic data and the complete image of all international applications published in pamphlet form. Another issue was the CD-ROM ESPACE-FIRST, which, beginning in 1988, was also published six times a year. It contained bibliographic data and complete facsimile image of the first page of each international application published during the two preceding months.[25]

The new media CD-ROM gave ability to not only distribute text but also drawings.

Online distribution

Commercial businesses were pioneers in the distribution of knowledge online. The Chemical Abstracts Service (CAS) database was of particular interest to the patent offices and big businesses., as this was their first introduction to the new area. The database was published by CAS, which became a self-supporting division of the American Chemical Society in 1956. It pioneered the use of computers for information services. In 1966 it devised an automated processing system through a computer-readable database. In 1980, CAS ONLINE was launched, making it possible for users to search the CAS registry database. Specific graphic terminals could select structure features from a menu and assemble them on the terminal monitor.[26] This

Storing information on magnetic tape was a big step forward. Later, systems with robots a la jukebox came to find information within 5-10 minutes. The previous batch run with hours or days of waiting time was obsolete. The picture is from a computer room with eight robots at EPO in The Hague.

could be used at patent offices through an early PC linked to CAS via an acoustic modem.[27]Databases for other sectors are INSPEC services in the electrical and physics sectors, MEDLINE in the medical industry and AGRIS in the agricultural and food sectors.[28]

The local patent offices constructed their own databases and made this available for use by others. EPO had four databases for the internal needs of the EPO, and around 1981, the first of these were made available. This was the European patent (application) register database, where the connection functioned through the network EURONET.[29]

People believed that patent offices, with their knowledge of the most cutting-edge technology, should be a forerunner in online distribution. This was not the case for several reasons, one of which was security. In 1996, the internet had grown to be an essential source of information, and the first article on its use was published in the leading journal, *World Patent Information*.[30] EPO tested the use of the internet to search for documentation. The examiners could soon use the internet and lawfully cite what they found in their search reports. First, in 1998, the EPO established its patent database ESPACENET on the internet. Soon all patent applications filed in 18 European nations became accessible.[31]

This service has increased in volume and later began receiving supplements from other patent databases. WIPO has a similar service, and other free services, with a focus on easy access, have been established by Google Patents and Lens.org.

Online publishing of patent information has been taken up by private content providers that have fine-tuned the search process together with aids to get other information, for instance, through thematic access via different systems. They delivered special retrieval features, such as chemical structure search, bio sequence search and visualisation of information flow. In 2000, three large companies were active in the market: STN International, DIALOG and Questel-Orbit. They were based on patents from the previously mentioned INPADOC and WIPO/PCT registration and the Derwent database of 13.5 million patents (today under the company Clarivate). It is a database on patent families, for which many double registrations have been avoided.[32]

Consequences for patent offices

The effect of the new technology was impressive. It resulted in higher productivity for examiners. It is not easy to measure exact extensions because of other factors, such as the rising complexity of the patents during the same time period. EPO aimed to increase its productivity by more than 10% between 1997 and 1999.[33]

The Danish patent office had an aim in the middle of the 1980s to rationalise the new technology with a gain of 30%. This rationalisation was not achieved through new technology alone but by new ways of organising the work.[34] In the middle of the 1990s, there was an increase estimated at 15%.[35]

