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THE INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) STRATEGY OF THE WORLD INTELLECTUAL PROPERTY ORGANIZATION (WIPO)

Information document prepared by the Secretariat

1. This document contains the Information and Communication Technology (ICT) Strategy of the World Intellectual Property Organization (WIPO).
2. After a process of deliberation and discussion over a period of one year, the WIPO ICT Board, at its eleventh session held on November 15, 2013, approved the attached ICT Strategy.
3. The ICT strategy was distributed to the WIPO Independent Advisory Oversight Committee (IAOC) at the closing of its 31st Session in November 2013. The ICT Strategy was subsequently presented and discussed during the 32nd Session of the IAOC, which took place from March 17 to 21, 2014.
4. The ICT Strategy was made available on the WIPO Public Site on December 10, 2013.

[The WIPO ICT Strategy follows]



WIPO ICT Strategy

December, 2013

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EXECUTIVE SUMMARY

Intellectual property has gained enormously in importance in recent decades for the economies of nations, regions and the world as a whole. At the same time, information technology has moved at heart of these economies, as most modern day industrial production and commercial transactions are now highly dependent on ICT infrastructure and platforms.

As the global forum for intellectual property services, policy, cooperation and information, WIPO's mission is to lead the development of a balanced and effective international intellectual property system that enables innovation and creativity for the benefit of all.

ICT also lies at the core of WIPO's execution of its mandate and conditions various dimensions of its work. It has evolved into the primary means for WIPO to deliver its services, and it permits those services to distinguish themselves from other avenues for seeking intellectual property protection at the global level.

The present ICT Strategy describes the role of information technology at WIPO and how it is expected to shape WIPO's approach to its work and program delivery. The ICT Strategy in particular is meant to ensure that the long-term evolution of WIPO's ICT solutions is capable of meeting the following demands:

- (a) Providing state-of-the-art services to a divergent range of stakeholders, both in terms of their economic development and their geographical spread on the globe;
- (b) Permitting those services to be delivered in the most cost-effective manner possible;
- (c) Ensuring appropriate data security, as well as protection against business interruptions;
- (d) Capitalizing on opportunities for providing new value-added services;
- (e) Assisting developing countries in their economic advancement by providing them with the capacity to effectively participate in the global networked intellectual property system;
- (f) Enhancing management control of WIPO;
- (g) Establishing a robust yet flexible ICT management framework for WIPO.

I. INTRODUCTION

This ICT Strategy describes the role of information technology at WIPO and how it is expected to shape WIPO's approach to its work and program delivery. The time horizon of this ICT Strategy is approximately five years, covering the period until the end of the 2016/17 biennium.

All of WIPO's areas are supported by information technology, at least to some degree. At its most basic level, this support will consist of standard office software (e.g., word processing), some administrative functionality (e.g., leave management), internal communication (intranet) and internet connectivity. However, in other areas, this support takes the form of dedicated, often bespoke, computer systems, which in certain cases can be large and complex, in particular if they are designed to interact with similar national or regional systems, such as is the case, for instance, in the PCT and Madrid.

Rather than describing in detail all of WIPO's systems, this ICT Strategy will cover only those that are considered essential from a strategic point of view, namely those used in:

- (a) The PCT;
- (b) Madrid and Hague;
- (c) Global Infrastructure; and
- (d) Administration and Management.

The first three are at the core of WIPO's substantive role in the international intellectual property system, including in respect of development, whereas the purpose of the fourth is to facilitate the management of the Organization by providing necessary administrative support and control functions.

The initial sections of this ICT Strategy are devoted to the context in which it needs to be placed, namely the IP Environment, WIPO's Role in the IP Environment, and Emerging Technology Trends. The Strategy then moves on to describe its Key Elements, how ICT is governed at WIPO, and how it is shaping the evolution of the PCT, Madrid and Hague Systems, Global Infrastructure, and Administration and Management. Finally, a section is devoted to the role of the CIO and the Information and Communication Technology Department.

II. THE IP ENVIRONMENT¹

In the knowledge economy and the innovation-driven society, investment in intangible assets is growing and, in a number of countries, now matches or exceeds investment in tangible assets. In recent decades, this development has led to an expansion of the demand for intellectual property titles, the major legal basis for the protection of intangible assets. For instance, demand for patents increased across the world from around 800,000 patent applications in the early 1980s to 1.8 million by 2009, with the greatest increase in demand occurring as of the mid-1990s. Trademark applications show a similar evolution due to an increased emphasis on brand distinction in both domestic and global markets. These trends are likely to continue for the foreseeable future.

