

MEETING OF INTELLECTUAL PROPERTY OFFICES (IPOS) ON ICT STRATEGIES AND ARTIFICIAL INTELLIGENCE (AI) FOR IP ADMINISTRATION

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NATIONAL AND INTERNATIONAL ICT STRATEGIES OF IPOS

Document prepared by the International Bureau of WIPO

INTRODUCTION

1. This document is intended to provide useful information to facilitate discussions on ICT strategies from national and international perspectives. It provides a list of the most common functions of Intellectual Property Offices (IPOs) in respect of patents, trademarks and industrial designs and the most common requirements to enable IPOs to provide efficient and high quality services, and the ICT components and infrastructure necessary to support those functions and to fulfill those requirements. The document consists of three parts:

- a) Part I (National ICT Strategy) discusses national ICT strategies, mainly focusing on efficient functioning of IPOs in respect of national processing of applications for IP rights;
- b) Part II (International ICT Strategy) discusses functions, requirements and ICT aspects in support of international cooperation and operation with regard to WIPO's Global IP protection services under the Patent Cooperation Treaty (PCT), the Madrid System for trademarks and the Hague System for industrial designs (referred to as "WIPO Global IP systems"); and
- c) Part III (General ICT Strategy) discusses common elements relevant both to national and international ICT Strategies and other considerations with a view towards suggesting certain directions for future discussion. Part III also discusses a future vision of ICT strategy that IPOs and the International Bureau (IB) may wish to explore.

PART I: NATIONAL ICT STRATEGY

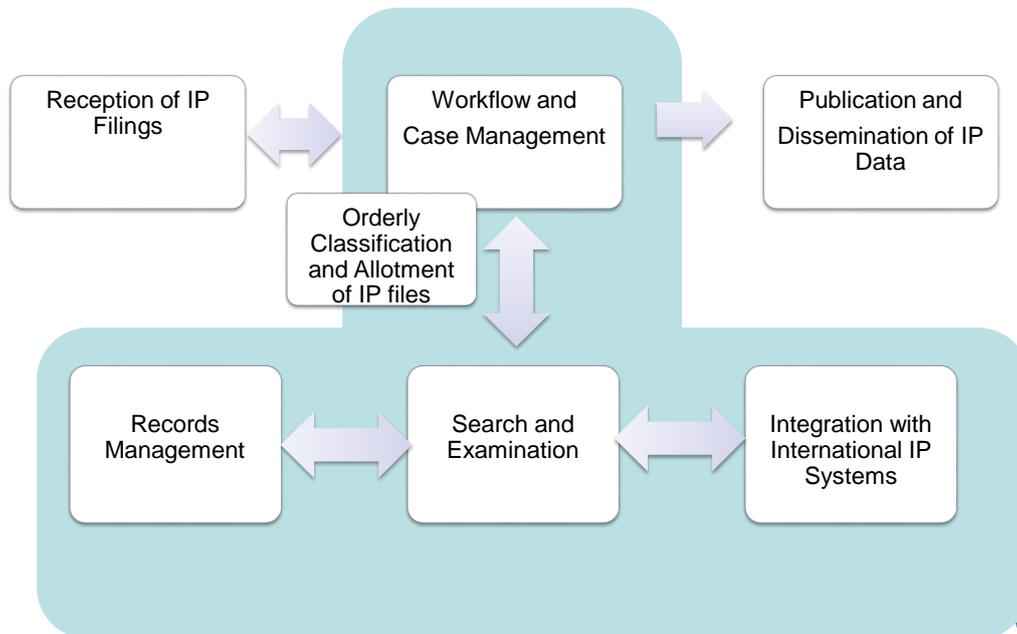
GENERAL REMARKS

2. IPOs are under pressure to process applications for national or international applications and registrations, and related actions efficiently, effectively and accurately. Each IPO needs to have ICT systems which closely match its national, regional and international roles. IPOs should make the best use of new opportunities offered by advanced technologies and international cooperation to share information on optimized business solutions and experience of developing ICT systems.
3. Since the beginning of this millennium, when the digital divide was discussed in the context of the Millennium Development Goals of the United Nations, technical infrastructure has much improved. Most countries now benefit from modern communication technologies, such as the Internet and mobile phones. However, opportunities to use more advanced ICT systems and tools are still not available to smaller IPOs with limited resources, notably in developing countries and least developed countries (LDC). Bearing this in mind, increased attention should be given to international cooperation and providing adequate solutions to such IPOs.
4. It is important to recall that, to be a useful part of their country's policy framework, IPOs need to provide a service which goes beyond simply administering the national IP laws efficiently. They also need to ensure an effective platform to assist their national creative community in beginning the process of seeking international protection. National applicants need to be able to analyze the costs and benefits of international IP protection and, where appropriate, to file applications for protection elsewhere without difficulties, whether this is done through direct national applications under the Paris Convention or international applications under WIPO Global IP Systems. This means that IPOs should take the international context into account when designing the interfaces to their IT systems which support their national requirements as well as their international roles. Similarly, data collection and storage should take into account the technical standards used for exchanging documents and data with applicants as well as other IPOs.

BUSINESS PROCESSES OF IPOS AND TECHNICAL REQUIREMENTS

5. IPOs share a common set of business processes at a high level. The requirements and challenges to be addressed by business managers and IT managers of IPOs to find solutions and formulate policy to be reflected in the national ICT strategy of IPOs are briefly described in the following paragraphs.
6. A top level chart showing goals, business functions and workflow for processing IP applications at a typical IPO is given in Figure 1.

Figure 1; A simplified diagram of IPO Business Processes



RECEPTION OF IP FILINGS

7. Reception is the process of accepting new IP applications or filings, and subsequent transactions filed by IP applicants. Reception establishes the basis of legal rights by assigning file/document numbers, official dates of reception, and accepting fees for the service.

8. In a paper-based world, reception relies on log books and manual inspection of documents. The reception process is being moved to online systems in many IPOs which can automate the process of checking basic formalities, assigning dates and numbers, and calculating fees.

9. However, online processes and digital processing introduce several new challenges. Some of the issues include:

- a) *Authenticity of digital records*: Most countries are adopting legislation to allow for electronic records and electronic transactions, not only for government services but also to enable online business. Without such a legal foundation, digital records may not be considered authentic.
- b) *Online payment systems*: There are very few global payment systems and those that exist (e.g. credit cards) may not be acceptable for government services. Each IPO needs to establish payment gateways with the local financial service providers. In many countries, centralized e-government portals are simplifying this problem.
- c) *Authentication and signature requirements*: IPOs need to provide an online mechanism to authenticate the users and to accept digital signatures. National regulations and e-government initiatives can also solve this problem.
- d) *Confidentiality and integrity of online transactions*: Users connecting to online services need to be certain that their transaction is confidential and cannot be changed by a third party.

e) *Other issues of security:* As for all online ICT systems, there are many security risks. IPOs may not have the in-house skills to manage security at a high level.

10. It is important to challenge processes where appropriate to ensure that the real requirements are being addressed. There is a significant risk of confusing issues of integrity, authenticity and confidentiality and so appropriate expertise is needed when designing solutions.

STRUCTURE OF DATA

11. Online services have improved the process of capturing data, especially structured bibliographic data which is standardized and well-defined in existing legal frameworks (for example, the Patent Law Treaty (PLT)) and technical frameworks (notably, WIPO Standards).

12. Despite many years of efforts, only a small number of IPOs have succeeded in receiving full-text XML (extensible Markup Language; a simple, very flexible text format designed for the exchange of a variety of data on the Internet) data from applicants. XML creation systems are complex and difficult to use and a large majority of applicants have opted to furnish documents in PDF format when given the choice and consequently, most IPOs accept documents in unstructured formats and need to extract and format the data themselves. It is a challenge for IPOs, and also for the IB, to process IP applications or subsequent submissions received in paper, fax, WORD, PDF or other unstructured format, since IP data contained in such applications and documents need to be converted into machine-readable and well-structured form – preferably in XML by Optical Character Recognition (OCR) in accordance with WIPO Standards. However, OCR is expensive for IPOs and introduces the risk of errors which may affect applicants' rights and the quality of the data.

13. Good practices for OCR are based on a strategy of "Quality at Source." The concept consists in each IPO being responsible for the quality of the full text it provides, benefiting from the technical assistance of large IPOs to put in place the required procedures and systems. In the context of ICT strategy, IP data should be generated in a standardized digital format at the earliest possible stage in the life cycle of an IP application, and preferably at the source. Accuracy is of high importance because the obtained texts are not only important for the national IPO to ensure the quality of public services, but also for other IPOs with which IP data is exchanged for international cooperation on search and examination and global dissemination of IP information. WIPO is assisting IPOs in this area, by providing training, software and customization of the WIPO OCR solution, which was initially developed for creating searchable full-text for PATENTSCOPE.

14. If the Quality at Source concept is to be pursued, it is ultimately a question of whether an IP application and its data are properly prepared by ICT systems that an applicant or their IP agent uses. Beyond the application bodies, there is an untapped potential to greatly improve service levels by integrating online services with the ICT systems used by IP agents (who file the majority of applications in most countries). Because there is generally little or no connection between the systems of the IPO and the systems of the IP agents, there is still a lot of re-keying of information which is inefficient and error-prone. Online systems at IPOs often transfer this work to the agents without offering them significant productivity gains beyond reducing the need to check whether data had then been transcribed correctly by the IPO. A commonly implemented data exchange protocol which allowed for a secure, bi-directional data transfer between systems would have many benefits and would encourage third party solution providers to develop integrated, interoperable case management systems for IP agents.