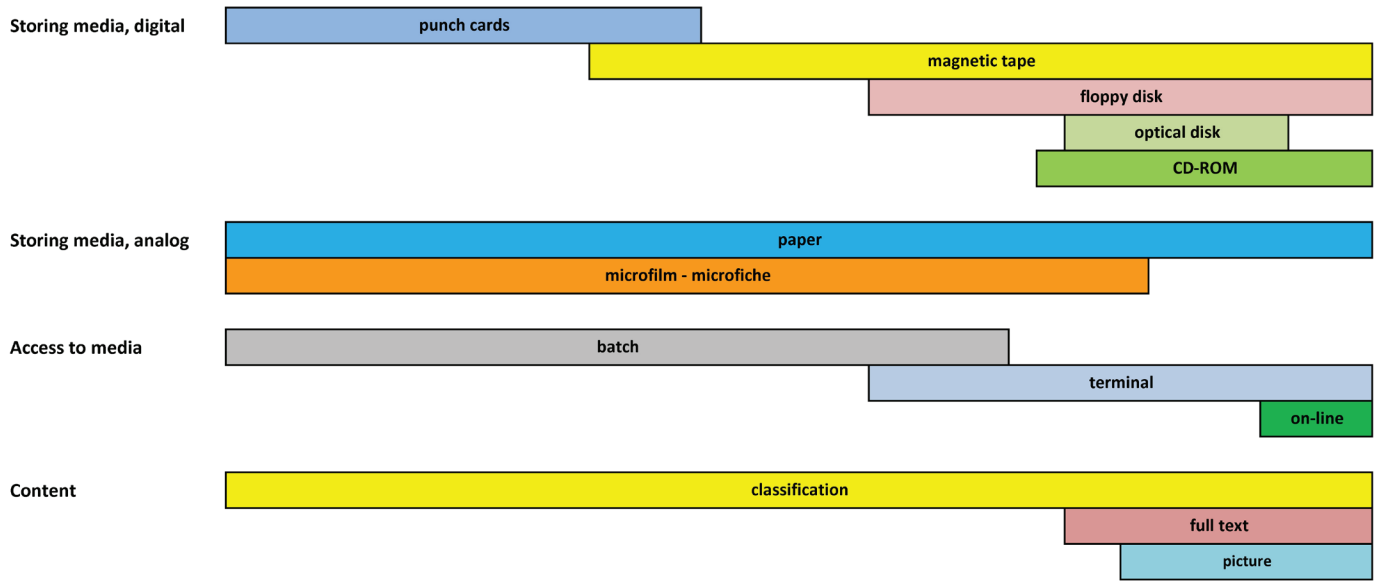
In the 1980s, examiners held several demonstrations, strikes and other sign-on conflicts both at EPO and at the local patent office in Denmark. It is not clear if the cause was a result of the changed working conditions created by the new technology.

The easy distribution of information saved a lot of work for the examiners when a patent was applied for in another country. In 1984, examiners believed that they would be able to reuse the complete classification allotted to them. For instance, the German patent office would be able to save close to 40% of its efforts if it could reuse the prior classifications made at another patent office. That year, the total amount of published patent documents was over one million, but they describe only approximately 400,000 inventions.[36]

The new technology made it possible to establish an international organisation like the EPO that could issue national patents. The EPO became a success, but it could also be a threat to the national patent offices. For small countries, the critical mass of patent applications could be too small compared to a desired staff of the previously mentioned 50-60 examiners. This situation was an issue around 1990, but the later growth in the number of applications reduced the problem.[37] The missing Danish assessment of the EPO system had stopped the political background for EPO from cooperating together with EEC, but in 1992, the Danish parliament agreed to the entire membership.[38]

It is evident that efficient communication was given a higher international standard on all levels. The mentioned cooperation around the technical standardisation, in for instance INPADOC, indirectly created harmonisation. Another eye-catching consequence of the new technology was the reduced need for more space. Gradually the use of paper archives decreased in the daily work of the examiners and many of the previous extra copies of paper stopped.

International cooperation has increased on all levels since the 1960s. Previously, the situation was based on rather autonomous national patent offices. The national laws were different, and the quality and routines varied greatly. For instance, patent offices had different policies where, for example, it was easy to get a patent in the UK while it was more difficult to obtain one in the Netherlands. The quality level developed against the same quality.



40 years of development. This is a rough sketch of the technical development from 1960 to 2000. The transition from paper to on-line had many staging points. Not least the development of standards for classification and workflows were important.

There is still a long way to go in an international patent system. The language problem is a dilemma for small European countries when all patents need to be translated to fit into national requirements. The mentioned critical mass of examiners at an office hinders international patents.

Consequences for the private business

Private companies with patent activities were significantly affected by digitalisation. A closer look at their situation indicates the scope of its influence. Companies have three interests in patents. First, they make applications for patents. The second interest is their need to monitor technical areas through the patent descriptions. The monitoring of competitors' steps in new directions is vital, and this survey would also avoid infringing other inventors' patents. The third interest is the protection of their own patents and the possibilitiy of producing them. They have the opportunity to protest against competitors' patent applications, which is a possibility built into the patent system.

The following analysis follows the circumstances of some specific companies. I have chosen to take a single company as an example. Some companies have a particular department with employed experts. Danish companies with most applications apply for more than 100 patents a year. For instance, the wind power company Vestas had 163 applications in 2021. Companies like this have such a large volume that a particular department is possible.