At the firm level, intellectual property also is at the cutting-edge of business activity. For the world's major companies, use of intellectual property is an indispensable strategic means of gaining domestic and global market share and competitive advantage. Research based on market valuations of firms in Standard & Poor's 500 Index indicates that intangible assets account for about 80 percent of the average firm's value, whereas physical and financial assets account for less than 20 percent of the balance sheet. It should therefore come as no surprise that the world's leading business innovators figure prominently among the many and diverse users of the IP system.

As a consequence of these economic and business developments, intellectual property, once seen primarily as a technical matter for legal experts, is now a high priority for governments, businesses, researchers, academics, individual creators and civil society. With this growth in importance, intellectual property has also attracted greater political attention and controversy. This is true not only at the national level, but also internationally, where the evolution of intellectual property is tightly linked to international trade, globalization and the accompanying redistribution of economic power.

One related development is the geographical shift in the use of intellectual property, reflecting underlying trends in economic activity, international trade and technological production. While traditionally the demand for intellectual property rights has come mainly from Europe, Japan and the US, over the past two decades there has been a shift to other economies, most notably Asia and in particular China and the Republic of Korea. The share of cross-border patent applications from Europe, Japan and the US dropped from 77 percent in 1995 to 59 percent in 2009. At the same time, China's share rose by more than 15 percentage points. Similar developments have been witnessed in applications for trademarks, where China, Japan and the Republic of Korea also figure amongst the most sought after jurisdictions.

¹ For more on the subject, see *The Changing Face of Innovation*, 2011 World Intellectual Property Report, WIPO Economics & Statistics Series, pages 23 – 72.

III. WIPO'S ROLE IN THE IP ENVIRONMENT

WIPO is an international organization with 186 Member States, whose mission is to promote innovation and creativity for the economic, social and cultural development of all countries, through a balanced and effective intellectual property system. WIPO aims to achieve this mission through a number of Strategic Goals, which were adopted by WIPO's Member States in December 2008 to refocus the Organization's work in response to the changing IP environment described above.

These goals include:

- (a) *Global IP Services*: Innovators and businesses seek responsive, streamlined international systems to enable them to protect their intellectual assets in multiple countries. An important cluster of WIPO treaties – covering the international protection of inventions (the Patent Cooperation Treaty, or “PCT”), trademarks (the Madrid Agreement Concerning the International Registration of Marks and its Protocol, or “Madrid”), industrial designs (the Hague Agreement Concerning the International Registration of Industrial Designs, or “Hague”) and appellations of origin (the Lisbon Agreement for the Protection of Appellations of Origin and their International Registration, or “Lisbon”) – ensures that a single international registration or application will have effect in any of the relevant signatory states;
- (b) *Global IP Legal Framework*: A fundamental WIPO activity is to facilitate a balanced evolution of international IP norms. The process is driven by the Organization's Member States and involves consultations with a wide spectrum of stakeholders;
- (c) *Global IP Infrastructure*: WIPO responds to the need for tools, services, standards and platforms that can enable IP institutions and other IP actors to work more efficiently, collaborate more effectively and provide high-quality services to stakeholders and users. An enhanced and strengthened international IP infrastructure allows innovators to share information and simplifies the exchange of data and knowledge between IP actors;
- (d) *Development*: Using the IP system to further economic development requires adequate institutional infrastructure and human resource capacity. WIPO provides support to developing countries, Least Developed Countries (“LDCs”) and countries in transition in building infrastructure and capacity and in formulating and implementing national IP strategies and plans, consistent with each country's needs, development priorities and resource base. The WIPO Development Agenda provides specific guidance, particularly in recommendations 10 and 12, on the provision of ICT-based technical assistance for development.

WIPO, however, is not the exclusive forum where these services are offered or activities take place. For instance, businesses have various other options to secure international protection for their intellectual property rights. These include alternative or complementary filing routes (in the case of patents and trademarks, the so-called Paris route, and the Patent Prosecution Highway for patents). In addition, certain regional organizations, such as the European Patent Office (EPO) in the field of patents and the Office for the Harmonization of the Internal Market (OHIM) in the field of trademarks, are seeking to offer platforms similar to the global platforms offered by WIPO. Finally, in light of the difficulties faced by multilateral public sector institutions to respond quickly to the pace of change in technology and business, solutions are often developed by business itself or provided through technology. Google's growing role in providing a global digital library (“Google Books”) and in the dissemination (and translation) of worldwide patent data is an illustration of this trend.

Information technology is a means of IP management and infrastructure, and is an indispensable enabler of WIPO services:

- (a) Information technology systems and networks, permitting the reliable receipt, examination, translation, publication and dissemination of intellectual property data, are at the heart of WIPO's Global IP Services;
- (b) The WIPO Global IP Infrastructure seeks to make available additional worldwide interoperable and interactive ICT platforms, as well as structured databases, covering a broad range of intellectual property subject matter;
- (c) Access to information, including technology, is critically important for development and for allowing countries to realize their political, economic and social goals. WIPO undertakes a broad range of activities to facilitate such access. A common feature of these initiatives is their reliance on information technology as a critical means of achieving these objectives.