15. The generation of standardized and well-structured IP data at source is supported by a text drafting system which applicants can trust and use easily. A large volume of existing patent documents are filed in or coded into WIPO Standard ST.36 XML format. A significant number of IPOs made heavy investments in that format, whereas a large group of IPOs intend to implement new WIPO Standard ST.96 (Processing of Industrial Property information using

XML). It is important that these Standards should be implemented in a way which allows error-free conversions between the two Standards for at least the primary substantive content.

16. In recent years, IPOs have started to accommodate needs of applicants to include highly technical information in an application in a standardized digital format that can be read and processed by the ICT systems of IPOs and the IB. The next paragraphs briefly explain some projects for digitizing data of highly technical information from the business and legal perspectives, which should be reflected in ICT strategy.

17. Firstly, technical information or complex elements such as flow charts, chemical and mathematical formulae, tables, graphs, photos, and the like, were previously embedded as image data in the full text of a patent application. These are now covered by the most recent standardized data formats and integrated into WIPO Standards for XML formats.

18. Secondly, there is a strong desire to allow the filing of color drawings of inventions or designs in a patent or design application, or color reproductions of trademarks in a trademark application. WIPO Standard ST.67 was developed for electronic management of the figurative elements of trademarks, and the Committee on WIPO Standards (CWS) undertakes discussions at Task No. 57 for developing a new standard regarding the requirements for collecting information from IPOs and applicants with regard to electronic visual representations of designs.

19. Thirdly, new elements arising from ICT technologies that could be protected by industrial designs also pose challenges to the ICT strategy of IPOs. They are graphical user interface (GUI), icon and typeface/type font designs which may be protected. At the Thirty-Eighth Session of the Standing Committee on the Law of Trademarks, Industrial Designs and Geographical Indications (SCT) held in October 2017, an information session was also held on these design elements¹. The proposals received at the said session of the SCT have been compiled in a document which will be considered at the next meeting of the SCT. This provides a significant technical challenge to IPOs with complicated legacy systems which expect black and white drawings. The CWS has also started to discuss a new WIPO Standard for the design of electronic graphical views².

20. Lastly, although it is considered as textual information, nucleotide and amino acid sequence listings attached to a patent application should also be integrated into the XML format of the patent application. It will be challenging for applicants and IPOs to comply with WIPO Standard ST.26 to make sequence listings machine readable and searchable from January 2022, as agreed at the CWS³. In collaboration with IPOs, WIPO has started to develop a common authoring and validation software tool which will enable applicants and IPOs to prepare and/or verify sequence listings in ST.26 XML format.

Recommendations

R1. Develop an online data exchange protocol covering key common transactions to generate high quality IP data at the source, based directly from output from IP management systems, with a view to create and exchange IP data with IPOs and the IB in accordance with WIPO Standards.

R2. In introducing an online data exchange protocol, implement appropriate policies and consider ICT systems in use by IP applicants and IP agents to facilitate their use of the protocol to submit high quality IP data.

¹ http://www.wipo.int/edocs/mdocs/sct/en/sct_39/sct_39_2.pdf

² http://www.wipo.int/edocs/mdocs/cws/en/cws_5/cws_5_22.pdf

³ http://www.wipo.int/edocs/mdocs/cws/en/cws_5/cws_5_22.pdf

R3. Back-file capturing of IP data by OCR conversion of image data should be properly undertaken in accordance with good quality control and relevant WIPO Standards.

R4. In addition to bibliographic data such as names of applicants, the full text of patent specification should be converted into, or generated at the source, to make patent applications searchable. Consider common tools or at least closer WIPO Standards for the preparation of XML from word processor formats to ensure consistency.

R5. Image data and complex elements such as image of a device trademark, an industrial design and graphs contained in IP applications should be generated as machine-searchable data in accordance with relevant WIPO Standards (in particular WIPO Standard ST. 96⁴).

WORKFLOW AND CASE MANAGEMENT

21. All IPOs need a system to track files, assign work, monitor deadlines and implement the detailed regulations and procedures for processing IP rights. In the paper-based world, this is done by physically circulating files and marking key information on the file cover (for example, deadlines and legal status information).

22. There is a significant opportunity to improve efficiency and quality by implementing an ICT system to manage workflows and business rules. However, many IPOs struggle with automation of these processes. The IB often observes that standard case management tools have not proven effective because the business rules and workflows at IPOs are complex and interrelated. IPOs often need to write complex software code to fully implement their business rules, which can result in systems that are difficult to maintain, and inflexible.

23. A good workflow management system for IPOs needs to have the following characteristics:

- a) *Adapted to IP business rules:* For example, the system needs to recognize processes that trigger other processes (e.g. publication), processes that are dependent on or freeze other processes (e.g. opposition), deadlines and time limits that are interdependent, etc.;
- b) *Flexible to changes in legislation and business rules:* Ideally, the system will allow different sets of business rules to be active for different sets of files (e.g. a new legislation is applied to all applications filed after a certain date);
- c) Ability to modify business rules without complex programming of software that supports workflow management;
- d) Fast, clear and accurate, delivering rich information and easily integrated with other services.

24. There are a small number of IP Administration software packages that meet these requirements. IPOs must either develop their own systems or else adopt one of the standard packages.

25. It should be noted that, if business rules are difficult to specify, this may suggest that a review of the processes is needed, or that large and complex processes need to be more carefully modelled as a number of less complicated sub processes. Many IPOs implement automated workflow management systems without taking full advantage of the possibilities to

⁴ Version 3.0 of ST. 96 was released in February 2018, published at http://www.wipo.int/standards/en/part_03_standards.html

improve business processes and management information. IPOs may continue, for example, to request multiple copies of documents or to conduct processes in a manner and order which simply replicates paper processes in the new system. Similarly, IPOs may not take advantage of the possibilities to improve management reporting by setting and measuring performance indicators related to quality or efficiency of work. An automation project should therefore not be seen as a simple ICT implementation but as a business transformation in which top management takes the opportunity to optimize business processes and improve service delivery. Such a transformation may also involve revising regulations and procedures to enable new work practices.

26. Most IPOs have a large existing investment in infrastructure and data, with a need to be able to provide long term support and processing for existing applications as well as seeking improvements for the future. Moreover, they often have a limited capacity for analysis and software development. This makes it essential that careful consideration be given to identifying and prioritizing the aspects of processing which could offer the largest benefits from collaboration in terms of improved results or reduced ongoing costs of development and maintenance of systems. It is essential that any such projects are not considered pure ICT projects, but are led by business representatives with the involvement of legal representatives at all stages.

Recommendation

R6. Re-engineer and transform the current business models and workflow processes based on paper transactions into modernized and optimized business models and workflow processes based on digital IP data transactions, with collaboration of business, ICT and legal representatives at all stages.

ORDERLY CLASSIFICATION AND ASSIGNMENT OF IP FILES

27. Workflow starts with reception of IP applications, followed by assignment of IP files to an organization unit for substantive examination. To facilitate the assignment, most IPOs cluster IP applications into a manageable number of files and assign them to the proper unit responsible for processing IP applications in particular categories. Most IPOs use national or international classifications for the clustering. As Contracting Parties of WIPO Global IP systems, the respective treaties expect or request the Member State to use international classifications such as IPC, Nice, Vienna, and Locarno classifications. The importance of accurate and internationally converged practices of using international classifications is important to operation under WIPO Global IP systems. For this administrative purpose, most IPOs may not need finely subdivided and detailed level of classifications. However, some classifications (in particular IPC) need to be large and complex, and use the most updated schemes for search purposes, as discussed later.

28. ICT systems should support the work of allotment of classification symbols. Challenges facing IPOs include training of classification officers, updating classifications including reclassification work, and public awareness building of classifications, if necessary, through the provision of local language version of classifications. IPOs with limited resources may not be able to cope with the challenges.

29. WIPO has provided internet publication platforms with search functionality such as IPCPUB which makes it easier for IPOs to produce national language versions of the IPC. WIPO has also provided IPCCAT (A categorization assistance tool for the IPC system mainly designed to help to classify patents at IPC class⁵), which is an AI-powered automatic categorization tool of IPC at the subgroup level.

⁵ <http://www.wipo.int/classifications/ipc/en/>

30. To assist users of the Madrid system, the Madrid Goods and Services Database contains acceptable indications of goods and services. The database is fully aligned with the Nice Classification, which is the standard for classification of goods and services in trademarks. The highest volume of acceptable terms is in English, which is currently the language that over

82 per cent of applicants choose. Madrid Goods and Services Manager also provides search functionality of Madrid Goods and Services terms and acceptance information of such terms at IPOs for Madrid system users (further details will be discussed in Part II).

31. To provide further IT support, it is worth exploring the development and/or enhancement of automatic classification tools for each classification, reflecting common practices to the extent possible, which can assist IPOs and users to identify proper classifications including Goods and Services terms in an efficient and effective manner (see document WIPO/IP/ITAI/GE/18/1).