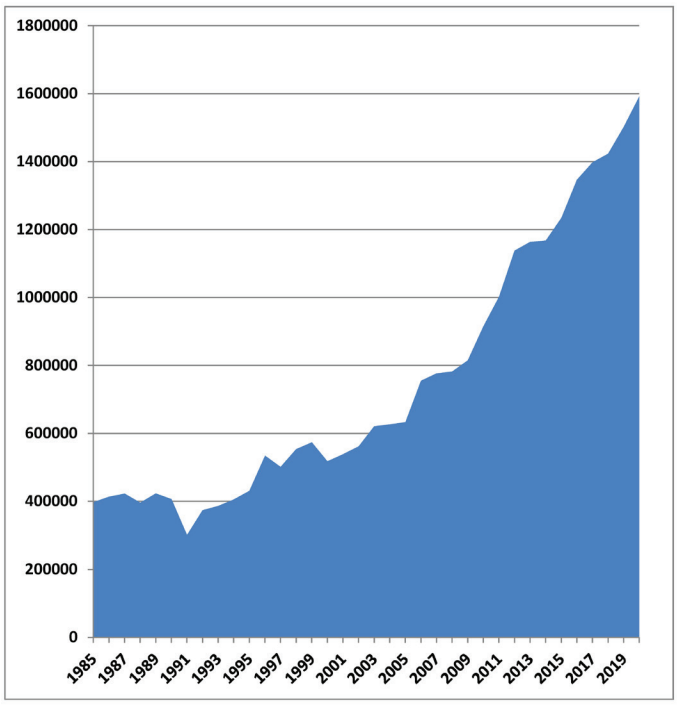
Patents at Grundfos

Most companies have a modest budget, and I have chosen to closely examine one of these. The selected company is Grundfos, the leading producer of water pumps on the international market. It has more than 20,000 employees.[39]

In total, Grunfos has 1,289 published patents. For instance, between 2000 and 2021, the company sent in 423 applications for patents and had 329 granted in the same period.[40] Grundfos' handling of patents around 1970 was in the hands of a patent agency. This agency examined the requirements and took care of the registration process of patent applications. The agency monitored the business area. A search in the EPO database shows that Grundfos, in the last three decades, made opposition to other firms published patent applications 36 times.[41]

The contact between the company and the patent agency was not firmly organised. A talented technician had a local connection with the developing technician, the leaders of the technical departments and the patent agency. The managing director sometimes joined the negotiations when specific essential patents were pending.

After 2000, the situation changed slightly. Still, the patent agency handled the examination for patents and made the preparation for the registration of new patents. Much of the monitoring business was moved in-house, and the organisation was reinforced with a responsible person to take care of the patent area. His experience was close to the level of the examiners at patent offices.



The number of patents has quadrupled since the 1990s. At the same time, technical innovations have become more complex, which is why the descriptions of patents today take up much more space. Thanks to digitalisation and international collaboration on systems, it has been possible to process the many inventions (WIPO database).

The flow of information had changed. The new technology allowed the company to get regular copies of total patent descriptions. For the first years, these were distributed on microfiche, but later they were accessible through the internet. For some years, the company had a subscription to a private service that delivered the exact monitoring of the business area that the patent agency had previously done. This service became redundant when online access enabled the use of classification registers and even word searches.

A strengthening of patent activities was achieved by the easier access to patent data. In parallel, the business for pumps developed a more international marketl and the ability to protect its productionthrough patents needed to be strengthened .

The easier distribution of information made an essential change in the involvement of the larger circle of technicians, enabling them to follow the technical development themselves. They received samples of patents in their area and could read descriptions and see the drawings.

Conclusion

As a result of the new information systems, technical knowledge is now better distributed. This improvement occurred not only within the patent business but outside, where free information databases are spreading knowledge of new inventions. The technical improvements for the patent business have been massive. Although we are not close to handling patents through a totally automatic process, patent examiners and other experts in the field have been provided with better and faster tools.

This can explain some of the wild growth of inventions. In the graph of granted patents, globally, the number has quadrupled in the last 25 years. This has happened as a result of more innovations from the old industrialised countries and from increased production from emerging countries like China. This has led to a massive burden in the workload of the patent business at a time when the load is increased as a result of the greater complexity in the descriptions of new technical ideas.