IV. EMERGING ICT TRENDS

Because information technology lies at the core of WIPO's most important activities, the Organization must constantly take into account of the evolutions affecting the technology landscape. Some of the most recent trends having a bearing of the functioning of WIPO include the following:

- (a) *Business intelligence.* According to a recent Forrester survey², business intelligence related technologies and practices have matured considerably and are now a key factor in changing the technology landscape of organizations. When adopted effectively, business intelligence provides valuable opportunities to improve competitiveness and operational effectiveness;
- (b) *Social media.* Social media are redefining how individuals and organizations interact with each other. This is far more than just the conversation or dialogue. Social media can also be used to conduct deep market research, stimulate product innovation and lifecycle management, manage customer relationship etc.;
- (c) *Consumerware.* As a result of the growing penetration of information technology in our daily lives, employees and customers are redefining how organizations provide information technology. The increasing popularity of mobile devices and apps has also made it difficult to completely separate personal from professional usage. Corporate ICT departments can no longer take the simple approach to wall off such devices and apps from their employees. When it comes to delivering services to customers, there is no other alternative but to embrace such technologies;
- (d) *Cloud computing.* Within a few short years, cloud computing has already become a reality for infrastructure, platforms, applications and services. As businesses continue to expect agility and flexibility, the adoption of cloud computing will only further increase as a viable and cost-effective complement to traditionally in-house hosted or outsourced ICT services;
- (e) *Information security.* Trendy technologies and practices, including some of the above, have created significant challenges for information security. The old approaches of erecting fences, digging trenches, and limiting entries are now totally inadequate in

² Forrester June 2011 Global Technology Trends Online Survey.

providing credible information security in today's all-connected world that is thirsty for innovation;

(f) *Big data.* As noted by the U.S. National Science Foundation, “[p]ervasive sensing and computing across natural, built, and social environments is generating heterogeneous data at unprecedented scale and complexity. Today, scientists, biomedical researchers, engineers, educators, citizens and decision-makers live in an era of observation: data come from many disparate sources, such as sensor networks; scientific instruments, such as medical equipment, telescopes, colliders, satellites, environmental networks, and scanners; video, audio, and click streams; financial transaction data; email, weblogs, twitter feeds, and picture archives; spatial graphs and maps; and scientific simulations and models.”³ The challenge is how to manage this information so that it is possible to reap the benefits of its availability;

(g) *Internet access.* Traditionally, poor internet access has been a constraint to delivering ICT-based services, particularly in developing countries. However, internet access has been quickly expanding in recent years and offers the possibility for developing countries to “leapfrog” older technologies and to deliver internet-based IP services. The business areas of WIPO can take advantage of this trend in their service delivery models.

³ National Science Foundation, Core Techniques and Technologies for Advancing Big Data Science & Engineering (BIGDATA), Program Solicitation, NSF 12-499, page 5.

V. KEY ELEMENTS OF WIPO'S ICT STRATEGY

Demands for WIPO's services are steadily increasing both in terms of volume and geographical coverage. While such expectations create opportunities, they also create additional challenges in terms of service availability, systems performance and information security. The present ICT Strategy is intended to serve as a road map for how to manage this evolution. It is organized around a number of elements, some of which are of such importance to the work and mandate of WIPO that their implementation is indispensable, whereas others are more a matter of strategic choice.

Indispensable elements

The indispensable elements of WIPO's ICT Strategy are:

(a) *State-of-the-art services*

WIPO has 186 Member States, with many different levels of development amongst them. At one end of the spectrum, many users of the services offered by WIPO are among the most technologically advanced companies in the world. In addition, WIPO has close institutional and operational links with the most modern intellectual property offices. Each of these private and public entities depends heavily on information technology for their own business processes and for the provision of quality services to their clients. The sophistication of WIPO's information technology solutions must meet the expectations of these actors;

At the same time, however, WIPO's solutions must be flexible enough to provide services which can be consumed by entities and communities in developing countries whose ICT capabilities are sometimes less advanced. Especially in those countries, internet performance has yet to meet industry expectations. As the pace of global economic recovery is yet to pick up, major investment in internet infrastructure is not expected in the near future;

In addition, the geographical location of users of WIPO services is increasingly spread throughout the globe. As noted in the previous section, one important change in the international intellectual property landscape is the shift towards of a preponderance of Asian users;

The ICT services offered by WIPO must be cognizant of these external factors and developments. The ICT Strategy seeks to ensure cutting-edge and flexible functionality, near 24/7 systems availability, and an infrastructure capable of delivering services of equivalent high quality to a user community that is more homogeneously distributed across the Organization's main markets.