Recommendations

R7. Explore the possibility of AI-powered automatic classification tools to enhance the use of, and control the quality of, classification symbols allotted to IP applications.

R8. Strengthen international cooperation for internationally coherent practices of using international classifications and for the provision of technical support to make local language versions of international classifications available.

SEARCH AND EXAMINATION

32. The function of search and examination is supported by databases and search engines. IPOs have requirements which are different from standard libraries or internet search engines, including:

- a) Searches must be well-structured with indexes and search syntax – IP searches cannot be done with general keyword searches;
- b) Classification systems and their specificities need to be supported;
- c) Phonetic search (for trademarks) and stemming rules are different from general search packages;
- d) Complex elements (for instance, figurative elements of trademarks, drawings and chemical formulae of inventions) need to be searched;
- e) The searcher needs to be able to control the degree of precision and recall in order to correctly set the scope of the search.

33. In most IPOs, search is still done using a paper-based paradigm, i.e. data and documents are manually classified and then a skilled searcher uses the classification symbols to structure the search, in combination with Boolean searching of abstracts, full text and any further coding which may be available (notably in chemical and biotech cases). This creates a barrier for smaller IPOs that do not have the resources to master large and complex classification schemes. For all IPOs to take advantage of modern technologies such as image recognition or similarity matching using AI or machine learning, a combined use of classification assistance tools (as discussed in the previous section) and new AI-powered search technologies appears to be a good approach until AI-based search tools reach a level of maturity where they can be fully relied on.

34. There are very few commercially available solutions for IPOs and so many IPOs spend considerable resources to develop their own customized search solutions. As search technologies are evolving quickly, few IPOs are able to keep pace with best practices.

35. Several IPOs are developing search tools which take advantage of new technologies. To some degree, it is useful to have multiple projects going on in parallel to investigate different options. However, the costs are beyond the reach of many IPOs and there is a significant risk of wasting resources on parallel development of near-identical solutions. Greater coordination and sharing would be desirable to minimize the costs to large IPOs and maximize the availability of effective solutions to smaller IPOs.

Recommendation

R9. Share information on emerging search technologies, especially image search, classification tools and language tools, and consider ways in which the technology can be shared and made available to smaller IPOs to improve the quality and efficiency of IP information search.

PUBLICATION AND DISSEMINATION OF IP DATA

36. Publication is a key function of the IPO which makes the information about the IP right available to the public, establishes legal certainty and triggers other processes, such as opposition. Publication also allows for the general dissemination of information that can be searched, analyzed, etc.

37. Publication was traditionally done through an official Gazette or Journal which was structured with sections, tables and indexes. Most IPOs still publish in this form, even if they have moved the publication to an online, downloadable file. Often this is because legislation is lagging behind technology and the IPO is obliged to publish in the traditional form, and often on paper.

38. The traditional format of publication has limitations, even if it is online, because it is difficult to search, and information may be dispersed across multiple Gazettes. The traditional publication format is one reason why it is very difficult to determine the exact legal status of an IP right in most jurisdictions.

39. There is a significant potential to improve publication and dissemination of information by adopting a design that is oriented to online use. This would include tables and indexes that are searchable and inter-linked, and functions such as a “register extract” which would group all legal notifications for one IP right in one place.

40. Published IP applications and other files submitted by IP applicants and produced by IPOs such as amendments to the applications and search reports (in case of patent applications, patent dossier refers to the submission) have great value for international cooperation. These matters will be discussed in Part II.

Recommendation

R10. Develop a reference platform for online publication and search, while contributing to the international cooperation under CWS about systems for providing access to publicly available patent information of IPOs participating in the CWS Task No. 52. The platform would be linked to international and/or regional databases to automate the dissemination of information.

RECORDS MANAGEMENT

41. Records management is a key supporting function for an IPO. It covers the following functions:

- a) Establishment of files and retrieval systems for all related information for IP applications;

- b) Classification and maintenance of search indexes;
- c) Maintaining the authentic records of IP application prosecution, including legal status of IP applications and IP rights;
- d) Digitization and formatting of data and documents;
- e) Establishment of databases, including databases of global IP data from other IPOs.

42. Many IPOs are still maintaining paper records, even if part of the information is digitized to support classification and search. Standard ICT solutions for records management may be used to meet the requirements for most IPOs. Once legal issues have been clarified (e.g. authenticity of digital records, form of digital signatures), there are usually solutions available to enable IPOs to move to paperless records management. IP legal status and a global portal of IP registries will be discussed in the next section.

43. Smaller IPOs are usually unable to maintain large databases and therefore rely on third parties, especially for the international databases required for patent search.

Recommendation

R11. IPOs should share information on ICT solutions for records management, in particular on the appropriate use of standard ICT packages and the solutions for guaranteeing authenticity of digital records, signatures, etc.

INTEGRATION WITH INTERNATIONAL AND REGIONAL IP SYSTEMS

44. Most IPOs need to interact with WIPO Global IP systems and/or regional IP systems (e.g. ARIPO, BOIP, EAPO, EPO, EUIPO, GCC and OAPI). Similarly, all IPOs rely on international standard reference data, defined in WIPO Standards, for information such as country codes or classification schemas.

45. All of these systems have provisions for decisions and information to be communicated between the different parties. However, most are still using paper-based paradigms where forms or copies of documents are sent between the parties. Even if the exchange is done online, information is often processed manually and may be re-keyed. Errors may be introduced in these processes in many places. For example, information may be incomplete or incorrectly interpreted; there is no reconciliation to guarantee that distributed versions of information are correct; multiple copies of information may be different. There is significant potential to use modern technologies to improve these information flows. Some examples include:

- a) Messaging systems, web services and APIs that allow machine-to-machine (M2M) communication that guarantees that information was correctly sent, received and registered;
- b) Distributed registries that guarantee that an authentic view of information is available to all participants.

46. Demand is growing for an easy and single access to all IP registrations at the national and international level. ICT systems supporting national registries in most IPOs are not designed to share their data with other IPOs or the IB. There may be legal and business reasons that make it difficult to interconnect IP registries.

47. There are two short-term solutions to the need for better access to IP registries. One is to create a thematic database extracting relevant IP registry data from national and international registries to meet specific needs. A recent example is Pat-INFORMED, which was announced on the occasion of WIPO Assemblies meetings in October 2017. The project, implemented in cooperation with IFPMA⁶, provides access to patent information related to registered medicines.

48. The second option is to create a global portal which links to national and international registries with hyperlinks from the WIPO web site. Such a portal was first developed in 2013 as a result of a feasibility study presented to the Committee on Development and Intellectual Property (CDIP) which recommended the establishment of a global portal that would provide information and links to online patent registries of WIPO Member States⁷. The Patent Register Portal was redesigned in 2016/17 as part of a Development Agenda Project on the Use of Information in the Public Domain⁸, approved by the CDIP at its 17th session in April 2016, with the objective to provide users of the portal with a more user-friendly interface and to facilitate their access through a single access point to online patent registries and to related legal status information in some 170 jurisdictions. This global portal is a modest attempt to initiate connections with a number of IP registries.

49. WIPO Standard ST. 27 on the exchange of patent legal status data (adopted in 2017) is expected to be implemented by IPOs to converge their practices for maintaining their registries. This will improve the availability and interpretation of information from national IP registries.

50. In the longer term, it would be possible to interlink the IP registries of national IPOs using modern web technologies (web service APIs or blockchain) to enable a shared, distributed model that makes available the legal status and relationships between IP rights in different IPOs.

Recommendation

R12. In cooperation with interested Member States, the IB should develop a prototype for a distributed IP registry. The prototype could be used for IP applications to create an authentic registry of IP application numbers, for example to be used for validation of priority claims. Study the possibility of using a distributed IP registry linking to WIPO CASE or the International Register. The potential of blockchain technologies for linking such distributed registries should also be explored.

WIPO IP OFFICE SUITE

51. The WIPO IP Office Suite is a group of software applications that IPOs can use to support the processing of applications for IP rights by establishing an e-registry, controlling workflow processes and business rules, and providing online services to local and international users. The WIPO IP Office Suite, or parts of it, is currently in operation in more than 80 IPOs in all regions of the world. Most recommendations discussed in Part I could be met by using WIPO IPAS Office Suite. For further details, see document WIPO/IP/ITAI/GE/18/4.

⁶ http://www.wipo.int/pressroom/en/articles/2017/article_0010.html

⁷ CDIP/4/3 REV./STUDY/INF/3

⁸ DA_16_20_03

PART II: INTERNATIONAL ICT STRATEGY

GENERAL REMARKS

52. Given that each IPO provides services under its national laws and regulations, which vary from country to country, business solutions and ICT strategies adopted for supporting the solutions are also diversified. Industrial property laws and their registrations are independent and regulated by each Member State of the Paris Convention. However, international treaties for international registration or filing procedures under WIPO's Global IP systems expect, and request on certain procedural aspects, IPOs to comply with internationally coherent and prescribed procedures to manage IP applications or registrations. IPOs interacting with the IB need to adopt technically standardized data and ICT systems with a view towards enhancing the quality, timeliness and accuracy of IP registrations and record management. IPOs may wish to focus on such common denominators and solutions to capitalize on other IPOs' good practices and solutions.