References

Blackman, Michael. 2004. "World patent information—the first 25 years.", *World Patent Information* 26 (1): 13–24. doi:10.1016/j.wpi.2003.09.002.

Blackman, Michael. 2007. "Vincent ('Vince') Smith Dodd 1924–2006.", *World Patent Information* 29 (3): 262–63. doi:10.1016/j.wpi.2007.04.008.

Bogsch, Arpad. 1992. *The first twenty five years of the World Intellectual Property Organization from 1967 to 1992.* Geneva: WIPO.

Claus, P. 1982. *"Patent search and information in the nineties.", World Patent Information* 4 (4): 149–54. doi:10.1016/0172-2190(82)90042-4.

Delorme, J. 1982. *"Dissemination of patent information.", World Patent Information* 4 (4): 155–58. doi:10.1016/0172-2190(82)90043-6.

Griset, Pascal. 2014. *The European patent: A European success story for innovation.* Munich: European Patent Office.

Hansen, Inge Berg. 1987. "Patenter og videnformidling.", *DF-revy* 10 (3): 57–62.

Mulvad, Nils. 1994. *"Chefer til eksamen.", DJØF-bladet* 18 (10): 14–15.

Pfeffer, Harold. 1964. "ICIREPAT and its activity.", *MULL: Modern Uses of Logic in Law* 5 (2): 23–27.

Shibata, Shizuo. 1984. "The current status and future plans of computer utilization in the Japanese patent office.", *World Patent Information* 6 (4): 170–76.

Sneed, Martha Crockett. 1998. "125 years of patent information to the people: The US Patent and Trademark Depository Library Program, 22 May 1997.", *World Patent Information* 20: 129–33.

Stillger, Josef, and Volker Hartung. 1988. "Use of CD-ROM for patent information.", *World Patent Information* 10 (1): 37–40.

Stock, Mechtild, and Wolfgang Stock. 2006. "*Intellectual property information*: A comparative analysis of main information providers.", *JASIST* 57:1794–1803. doi:10.1002/asi.20498.

Villadsen, Kjeld Simon, and Peter Kyng. 1994. *Fra væsen til virksomhed -. Bind 1. 1894-1994.* Taastrup: Patentdirektoratet.

Regional Workshop on Patent Information and Documentation: Singapore, February 20 t0 23, 1989. 1989. Geneve: International Bureau of WIPO.

Notes

1 Claus 1982, p. 149.

2 Article 54, The European Patent Convention 1973.

3 Griset 2014, p. 126.

4 Villadsen and Kyng 1994, p. 78.

5 Griset p. 152.

6 Claus p. 154.

7 Hansen 1987, p. 57.

8 WIPO 1989.

9 Claus p. 152-153.

10 Claus p. 154.

11 Shibata 1984, p. 170.

12 Griset p. 47.

13 Shibata 1984, p. 170.

14 Griset p. 114.

15 Bogsch 1992, p. 80.

16 Pfeffer1964, p. 348-361.

17 Griset p. 48, 144, 224 and 226.

18 Hansen, p. 57-62.

19 Griset p. 224-226.

20 Griset, p. 226.

21 Stillger and Hartung 1988, p. 38.

22 Claus p. 153-154.

23 Sneed 1998, p. 130-131.

24 Griset, p. 226.

25 Bogsch, p. 114.

26 https://web.archive.org/web/20100612193647/http://cas.org/aboutcas/cas100/annivhistory.html. Archived at the Wayback Machine. Accessed 10.7. 2022.

27 Blackman 2007, p. 263.

28 Claus p. 149.

29 Delorne 1982, p. 155-158.

30 Blackman 2004,, p. 16.

31 Griset, p. 226-228.

32 Stock and Stock 2004.

33 Griset, p. 231.

34 Villadsen and Kyng, p. 71.

35 Mulvad 1994, p. 14.

36 Claus p. 150.

37 Villadsen and Kyng, p. 77.

38 Villadsen and Kyng, p. 86.

39 Much information was achieved through interview with former and present employees at the company in the spring 2022.

40 Search in Lens.org, patent owner 2000-2021 09-07-2022.

41 Search in EP Bulletin 09-07-2022.