(b) *ICT security and defense systems*

Much of the information handled by WIPO is of a highly confidential and commercially sensitive nature. Whilst this is most notably the case for the patent applications filed under the PCT, the Hague system has equivalent confidentiality requirements:

In recent years, information security related risks have grown exponentially. Today, WIPO not only has to deal with the traditional computer virus, phishing and penetration attacks (with ever increasing sophistication), but also to defend itself against sometimes well-resourced large scale attacks intended to cause major and public disruptions publically, as well as more pervasive but persistent attacks intended to secretly obtain sensitive information continuously over time;

While addressing these risks, WIPO's information security strategy is also expected to address internal controls, especially automated controls, to improve information assurance, as WIPO's information systems are becoming more and more integrated with its business processes;

Paradoxically, in addressing these information security risks, WIPO needs to meet increasing expectations, both on the part of its employees as well as of its global clients, for enhanced connectivity and mobility at all times from anywhere.

(c) *Business continuity*

Not so long ago, the purpose of information systems was to "support" the business process. Typically, when there were interruptions in the availability of these systems, the work, or at least substantial portions thereof, could continue to be performed, although admittedly at a much reduced level of efficiency. Nowadays, information systems have become much more central to the business process. For instance, in the PCT, Madrid and Hague systems, paper files no longer exist, because the entire operational process has become electronic. If the information systems supporting these business areas become unavailable, it simply becomes impossible to perform any work in these departments. This dependence on information technology is likely to deepen even further in the future, in particular if the ICT systems of various actors in the global IP system begin to interact with each other synchronously. For certain aspects of the work, it is anticipated that the distinction between the business process and the related information systems will disappear. This evolution has already run its course in certain national intellectual property offices, the Japan Patent Office (JPO) being a good example, where the formality examination of more than 300,000 patent applications per year is performed in a largely automated fashion;

Various adverse events, from natural disasters to man-made disruptions, may impact on WIPO's ability to conduct its business. Consequently, business continuity is becoming an urgent matter for the Organization and it is, to a large extent, dependent on the capability of its critical ICT systems to withstand or recover from these adverse events. This presents a particularly challenge for WIPO as the rapid organic growth of information systems in the past had not offered the benefit of enterprise-wide systems architecture design and subsequently it is difficult to segregate the systems based on priorities to establish the business continuity capability cost-effectively.

(d) *Efficiency*

Reflecting the increased economic importance of IP, WIPO's Global IP Services have experienced sustained growth since they came into existence and this growth has been truly extraordinarily in certain respects. For instance, since it began to operate in 1978, the PCT has known only one year where there was a decrease in filing rates (2009, due to effects of the global recession). In 2011, filing rates grew on average by 10.7%, despite a weak economic outlook in two of the most important filing regions (North America and Europe). In the same year, Chinese, Japanese and Korean filings grew by 33.4%, 21% and 8% respectively. Madrid and Hague systems also experienced growth of more than 5% in 2011. Growing workloads at WIPO, however, are not confined to the registration systems. They also result from a higher emphasis placed on developmental issues following the adoption of the WIPO Development Agenda;

While these growing workloads are accompanied by higher income for the Organization, mainly due to the growth in PCT fees, these increases in revenue may not keep pace with future cost pressures, unless significant efficiency gains are

achieved. The ICT Strategy recognizes that information technology is a primary means of securing these efficiency gains.

(e) *Interoperability*

The entire industrial property system (encompassing patents, trademarks and designs) can be viewed as a network of international, regional and national intellectual property offices collaborating on the basis of agreed upon frameworks, with WIPO as a central node in the configuration. Information technology is fundamentally transforming this collaboration (including the manner in which WIPO operates) through the conversion of data in digital and machine-readable formats, the integration of such data into searchable databases and the making available of such databases on global networks;

To deliver higher-quality services in this environment, this ICT Strategy emphasizes the importance of interoperability in the development of global standards, data formats and systems.