53. In addition to the major IP treaties, as discussed in the section concerning integration with international IP systems, there is a common recognition that many national processes could be done more effectively if IPOs either exchanged certain data at an early stage or else supplied information to third party information service providers in a fully consistent manner. However, enabling such exchanges requires a large degree of coordination. WIPO Standards and other recommendations such as the Common Application Format go some way towards meeting these needs, but there remain major gaps and differences in implementations which make it difficult to import and use information effectively.

54. Advantages of standardized IP data are among others the enhancement of efficiency of workflow and accuracy of records, which are discussed in Part I. From the viewpoint of international ICT strategy, more compelling reasons are the assurance of security, integrity and compatibility of data format and structure for the exchange of IP data among different ICT systems of many IPOs.

55. It should also be recalled that, from the viewpoint of users and applicants, standards are important in minimizing costs and risks for applicants seeking protection in other countries. Attempting to fully standardize all data structures would be essentially impossible, involving time and expense going far beyond any possible benefits. However, by ensuring that key information, such as names, addresses, priority details and citation data, is exchanged in consistent formats, opportunities are increased to export such data from one system (be that an Office system or a third party IP management system) to another in a manner which can be directly used in other IPOs, minimizing the risk of data transcription and conversion errors, which can be costly and difficult to identify and correct. It is therefore important to identify the areas of key interest and ensure that the standardization of these parts is carefully considered and well implemented.

WIPO GLOBAL IP SYSTEMS

PCT

Figure 2; Simplified diagram of a possible patent family and some potential interactions

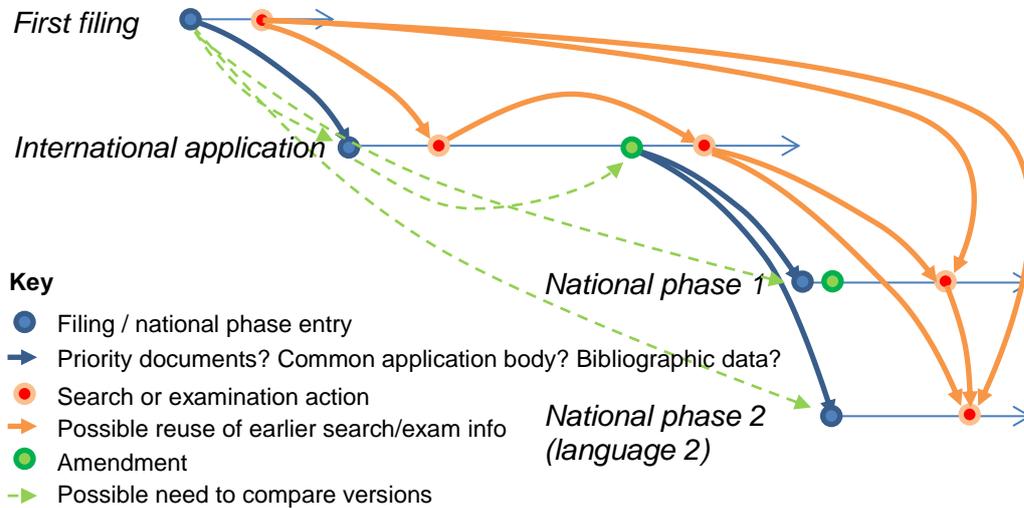
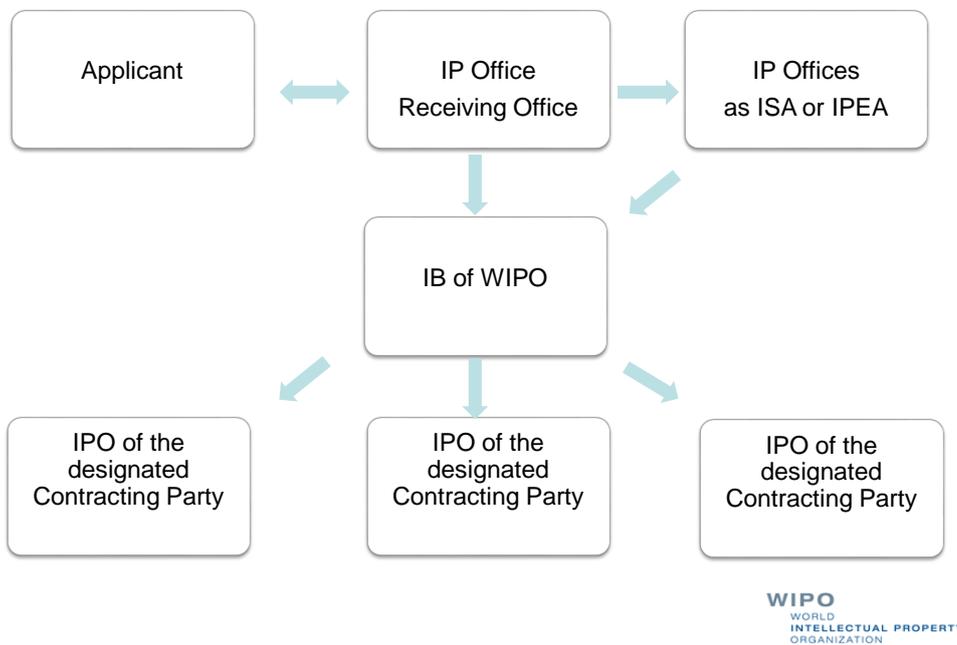


Figure 3; International Phase of the PCT system



Data Structure and Data Exchange

56. The internationally standardized data structure and format as set forth in WIPO Standard ST. 96 allow IPOs and the IB to connect ICT systems and to process IP data with the minimum human intervention and the maximum possible accuracy and quality of IP data transaction.

57. There are needs for specific standards to allow for M2M data transactions, such as message format, data dictionary and naming conventions for Uniform Resource Identifiers (this is under discussion at CWS⁹). Advantages are as follow:

- a) Applicants may wish to submit the same or very similar applications to different IPOs and the IB (for example, for PCT international applications, by the Paris Route or for the PCT national phase or for IPOs of the designated Contracting Parties under the Madrid and the Hague systems);
- b) IPOs and the IB will be more efficient if there is consistency between the formats of transactions required for national or international filing;
- c) IPOs and the IB should be able to perform effective comparisons between applications and other IP documents, as well as different versions of the same application, before and after amendments/irregularity updates;
- d) Applicants, IPOs and the IB should be able to reuse bibliographic data effectively.

58. The possibility of reusing bibliographic data, for example, should allow an applicant to submit the bibliographic data prepared for an application to one IPO as a draft to another and only need to make changes where there are specific differences between the two. There will be demand for allowing bibliographic data to be “pushed” from the applicant’s IP management system into a draft application on the IPO’s server, prior to completion and validation within the environment provided by the IPO and pulled back from the IPO when new documents or data become available. This implies that many IPOs should offer a common API for the applicant system to initiate the draft – in effect, a more modern implementation of the interoperability protocol set forth in the PCT Administrative Instructions Annex F, without the reference to specific client software.

59. IPOs need to be able to exchange patent and PCT data effectively both with each other and with applicants, and to this end, the exchanges need to be well automated to ensure that they happen reliably and without the introduction of errors caused by the need for human transcription of data. Given the large numbers of IPOs involved, effective standards are needed in order to allow IPOs to communicate reliably and give third party patent information suppliers and patent management system suppliers an incentive to develop systems to interact efficiently with the Office systems.

60. The exchange of PCT data between the IB and its partners can be summarized as follows:

- a) EDI (in case of PCT, PCT-EDI), an asynchronous file transfer platform is the main hub for data exchange;
- b) Data formats are mostly image based, with additional indexing and metadata supplied in structured format;
- c) Data standards applied (in case of PCT, the so-called ‘minimum specification’ – a simplified interpretation of PCT Administrative Instructions Annex F; and Annex F/WIPO Standard ST.36 (WIPO Standard ST.96 is under consideration with certain IPOs);
- d) Almost all paper based exchanges have been eliminated, with digital exchanges accounting for over 97 per cent of incoming and outgoing data.

⁹ http://www.wipo.int/edocs/mdocs/cws/en/cws_5/cws_5_22.pdf

61. The exchange of PCT data between entities not involving the IB can be summarized as follows:

- a) The ePCT office portal, ePCT machine to machine services and the eSearch-Copy systems are used to a limited degree;
- b) Data format is mostly image based, with additional indexing and meta data supplied in structured format;
- c) Data standards applied include the so called 'minimal specification' – a simplified interpretation of Annex F; and Annex F/WIPO Standard ST.36, ST.96 is under consideration with certain IPOs;
- d) Arrangements are on an ad hoc basis at relatively low rates, and as a consequence there are significant opportunities for further digitalization in this sector.

62. For the IB and its partners to benefit further in data exchange activities under the PCT, there are a number of challenges to overcome. First, for reasons already covered above, a more standardized fully XML-based format should be used instead of the largely image-based model in place today. Secondly, the vast number of possible bilateral exchanges in the PCT system (for example between receiving Office and International Searching Authority) could be standardized using centralized models such as the eSearch-Copy model. This would also assist with accommodating the security requirements associated with transmitting PCT data which increases cost and complexity, in particular for smaller IPOs. Finally, the timeliness and accuracy of data arriving on the databases distributed between the IB, IPO's and International Authorities suffers from the time lags associated with asynchronous data exchange.

Recommendations

R13. IPOs to work towards increasing the degree of exchanging standardized fully XML based data with the IB, considering synchronous models such as ePCT machine to machine services.

R14. The IB and IPOs should begin consultations on a standardized model for data exchange for the traditionally bilateral paper exchanges in the PCT, taking into account investments in assuring security requirements are optimized.

Patent Family Identification

63. IPOs are increasingly interested in work-sharing arrangements using tools such as WIPO CASE (Central Access to Search and Examination) or One Portal Dossier to view search and examination results from other IPOs. However, in general, these systems only include search and examination results from published patent applications. Many IPOs are reducing their levels of backlogs such that they are conducting their first search and examination actions before the priority applications (or subsequent applications at the Office of first filing) have been published. The Office of second filing will, of course, be aware of the existence of the application from which priority was claimed, but there will generally be no knowledge of other family members by any of the Offices concerned. Families are only identified sometime after the publication of multiple related patent applications. Until those links have been built, the opportunities for Office-driven work-sharing are limited.

64. Systems for pre-publication sharing of search and examination information can be relatively simple in themselves, provided that the family information is available and the right of one Office to view the pre-publication information can be established.

65. Many IPOs have an absolute prohibition in their national law on providing any information concerning patent applications to other parties prior to publication without the permission of the applicant. However, there may be some actions IPOs can take to contribute to the effective working of a patent system.

66. For example, in the United Kingdom, the Patents Journal publishes the following information for every application shortly after filing: the name(s) of the applicant(s); the title of the invention; the filing date of the application; any priority details; and the application number allotted to the application. Such an approach taken more broadly would greatly enhance the possibility of building patent families at an early stage.

67. Alternatively, applicants could be encouraged to give permission for IPOs to share search and examination results and sufficient information to locate them with other IPOs where applications with a direct priority-based link have been filed. For example, the WIPO Digital Access Service for Priority Documents (WIPO DAS) could be extended to include search and examination results and to share details of priority claims with the Office of first filing and other Offices of second filing; Offices of first filing could offer the use of DAS free of charge if such sharing was permitted, but require the use of an alternative arrangement for priority documents with a significant fee otherwise.

68. Various emerging technologies may also offer practical opportunities for IPOs to determine that links exist between patent applications without directly communicating the details of the applications concerned. However, in this absence of a right to share the associated search, examination and classification details of the applications, the value of this information is limited.

Recommendation

R15. IPOs should investigate legal and technical possibilities for identifying patent families prior to publication and ensure permission for IPOs processing family members to access search and examination reports. This recommendation should be considered in conjunction with R12 regarding the establishment of distributed registries, considering that a limited amount of information (e.g. priority references) could eventually be shared on a distributed registry prior to publication.

Exchange of Patent Search, Examination and Classification Data

69. WIPO CASE and the IP5's One Portal Dossier seek to allow IPOs to share search and examination reports. However, in many cases, the documents are in image format and the data within them cannot be directly reused or translated using machine translation systems. Some efforts are under way to increase the quantity of machine-readable citation information which is exchanged, but this is only part of the issue. Ideally, an examiner should be able to read any search and examination data created at an earlier stage of processing, whether at the examiner's own IPO or elsewhere, and be able to reuse it to whatever extent appears relevant to the application as it stands at the time and with regard to the relevant national law (or PCT requirements for international phase processing). A family of applications might have the following sequence of search and examination:

- a) National search of first national application;
- b) PCT search and written opinion of international application;
- c) Examination of parallel national application;
- d) Chapter II examination of amended international application;

- e) Availability of international preliminary report on patentability (Chapter I or II of the PCT);
- f) Parallel search and examination of national phase entries.

70. Some efforts have been made to update the XML specifications of the International Search Report, written opinions of the International Searching Authority and of the International Preliminary Examining Authority and the international preliminary reports on patentability to minimize the effort in transforming XML from one stage to the next. However, the PCT reports are in radically different formats from those of most national search and examination reports.

71. Work is currently under way to establish data standards for search and examination reports according to WIPO Standard ST.96. It would be desirable to use this opportunity not simply to replicate the formats of existing reports, but to look at how data flows from one stage to the next and consider how this could be best encapsulated to allow effective reuse of information which remains relevant at each stage compared to the previous one. The existing paper and WIPO Standard ST.36-based report formats could then be updated if necessary to reflect improved practices. At minimum, each written opinion or examination report should either contain or be accompanied by a machine-readable citation list equivalent to that in a search report, but preferably there should be better opportunities to reuse and automatically translate the text and structured information on matters including unity of invention, excluded subject matter and validity of priority claims.

72. To overcome difficulties arising from different data formats of IPOs, the successful implementation of web service APIs by the WIPO CASE/Global Dossier network is a good solution. Using WIPO CASE or Global Dossier, patent examiners can access the case files of patent applications at other IPOs in real time over the Internet. This is done by implementing a web service API at each providing office that delivers three to four simple transactions (get bibliographic data, get document list, get document content). Each participating office can implement these APIs to access their own back-end systems, without any need for harmonization or standardization of those back-end systems. The result is a distributed data system where users can retrieve data and documents from multiple sources simultaneously, from multiple different geographical locations.

73. The experience gained from WIPO CASE and Global Dossier demonstrates that IPOs can be interconnected relatively easily using modern web technologies. There is a potential for the same approach to be extended to other usage scenarios, such as data exchange for regional and WIPO Global IP systems, exchange of priority documents, exchange of other document content, for example to support collaborative examination.

Recommendations

R16. The application body formats for WIPO Standard ST.36 and ST.96 should be carefully analyzed and recommendations made for more specific, practical forms of implementation than the general standards (which allow for an enormous number of options) which meet all the needs for patent processing and allow reliable two way transformations between the two.

R17. The work on development of search and examination report standards for WIPO Standard ST.96 should not simply convert the ST.36 standard to the expectations of ST.96, but analyze whether the structures encourage easy reuse of data between stages of search and examination both with an IPO and between different IPOs.

R18. Common conversion software should be developed for the validation and conversion of major document types (initially DOCX; other formats could also be considered) into simplified XML formats. The software should be carefully version

controlled, be suitable for integration into national processing systems both by local deployment and by reference to an API for centralized instances and be capable of producing either WIPO Standard ST.36 or ST.96 output in formats which allow for accurate conversion between the two at a later stage, if required. Converters for the other direction (ST.36 or ST.96 to DOCX) should be considered at a later stage if it will assist the process of effective amendment/correction of applications.

R19. IPOs and the IB should agree PLT-compatible bibliographic/description data packages for use in their online filing systems, together with a common method of coding Office-specific sections, allowing more effective reuse of bibliographic/description data from previously filed applications and development of third party IP management systems to deliver bibliographic/description data without the need for conversion or retyping.

R20. IPOs and the IB should agree formats for packages (for PCT, this could be based on the existing PCT Annex F packages), which can be readily prepared by third party software (also including export of a filed application from another IPO) and pushed to Office servers to prepopulate most of a draft application prior to completion in an online filing system.

R21. IPOs should participate in WIPO projects to use global common tools and platforms to which ICT systems of IPOs should be connected, such as WIPO CASE, WIPO global portal of IP registries, and provide IP data in accordance with relevant WIPO Standards.

Publication and Worldwide Dissemination of Patent and PCT Information

74. For many IPOs, publication processes appear to work well and the national collections are regularly imported into the collections of patent information services and made available to the world. Historically, the exchange of IP documentation and data has been agreed on a bilateral basis and without charge. IPOs should continue to apply this well-established practice of free-of-charge exchange between IPOs and further promote this on a multilateral basis with a view to achieving worldwide dissemination of IP data in an internationally coherent way.

75. Most IPOs need to access and search patent data of other IPOs to examine international novelty and inventive step of a patent application. Patent information is also valuable as technical information resources for facilitating the dissemination of useful knowledge for innovation. Under the PCT, International Searching Authorities have obligations to search PCT minimum documentation. While some IPOs still charge fees for access to national patent data, most IPOs now publish and make their national patent data available free-of-charge, and provide such data to WIPO PATENTSCOPE.

76. Disseminating global patent data is a challenge for many reasons. Notably, the data needs to be disseminated in a timely manner (that is to say, the data should be available shortly after its publication), the data should be complete, both in terms of historical coverage and in terms of the completeness of the bibliographic and full text fields. It also needs to be accurate, especially the numbers of the IP application or registration, the applicants names, the classification codes as well as the quality of the full text, if obtained by OCR. Finally, the data should ideally be in an interoperable format, regardless of the source IPO, for which the existing WIPO Standards have been promulgated and new standards are being worked on. These challenges need international cooperation for assisting smaller IPOs with limited resources in digitizing IP data.

77. WIPO Standard ST.37 provides a recommendation for an authority file of patent documents issued by a national or regional IPO to enable other IPOs and other interested parties to assess the completeness of their collections of published patent documents. The IB is developing a portal webpage of authority files, in which authority files of IPOs or link to the IPOs' authority file will be available.

78. Language barriers remain an important issue for a better access to IP information. IPOs and the public should use machine translation technologies to overcome the barrier. WIPO Translate is a common tool that WIPO has developed and made available to the public by using PCT data. In developing a common tool, with multiple investments by many IPOs, international cooperation could produce the best possible tools for public use. Corpora to train machine translation engines should be contributed by IPOs in the course of updating WIPO Global Databases. This enables local market customers to effectively search the patent information available worldwide in their own language and facilitates local innovation. One possible means to accelerate these efforts would be to create an international Fund-in-Trust, voluntarily contributed by IPOs, dedicated to the digitization and proofreading of back files unavailable in full text, for the benefit of the IP community at large.