Elements of Strategic Choice

The elements subject to a strategic choice by the Organization are:

(a) *Federated Governance Model*

With the exception of infrastructural issues (hardware and network), there has traditionally been relatively little central management of ICT in the Organization, leaving the initiative and decision-making, particularly in terms of application development, mostly to the various business departments. This approach has been successful, and has resulted in the wholesale modernization of the information systems in a number of important areas, most notably the PCT and Madrid. However, because of internal and external pressures, a more organizational and coordinated approach is required. In response to this need, the ICT Strategy proposes a federated ICT governance model, where appropriate authority remains delegated to the various business departments, which, however, are required to operate under an ICT management framework and guidance set by the ICT Board;

(b) *Enterprise architecture and data management*

In any organization the evolution of ICT needs to be driven by the business within the context of enterprise wide solutions. Enterprise architecture helps the Organization determine the structure and operation that can most effectively achieve its current and future objectives. Enterprise architecture provides a number of views or perspectives of the Organization. Through these views the Organization can make more informed decisions, be more flexible and responsive to changing business needs and market conditions, identify and improve inefficient processes, eliminate redundant processes and use the limited organizational resources more optimally. Within a federated governance model, where authority remains delegated to the various business departments, enterprise architecture plays an important role in ensuring consistency and reusability across to the Organization, and is a cornerstone of the ICT Strategy.

The amount of data WIPO needs to accommodate is expected to increase for more than five folds within the medium term. Without re-examining WIPO's data management, practices and technologies, this is likely to create significant financial and technological

challenges for the Organization to sustain. Furthermore, with large amount of data under its custody, there is increasing expectation to harvest better analysis for decision making.

(c) *Rightsourcing*

The ICT Strategy starts out from the premise that it would be both inappropriate and unsustainable to meet the growing demands placed on WIPO in respect of ICT primarily by increasing staffing levels. In keeping with the need to take a nimble and pragmatic approach to the issues, the ICT Strategy therefore relies to a considerable degree on outsourcing, but primarily for commodity-type services and in a tightly controlled manner, thus achieving maximum resource flexibility, while ensuring that business intelligence remains within the Organization;

At the same time, to be able to manage the change process, the Organization must secure the right staff skills. The ICT Strategy contemplates the creation of a skills inventory to identify key management and technical skills that are needed in-house, which will drive long-term HR planning, recruitment, succession planning and training. In addition, the ICT Strategy places more emphasis on matrix management with a view to ensuring that the resources are utilized in the most effective manner possible, in manner that crosses the Organization's traditional vertical business areas.

(d) *External Offices*

External offices play an increasingly important role in the effective delivery of WIPO's products and services, including development oriented services, to Member States and other stakeholders. They provide a platform for the evolution of WIPO as a truly global organization that delivers coherent services more efficiently and responsively through closer co-operation with the stakeholders and beneficiaries. For these external offices to function effectively, the ICT Strategy foresees that they be connected in a seamless manner to WIPO's administrative systems in Geneva and to each other, so that the necessary information flows and resulting management coordination can be assured (the "WIPO Global Office").

(e) *Mobile and virtual meetings*

The explosive growth of the consumerization of mobile technologies has started to influence enterprise technology environment. Organizations start to enable existing applications and business processes with mobile capabilities to extend their usefulness to employees as well as to customers, partners and service providers. New generations of services based on mobile technologies are also emerging. This trend is expected to accelerate. While this trend creates greater opportunity for WIPO to increase employee productivity and enable its services delivered online to respond more efficiently to client's expectations, it also renders the effectiveness of the traditional controls based on the rigid segregation between personal and enterprise devices. This leads to additional difficulties in safeguarding confidential information.

The modalities of meetings and conferences are changing. It has been rather recent that WIPO has introduced the live broadcasting of major meetings over the internet (webcasting) and making the recordings available on demand (Video-on-Demand or VoD). The construction of the new Conference Hall provides WIPO the opportunity to take this further in meeting Member States' expectations for remote participation.

VI. ICT GOVERNANCE AT WIPO

WIPO, for most of its existence, has been organized along very vertical lines. This organizational model permeated most aspects of the Organization's work, including ICT management. As a result, the major business lines (principally PCT and Madrid) led the design and development of the ICT applications supporting their processes in a highly independent manner. Only infrastructural aspects were managed centrally, and were provided as a service to the business lines.

This model has yielded many positive results for the Organization, most notably the complete transformation of the old paper-based PCT and Madrid processes into fully electronic processes. These successes were largely due to the fact that, on the one hand, authority for the design and implementation of the systems were delegated to those people who were closest to the business and therefore understood it best, and, on the other, any layer of bureaucracy typically associated with more centralized organizational models was avoided.

Given these achievements, the past model should be maintained, especially given the specialized needs of each business areas. However, several factors have emerged, both internal and external, that require adjustments to the model, to ensure more coordination and coherence. These factors are the following.

The first such factor is technology itself. Technology has now evolved to the point where its ability to integrate systems and offer a deep view of all aspects of the business cycle yields such compelling management benefits that they can hardly be overlooked. One important driver of this at WIPO is Enterprise Resource Planning (ERP), including Business Intelligence. This project aims not only to modernize the Organization's many disparate legacy administrative systems, but also to link them up to the core systems in the business departments. This will offer much more comprehensive and effective planning, monitoring and reporting facilities, which will significantly enhance the control of the Organization, to the benefit both of the Secretariat, as well as the Member States.