Recommendations

R22. IPOs need to share and disseminate patent information and data without any barriers and free-of-charge or at a marginal cost.

R23. IPOs are encouraged to provide their authority file or the link to their website of authority file to the IB.

R24. Explore the possibility of an international Fund-in-Trust voluntarily contributed by IPOs to enhance international cooperation for digitizing IP data as a global public good.

Priority Documents

79. Most national IPOs require priority documents to be filed to support any priority claim. Even where this is not required, unless a citation is found which requires assessment of the validity of the priority claim, it is typically desirable for the applicant to make the priority document available anyway. A large proportion of priority document exchanges between the larger IP Offices and between PCT receiving Offices and the IB for the international phase of the PCT are automated, either through bilateral exchange programs or via the WIPO DAS system.

80. However, the existing priority document exchange systems do not cover all cases. In the PCT, around 13 per cent of priority documents are still delivered by the applicant obtaining and transmitting a paper copy. For applications filed at many receiving Offices, including some high volume IPOs such as the EPO and the IB, this figure is above 50 per cent. While a few IPOs have set up processes to provide priority documents as digitally signed PDF documents, it seems likely that, outside of the priority document exchange system used by the IP5 Offices, most priority documents are delivered as paper copies.

81. Moreover, even where priority documents are transmitted electronically, what is exchanged is usually an image format document, which does not assist comparison of the priority document with the later application. Common use of digitally signed PDF documents would go a long way towards more easily meeting legal requirements of priority documents, and would assist in eliminating the need to create, mail and scan paper copies. Ideally, priority documents should contain the most useful information possible. Where an application was filed in a full text format, that version should be included in the package. Similarly, any color information should preferably be retained. Priority documents should contain XML bibliographic information which could be used to support IPO processing or the creation of a later application where it is uploaded by an applicant to the systems of another IPO (uploading the priority document would automatically import the application details as a priority claim and optionally add the applicant details and the priority document for use as the application body of the later application). Special provisions may be needed to effectively handle extremely large nucleotide and amino acid sequence listings (perhaps by way of allowing reference to secondary packages, separate discs or appropriate depositaries), but these are very small in number should not prevent the development of more effective systems for handling normal cases.

82. The WIPO DAS system offers a general exchange mechanism, but has so far been implemented by only 17 IPOs (including the IB). Moreover, its use is quite limited between most of them. Despite the fact that the service was set up primarily for Paris-route purposes, the volume of use of the system remains dominated by the transmission of documents for PCT purposes from just two IPOs. For smaller IPOs, there are considerable costs involved in implementing the ICT systems to support DAS and such ICT developments compete with other priorities. In the cases where applicants choose to use DAS extensively, statistics indicate that they are incentivized by the zero cost of using DAS compared with the fees charged by IPOs for furnishing paper documents. IPOs should consider whether it may be more effective to simply provide electronic priority documents on demand, in a standardized XML format, and which can simply be uploaded by the applicant at the time of filing a subsequent application without the need for any exchange system.

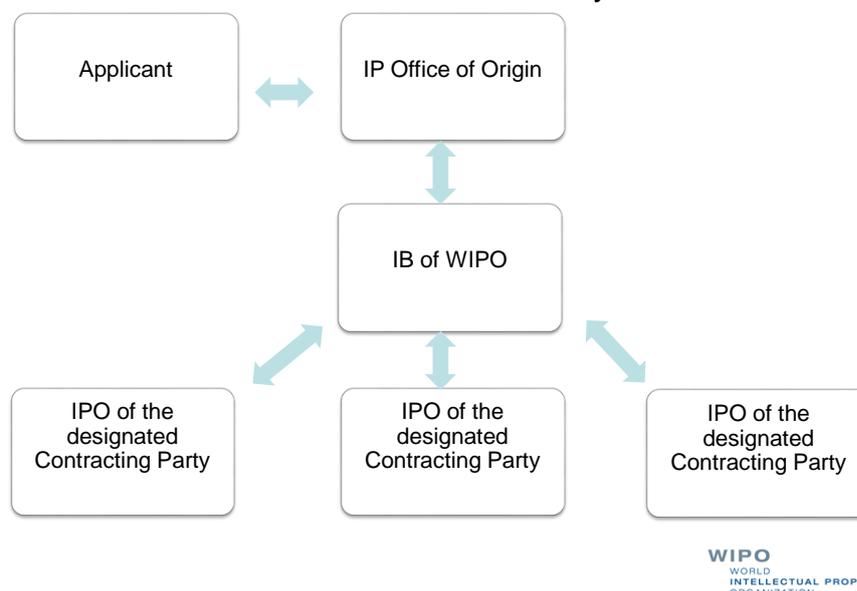
Recommendations

R25. IPOs should consider the use of WIPO DAS, particularly for processing patent and design applications.

R26. Develop further a new recommendation on a signed electronic package format for priority documents, including application bodies in full text formats (where available) and bibliographic data in XML format as a part of WIPO Standards. The new format could be exchanged via WIPO DAS or directly between applicants and IPOs.

Madrid system

Figure 4; International Trademark Registration Process under the Madrid system



83. At present, the International Register contains over 634,600 active international registrations. These registrations are equivalent to some 5.7 million active trademark registrations in the Contracting Parties. In 2016, the IB received 52,550 new international applications and over 50,000 requests or other documents per month for processing. Applications and requests are communicated from national/regional Offices to the IB in batches, in a variety of formats and by different means of communication. This is due to a large diversity in the IT systems, legal requirements and processes of national/regional IPOs. A significant number of applications and communications received from IPOs are still received on paper, or as scanned PDFs of documents, necessitating costly and error-prone OCR and manual

processes to ensure proper processing of incoming data. Communications from the IB to IPOs occur via similar means, with batch transmission of required data by a variety of means, depending on the established rules, needs and capacities of each individual Office.

84. WIPO has established electronic means for data transmission, but these are not uniformly applied or supported across member Offices, and suffer from the lack of a well-defined and supported data format and verification systems. Electronic forms and filing systems are inconsistently available among member Offices and the IB, necessitating bespoke development by individual IPOs to support common functionality. WIPO has created and made available to member Offices an application eFiling system, but this is currently in operation only in a limited number of IPOs.

Recommendations

R27. Encourage the wider use of existing standardized data exchange mechanisms, promote wider use of electronic filing and prioritize creation of additional electronic forms to improve the quality and reliability of data received from applicants, thereby reduce the errors caused by data content and format inconsistencies.

R28. Establish a self-service, centralized transaction processing model wherein users and IPOs connect to a central IB platform for data services. This will change the paradigm from one based around batch transmission of forms and responses to one of real-time updates to the International Register entered directly by the parties concerned.

Goods and Services Description

85. An international application filed through the Madrid System must include a list of goods and services for which protection is sought. The Office of origin, through which the international application must be filed, must certify that the list of goods and services are covered by the scope of the national/regional application or registration, on which the international application is based.

86. The goods and services in the international application must be indicated in precise terms and grouped in the appropriate Classes of the Nice Classification. If WIPO finds that the specific requirements are not met, the examination process will produce an irregularity that must be communicated to the applicant and to the Office of origin, and appropriate modifications must be made before the application can be registered. The list of the Nice Classification is updated every year by the Committee of Experts of the Nice Agreement. Applicants can list the goods and services using whatever terms they deem appropriate, and are not restricted to indications included in the List of goods and services of the Nice Classification.

87. Each member Office also has specific requirements for the acceptability of particular terms of goods and services and can individually accept or reject particular terms based on its practice. To help applicants compile the list of good and services in the international application, WIPO has created the Madrid Goods and Services Manager (MGS), which establishes a central database of terms aligned with the current version of the Nice Classification. MGS also contains information on the acceptability of terms to each of the 35 participating IP Offices (as of 2017). By checking the acceptance of terms using this database, an applicant can reduce the chances of receiving irregularities from WIPO as well as provisional refusals from those Offices of designated Contracting Parties participating in MGS.

88. The IB is exploring the possibilities of using AI to assist an applicant in identifying the right Class of the Nice Classification from terms of goods and services that the applicant wishes to include in the application. Combined with MGS, it is hoped that irregularities in relation to goods and services and the Class of the Nice Classification will be reduced, with providing greater clarity of acceptability of certain terms at the designated Contracting Parties. The sharing of large data sets of terms of goods and services and the corresponding Classes of the Nice

Classification should enhance the development of AI-powered assistance tool and a possible automatic classification system for recommending classes for new proposed terms.

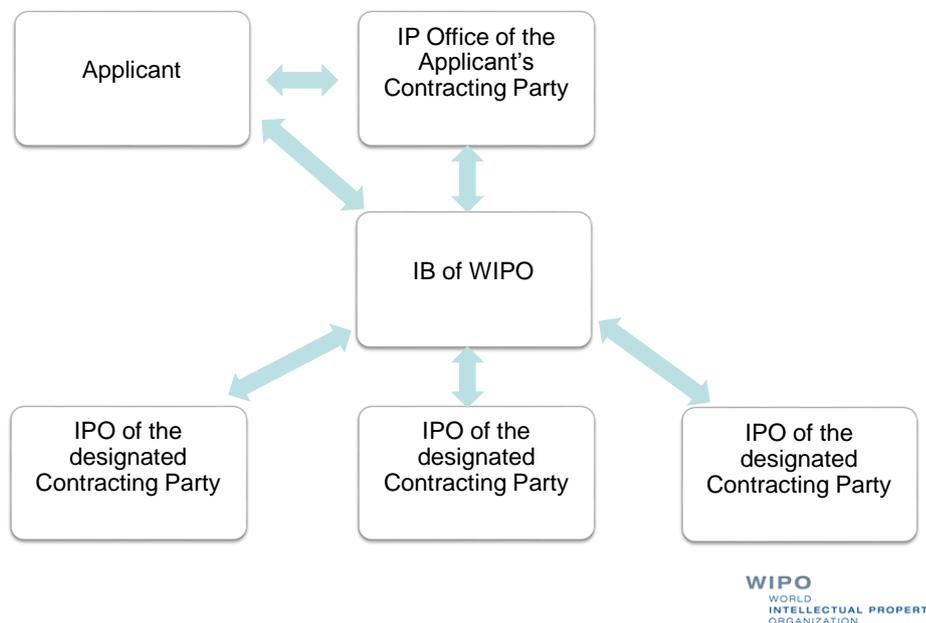
Recommendations

R29. Promote wider sharing of data concerning terms of goods and services that are acceptable or not by IP Offices to further reduce the need for costly and time-consuming processes (irregularity and refusal processes).

R30. Create a more comprehensive, user-friendly and machine accessible database of terms of goods and services that could reduce irregularities.

The Hague system

Figure 5; International Design Registration Process under the Hague system



89. WIPO is in the process of developing a new Hague ICT platform to support the modernization and streamlining of all internal- and external-facing business functions to improve the quality of operations. All strategic elements discussed in connection with the PCT and Madrid systems in principle apply to the development of the new system.

90. One area of potential improvement is the use by IPOs of normalized refusal grounds. Some IPOs have pioneered in using standard grounds of refusals, which demonstrated the following benefits:

- a) there are productivity gains at the IPO, where an examiner can simply tick pre-defined grounds and fill-in editable portions of the document, as opposed to drafting an entire document;
- b) it is a significant step towards full-text data exchanges;
- c) normalized grounds are more predictable and understandable by holders of international registrations;

d) it becomes easier to extract reliable statistics on the most common grounds of refusals to guide users of the Hague System.

91. In addition, the CWS has defined Hague-related XML components for exchanges with the IPOs in WIPO Standard ST.96 (version 3.0). The Standard is a documented schema that improves the quality of exchange with the IPO, where it can be expected that the validated XML documents would result in greater data integrity and granularity. This version includes all the transactions for Hague Systems between IPOs and WIPO. In the course of 2018, the Hague System plans to move its electronic version of the Bulletin to ST.96 and invites IPOs to start using ST.96 for more efficient and effective communications with WIPO, taking into account the planned transition of Hague data services to the new WIPO Standard ST.96 format in 2021.

92. IPOs should also consider the ability to store, retrieve and display moving image files. The IB is evaluating the handling of such documents in its new ICT platform, assuming that the legal framework of the Hague System evolves in that direction. If so, the official publication of an international registration in the International Designs Bulletin might contain such moving image files in the future. Whilst the publication in the Bulletin constitutes sufficient publicity under the Treaty, there are a few IPOs that currently import the data and images from the Bulletin/Global Designs Database into their own back office systems, primarily for substantive examination or local republication purposes. Those IPOs, if they have an opportunity to revise the document management of their back office systems, should thus not restrict the permitted image files to only traditional image types and formats, but also be technically ready to accommodate moving image files and deal with the associated data storage and security issues.

93. The exchange of priority documents through the IB is not part of the international procedure under the Hague System. However, the submission of the priority document may at times be material to the eligibility for protection of the industrial design concerned. For this reason, the legal framework was revised in July 2014 to enable applicants to provide a DAS access code, which in turn enables a DAS-participating designated Office to retrieve authentic electronic copies of priority documents. In this regard, it is to be noted that, even if a given IPO does not usually require the submission of a priority document for its own procedure, its participation in DAS as a depositing Office would assist applicants claiming priority based on a first application filed with that Office.

Recommendations

R31. IPOs should continue and expand their use of standard grounds of refusal.

R32. The quality of exchange between IPOs and with the IB would be improved if IPOs move to using WIPO Standard ST96 for Hague-related XML components.

R33. Technical issues related to the acceptance of moving images need to be considered, alongside the associated preparations with regards to integrity in terms of transmission and storage – as well as publication and sharing.

R34. IPOs are encouraged to consider participating in DAS as depositing and accessing IPOs for design priority documents, which would potentially reduce costs and risk with regard to provision of certified copies in respect of Hague international registrations.

FINANCIAL DATA TRANSFER/PAYMENT TO BE MADE BETWEEN THE IB AND IPOs

94. The current model involves multiple settlement methods, data formats and often bi-directional payments between the IB and IPOs. These payments may also be across the different IP systems (PCT, Madrid, and The Hague) and in different directions for each IP system. For example, the United States Patent and Trademark Office (USPTO) bulk PCT payments to the IB and monthly Madrid and Hague fee payments in the other direction to the USPTO. Additionally there is the impact of capacity, security and volume on transaction flows between the IB and IPOs, e.g. holding of Madrid and Hague fees or crediting them to a Current Account for smaller IPOs. Reporting formats vary between IPOs from XML file uploads, to Excel files to PDF statements of records.

95. Essentially there is little active consolidation or netting of flows across the business units leading to higher transaction costs, settlement delays and more transactions than would be economically necessary.

96. With the above inefficiencies in mind, the IB will pilot a netting software system to concentrate flows between the IB and IPOs. This netting solution will consolidate bi-directional payments in multiple currencies to single direction payments and additionally consolidate what could be multiple currency payments to a single currency flow for each participant. The netting solution will also have the capacity to receive and transmit payment support details, such as the application number, in future iterations.

97. There are, however challenges involved in such a system: security for the participants over the application details that support payment transactions, identification and authentication between systems, timing differences which may arise when applications are filed in a manual or paper system creating delays and possible processing errors. Additionally, a variety of file formats are currently provided by the IPOs – standardization of the data file formats and provision of application data in a secure electronic format are therefore essential to ensure a smooth functioning single system which can handle high volumes of transactions for payment settlement.

98. The IB has commenced a limited pilot with key IPO participants and with a limited scope at present involving only PCT transactions. Future expansion to more participants will require the cooperation of IPOs to adhere to agreed settlement timetables, the use of web-forms for data collection and the adoption of standardized electronic filing systems, such as Madrid online filing. Training in the creation and transmission of the necessary secure file formats both from the filing systems and from the netting system to the IPOs finance and records system will need to be implemented in many cases.

Recommendation

R35. Enhance international cooperation among IPOs and the IB to adhere to agreed settlement timetables, the use of web-forms for data collection and the adoption of standardized electronic filing systems.

GLOBAL IP PLATFORM

99. WIPO has started an initiative aimed at introducing a single common IT platform (hereinafter referred to as “the Global IP Platform”), which connects the multiple IT platforms supporting the WIPO Global IP systems and services of the WIPO Arbitration and Mediation Center (AMC). The Global IP Platform would provide a single entry portal to users of WIPO Global Protection systems services and AMC services via a single WIPO account for each user and implement a user-friendly navigation policy with a common user interface and a central payment portal using a new global payment system. In the long run, the platform will offer a converged environment for accessing WIPO’s data assets, its value added ICT services including analytics and APIs. Access to the system will be based on a single sign-on (SSO)

account with capabilities in mapping individual users of WIPOs Global IP Protection Services with the entity they represent.

100. As key stakeholders in the Global IP Platform, IPOs are requested to explore means of supporting the interoperability of their account management and authentication systems with the Platform. Moreover, consideration is encouraged in exchanging ideas and planning for and developing strategies that enable IPOs to optimize the expected benefits of a converged environment for data assets, APIs, and the other value added services expected to come out of the Global IP Platform.

PART III: GENERAL ICT STRATEGY

INFORMATION SECURITY AND IP DATA ASSURANCE

101. With IPOs, the IB and third party providers increasingly relying on the use of ICT systems to deliver a highly interconnected and global IP system, the risk of cyberattacks and data breaches must be considered carefully. Applicants expect a high degree of confidentiality, integrity, availability and privacy of information they submit to IPOs. The value of IP information processed by IPOs has intrinsic worth and can be of value to various threat actors from cyber criminals to corporate espionage. In some cases, a breach of confidentiality of unpublished IP applications can lead to an economic cost to the applicant and reputational damage to the IPO in question as well as damage to the integrity of the IP rights. Unfortunately, the increasing and frequent reports of data breaches in the press has become a norm and many IPOs lack the knowledge, skills and resources to invest in information security to protect against threat actors that are far more sophisticated in their tactics, skills and investment capability.