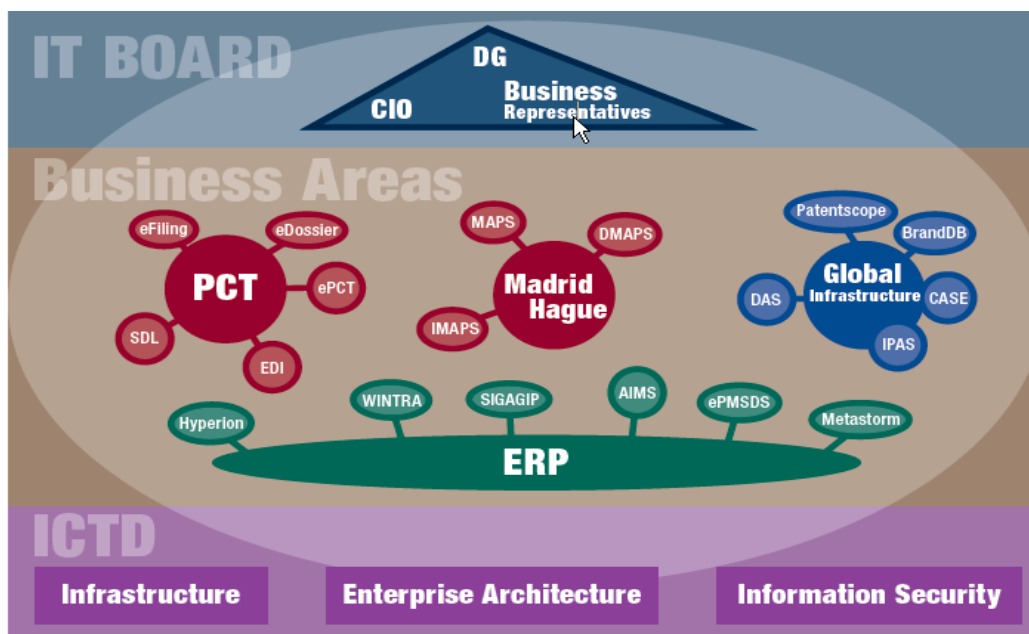
The second factor driving this change is information security. As previously noted, much of the information handled by WIPO is of a highly confidential and commercially sensitive nature. The worrying increase in recent years in the number of hacking attacks throughout the world has been widely covered in the media, and may well become one of the principal scourges of the information age. Given this anarchic environment, the very loosely coordinated approach to the Organization's information architecture which was implicit in its old management model can no longer be sustained, because it would expose WIPO to an unacceptable degree of risk.

The third factor is costs. If the business areas are left to work too independently on their own, almost inevitably some degree of wastage across the Organization will manifest itself, because of redundancies and insufficient focus on synergies. In light of the severe financial pressures facing WIPO, which are likely to grow in the future, more robust overall management of resource allocation and priority setting in the area of ICT is necessary.

While a shift away from the old highly independent model is required for the reasons set out in the previous paragraphs, it is important not to over-compensate. The best ICT governance structure for WIPO is one that preserves the advantages of the previous model but, at the same time, addresses its deficiencies. Bearing these objectives in mind, a "federated governance model" is the best way forward for the Organization. Under this model, appropriate authority remains delegated to the various business departments, which, however, are required to operate under an ICT management framework and guidance set by the ICT Board. A graphical representation of the federated governance model is provided below.

The roles and responsibilities of the various instances in this framework are as follows:

- (a) The ICT Board, comprising the Director General, the Chief Information Officer (CIO) and a number of key business representatives, sets the overall strategic direction, initiates and monitors projects of key importance, and sets organizational priorities;
- (b) The Business Areas continue to be principally responsible for the design, development and operation of the systems supporting their own business lines, as well as for the resources required for this work;
- (c) The Enterprise Architect, reporting to the CIO and to the ICT Board, is responsible for ensuring that common IT infrastructure elements (data management, application architecture elements, etc.) are available and that strategies implemented in the business areas are consistent;
- (d) The Information and Communication Technology Department (ICTD) delivers infrastructure and technical services to the business areas and provides guidance and oversight in respect of information security and enterprise architecture.



VII. ICT IN WIPO'S MAIN BUSINESS AREAS

The ICT landscape for the PCT, Madrid and Hague systems is characterized by the following main factors:

- (a) Rising numbers of applications mean that it is increasingly important for Offices to maximize the efficiency of their processing and to minimize all delays – including those from transmission and document handling and classifying. Failing this, Offices will produce lower quality work or fail to meet important time limits, either of which may have adverse effects for applicants, effectiveness of the Offices and perception of the system;
- (b) Increased membership of, in particular the Madrid and Hague systems in Asia and South America, will challenge the efficiency of communication services with both Member States and clients;
- (c) The norm of electronic services in all sectors of society has created an expectation of immediate and up to date information and responsive, interactive feedback to requests for services. Improvements are occurring in national processing and it is important to ensure that the PCT, Madrid and Hague systems deliver services effectively if they are to be the system of choice for seeking international protection;
- (d) There is an increasing third party appetite for directly usable IP information of a wide variety of types. In respect of patents, this includes technical information to assist technology transfer and bibliographic and processing information to track competitors, or create more effective patent landscapes and economic models;
- (e) As globalization progresses, the delivery of electronic services in multiple languages leads to broader design considerations in the construction of ICT systems;
- (f) The ability of the national and regional Offices to develop and support their own ICT infrastructure varies dramatically. It is important to ensure in particular that the digital divide is reduced for IP services to developing countries;
- (g) For those with their own ICT systems, the data standards used also vary significantly, making fully consistent processing more difficult, though the PCT, Madrid and Hague systems offer greater standardization than exists for national systems more generally.

Specifically from a data management perspective, the PCT, Madrid and Hague systems also have the following additional features in common:

- (a) The vast majority of transactions in these systems are in electronic form (often through the internet);
- (b) The various actions that are required for the management of a particular right within these systems are not taken by a single entity (for instance, the International Bureau), but by a network of entities, operating in a procedurally orchestrated manner at the national and regional levels (for instance in the PCT: the Receiving Offices, the International Bureau, the International Searching and Preliminary Examining Authorities, and the Designated and Elected Offices);
- (c) In the course of the management of the rights in question a wide variety of data is generated by the applicants and Offices. This data is valuable because, at the micro-level, it provides detailed information on the status of the rights in question, and, at the

macro-level, it reveals important trends in the international intellectual property system, which, in turn, can point to new technological, commercial and economic developments.

While the data generated by the PCT, Madrid and Hague systems is of great value, it is unfortunately not complete. This is because the rights that are subject to these systems (or rights that are closely connected to them) are also covered by other separate procedures which are not institutionally or operationally connected to the PCT, Madrid or Hague. Typically, these are the national or regional procedures for the protection of patents, trademarks and designs, but other international procedures can come into play as well (such as the Patent Prosecution Highway).

In other words, while an enormous amount of valuable IP data is available at the international, regional and national levels, the full potential of this data cannot currently be unlocked, because:

- (a) The overall system has not been designed with this purpose in mind;
- (b) The relevant data elements that would need to be connected cannot currently be connected to a sufficient degree, because they are stored and managed in disparate systems;
- (c) Designing the means of presenting this vast amount of data in ways that can conveniently be consumed by the various classes of interested parties is a formidable challenge and a complete solution does not yet exist.

One objective of WIPO's Global Infrastructure initiative is to make a major contribution to solving these problems.

Patent Cooperation Treaty (PCT)

The PCT is the most widely used of WIPO's global protection systems, allowing a single patent application to be made to a receiving Office which has effect in each of the Contracting States of the system. The international phase of the application involves processing according to strict time limits by various different Offices:

- (a) The Receiving Office ("RO": initial receipt of the international application and formalities checking);
- (b) The International Searching Authority ("ISA": a search to determine whether the claimed invention is new and inventive, a written opinion on novelty, inventive step and other issues plus a variety of other responsibilities in special cases);
- (c) The International Bureau ("IB": international publication, translations of abstracts, international search reports and written opinions, transmission of information to Offices, coordination of activities plus a variety of other responsibilities in special cases);
- (d) In some cases Supplementary International Searching Authorities ("SISA") and International Preliminary Examining Authorities ("IPEA").

After the international phase, the application enters the national phase before Designated or Elected Offices ("DO" or "EO") which make the decision whether or not to grant a patent in accordance with the relevant national law.

Apart from the general considerations set out in the previous section, the context for the PCT also needs to take into account the increasing connectivity between national systems and the PCT as well as between national systems independent of the PCT. In particular:

- (a) International applications are not normally a “first application” for the invention but most commonly “claim priority” from an earlier national patent application. The process of claiming priority requires a certified copy of the earlier application to be prepared by the Office where it was first filed and be sent (directly or via the applicant) to the IB. The earlier applications have usually not been published and are highly confidential;
- (b) The PCT processing may also take advantage of work done on the priority applications – it may be necessary to transmit (directly or via the applicant) copies of documents such as national search reports from the Offices which established them to the RO, IB or ISA;
- (c) When the international applications enter the national phase, the work is taken over by the designated Offices in a manner similar to normal national patent applications. However, these Offices need to receive information effectively from the IB for the national processing to begin and it may also assist efficient and high quality processing to receive information about the prosecution of the international application before other designated Offices.