102. It is therefore prudent that IPOs invest in meeting certain minimum standards for information security in order to demonstrate reasonable assurance of internal control effectiveness. While there are several international standards for information security such as ISO/IEC 27001, some IPOs may be obliged to meet their own national standards for information security, where applicable. Given the highly interconnected nature of the IPOs requiring transmission of IP data, there is a need to validate and verify this data by the receiving Offices. In the absence of the assurance of information security controls, it would be difficult for the receiving Office to trust the communication from the transmitting Office, which could be a source of infection, potentially leading to a breach of systems and data. WIPO Global IP Systems have been independently certified to ISO/IEC 27001. While the certification is not a guarantee of security, it provides a reasonable assurance that management controls exist to continually monitor, assess and mitigate information risks.

103. Should IPOs choose to adopt the Cloud for managing their ICT infrastructure and IP applications, similar information security risks extend to the Cloud service provider who could be a target of a cyber-attack or a conduit for a threat actor into the IPO. Cloud service providers should also be held to the same standard (or higher) for information security as the Offices, prior to executing a contractual relationship and during the term of the contract.

104. When integrating with international and regional systems for electronic exchange of IP information from IP applications, case file information, bibliographic data, or priority documents, these are done inconsistently between Offices using various mechanisms from secure file transfers, or in some cases APIs. Additionally, the adoption of these mechanisms varies with various Offices. Some of these mechanisms may result in duplication of information and errors when manually re-keying information, and potential loss of confidentiality if the shared secret for encryption is lost or compromised. There is an opportunity to standardize on modern and secure means and protocols allowing for authenticated machine-to-machine transfer of information between IPOs, without manual intervention. Use of secure web services and APIs will ensure authenticity (through digital signatures and timestamps), confidentiality (through encryption), and protection against Denial of Service attacks (through secure configuration of

attributes). These APIs could also be securely exposed to third party IP providers to transmit IP information to IPOs in a secure and consistent manner.

105. As discussed in the previous section, the Global IP Platform is intended to support interoperability between its various Global IP systems to provide an enriched user experience. One of these features will allow users authenticating to any one of the Global IP system to access their IP applications in other IP systems without the need to re-authenticate, using SSO. Communication between IPOs by machines or individuals frequently require some form of interactive authentication prior to transmitting, or accessing IP information. Unless informed by IPOs, an individual who left an Office may still have their account credentials active on data exchange systems, opening up the potential for misuse. The SSO functionality could potentially be extended to communication between IPOs without requiring interactive authentication each time, using federation protocols and technologies through the creation of a digital trust network between IPOs.

106. While adoption of Cloud technologies as in the case of the PCT and the Hague systems provide great business value to IPOs from a lower total cost of ownership, business continuity, and faster time to market, it also introduces information security risks among other risks that could lead to a potential compromise of IP data. In addition to ensuring that Cloud service providers are able to demonstrate reasonable assurance of internal controls through independent audits, IPOs will have to consider additional technical controls to protect against information risks in the Cloud. These include some key non-exhaustive controls such as encryption of sensitive IP data in Cloud environments with options to hold your own encryption keys, strong multi-factor authentication for applicants and administrators of the backend systems, isolation or segmentation of IP data based on security classification, and 24/7 monitoring, detection and response to malicious activity or anomalies on Cloud environments.

107. Data integrity, authenticity, and non-repudiation are an important attributes when transmitting IP information. While encryption technologies are commonly used for online filing of IP applications (see Reception of IP Filing in Part I) and also for IP information exchange between IPOs, to ensure confidentiality, there are not many cases of the use of digital signatures to ensure data integrity and non-repudiation. WIPO DAS for Priority Documents is one such example of the use of digital signatures. In the absence of such integrity controls, there is the possibility for intentional or unintentional modification of IP information while in transit. IPOs will benefit from agreeing to secure reference architecture for ensuring data integrity, authenticity and non-repudiation through the use of digital signatures and a central or managed Public Key Infrastructure (PKI).

Recommendations

R36. Agree on an international standard for information security such as ISO/IEC 27001 as a means to demonstrate reasonable assurance of internal control effectiveness by Offices. Where Offices are required to comply with their own national information security standard, a mapping to the international standard can be provided to demonstrate a healthy information security management system. For external Cloud service providers, agree on minimum certification and independent audits against standards prescribed by the Cloud Security Alliance STAR or SSAE (ISAE) SOC II Type 2 as a means of information security assurance in the Cloud.

R37. Consider standardized security mechanisms as part of the review of data exchange protocols.

CLOUD INFRASTRUCTURE HOSTING

108. A significant barrier to implementing advanced ICT systems, especially for smaller IPOs, has often been ICT infrastructure. Although ICT equipment has become commoditized and relatively affordable, IPOs still need to invest in basic infrastructure such as data centers, power supply, security and skilled staff to support the infrastructure. Because of these barriers, many small IPOs are still operating on unreliable, outdated and inadequate ICT infrastructure.

109. Cloud computing offers the possibility for smaller IPOs to take advantage of the massive economies of scale offered by Cloud service providers. The cost of hosting ICT systems on Cloud service providers may be a fraction of the cost of in-house data centers. The additional flexibility and access to modern secure technologies will increase the ability of IPOs to deliver world-class services to their stakeholders, especially online and paperless services.

110. However, IPOs should consider several new challenges before migrating to a Cloud computing environment:

- a) Governance and legal framework, including the territorial location and ownership of data centers and guarantees regarding data protection;
- b) The need for skilled staff to manage and configure the Cloud environment for optimal cost and performance. In particular, managing a Cloud environment for robust security and resilience requires new skills;
- c) As all Cloud resources are accessed over the internet, IPOs will need high bandwidth and reliable internet connectivity.

OVERALL DESIGN OF INTERNATIONALLY CONNECTED ICT SYSTEMS

111. As can be seen from Part I and Part II, there are commonalities in both strategies. IPOs are expected to optimize their investment in designing ICT systems, reflecting both national and international aspects. For instance, IP data generated by IPOs at the national phase such as a basic registration of a trademark or a first filing of a national patent application, in some cases, will become the basis of an international application filed at other IPOs either through the Paris route or under PCT, Madrid Protocol or the Hague Agreement. On the other hand, IP data processed by the IB often enters each national phase of certain IPOs or constitutes registration record of trademark of certain IPOs.

112. In complying with business and legal requirements of international collaboration among IPOs, the ICT strategy should make sure that an overall design of ICT systems of each IPO should be in one way or another connected to other IPOs and notably to the IB.

113. If a historic evolution of ICT systems of IPOs is described as a progressive move from independent stand-alone systems towards more integrated ICT systems to other IPOs and the IB, we are in transition to phases 2 or 3 as follows:

- a) Phase 1 (independent model): a totally independent IPO with its stand-alone ICT systems with no connection to other IPOs or the IB;
- b) Phase 2 (cooperated model): an IPO with a limited connection through which ad-hoc and manually processed transmissions of IP data are made to other IPOs and the IB;
- c) Phase 3 (connected model): an IPO with multiple connections through which transmissions of IP data are made by M2M transmission to other IPOs and the IB.

114. In theory, a phase of a full integration model may be a logical step to deepen multiple connections of IPOs, where an IPO connected to globally shared platforms at WIPO to manage IP data without managing the ICT system of its own, while keeping its ICT system exclusively dedicated to national services. However, this phase would not be accepted by some IPOs in view of their national policy, whereas other IPOs in particular smaller IPOs with limited resources may find the full integration model cost-effective, efficient and acceptable.

115. At all phases, it is possible and desirable to explore the possibility of sharing common tools developed by certain IPOs or by the IB to the benefit of all IPOs, in particular small IPOs with limited resources and which cannot afford to develop their own ICT tools. Certain ICT tools might as well be a global tool as the result of international collaboration, as more IP data may produce better ICT tools. Examples of common tools justifying international cooperation include search tools, classification assistance tools, and machine translation. WIPO Knowledge Network suggests that such international collaboration by contribution of IP data to the IB to create an IP knowledge reserve.

116. In view of experience and good practices established in recent years for international data transmissions, such as the Internet, international banking and e-commerce, challenges facing IPOs and the IB are common to those international transactions of data and business information. It is necessary to make sure for all participating IPOs and the IB, in providing certain services to users, that the following elements should be coordinated and standardized for interoperable ICT systems and M2M transmission of IP data:

- a) Common business strategy (already established under the Paris Convention, PCT, Madrid Protocol, and the Hague but with a need for updating and elaboration);
- b) Common ICT strategy;
- c) Common ICT policies such as policies regarding IP data and network security for international transaction of IP data, protocol of IP data transmission, and IP data dissemination;
- d) Common ICT tools for IPOs to share and use for national and international administration and services of IPOs and the IB;
- e) Standardized format and structure of IP data to enable M2M transmission.

117. WIPO has established a number of WIPO Standards with regard to e) above. Several tools have been developed by IPOs and the IB which were made publicly available in connection with d) above. However, on a), b), and c), little has been discussed and agreed.

Recommendations

R38. Improved methods should be explored for integration with international systems and for centralized systems. Create a centralized service, as a demonstration/prototype, with open and standard APIs, for dissemination of classification and standards data and for transactional data exchange between IPOs and regional/international IP systems.

R39. Share information about online services (filing, subsequent transactions, etc) with the aim of identifying common transactions and services that could be made available through APIs to enable interoperability of systems, including systems developed by third party solution providers.

R40. Explore the possibility of global joint projects to capitalize on common interests and synergy of IPOs.

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