Many of these processes have direct equivalent requirements in conventional national processing using the Paris Convention to claim priority independent of the PCT. Various systems are being set up to support the processing, notably including the WIPO Digital Access Service for Priority Documents, WIPO-CASE and as parts of plurilateral initiatives such as One Portal Dossier and Global Dossier and it is important to ensure compatibility and synergy between PCT and related systems.

The PCT aims to provide an electronic hub (“ePCT”) for all international phase processes in a selection of manners.

Offices will be provided with a range of tools appropriate to different levels of automation. A web browser interface can be used by Offices with no automation of their own, where local automated systems are not yet capable of direct communication with the IB, or for individual services which have not yet been automated satisfactorily. The PCT-EDI system can be extended to permit batch processing of documents and data of an increased range of types. Web services will be provided where appropriate to permit near-real-time interactions to be automated effectively.

Applicants will be provided with a browser interface permitting information from and interaction with all Offices (RO, ISA, SISA, IPEA as well as IB) collaborating using the electronic services. Web services may also be provided for some functions to be integrated with commercial patent management/docketing systems.

New services will, as far as possible, be data-driven, relying directly on information input by the applicant or Office responsible for requesting an action, rather than using traditional forms and letters which need to be read and the relevant information transcribed.

To the extent possible, ePCT will draw on related international electronic services such as DAS and WIPO-CASE to provide improved levels of service or easier integration of services for national Offices wishing to use consistent approaches for Paris and PCT-route applications. Services will seek to provide single sign-on with Madrid, Hague, DAS and other related WIPO services and share experiences and potential common issues in order to work towards a more consistent approach across WIPO’s services related to IP application and registration activities.

The ePCT system aims to reduce the workload per application for Offices and time taken to process applications by:

- (a) Reducing the formalities defects in filings;
- (b) Automating and, where appropriate, reviewing or deleting processes which could be done more effectively or are no longer necessary;
- (c) Relying on data input by the applicant or Office which is responsible for beginning an action, eliminating transcription time and errors; and
- (d) Eliminating postal delays and related processes such as manual scanning, classification and routing of documents.

The system also aims to improve the quality and availability of patent information, by receiving information in forms which can be processed directly and made available to applicants, Offices and the public.

The biggest concern for PCT ICT systems is security. It is essential that all systems are highly secure in a wide range of senses: assurance of delivery and integrity of documents and data as well as certainty that access to confidential information is properly limited to authorized parties. Failure on any of these issues may cause a significant loss in confidence in the system.

Availability of systems is also a major factor. As applicants and Offices increasingly rely on ICT systems for their work, non-availability of the systems changes from a minor inconvenience to a major problem. For applicants, non-availability may mean loss of rights due to late first filings or missing time limits for later actions. For Offices, non-availability of systems relied on for core functions may mean Office staff are unable to work.

Set against these points, failure to invest in and increasingly rely on appropriate ICT systems will result in the loss of PCT system market share to alternative routes of protection which improve their service offerings better and faster. It will also hamper the delivery of patent information benefits which are sought by third parties.

Madrid and Hague

The Madrid and Hague systems are international registration systems for the protection of trademarks and industrial designs respectively. These systems establish international registers which have been in existence for 120 years in the case of the Madrid system, and have been in electronic form since the mid-1990s.

System stakeholders are as follows:

- (a) The IB of WIPO, responsible for the administration of the two registration systems, establishing an electronic register of international trademark and industrial designs rights;
- (b) In the case of Madrid, the Office of Origin, the Office where an applicant for international trademark registration is entitled to file;
- (c) Designated Contracting Parties, member countries where protection is sought.

The legacy ICT systems facilitating WIPO's administration of the Madrid and Hague procedures also date from the mid-1990s and comprise a full electronic records management capability together with bespoke work flow management, paperless internal procedures and full bidirectional electronic communication capability with system stakeholders.

Designing and building appropriate ICT systems supporting the Madrid and Hague systems into the future, implies the development of an ICT strategy which will result in the following key stakeholder service elements:

- (a) The electronic registers of the Madrid and Hague systems will be open to, and accessible by stakeholders, in real time, over the internet, according to their specific role, using standard internet browsers. Offices therefore will have access to all data pertinent to their registration system roles and procedures. Applicants, holders and representatives will have access to their portfolios in real time over the internet. Third parties and the general public will access all published IP information derived from the Madrid and Hague registration systems;
- (b) The IB's ICT processes and procedures will be available for integration with office ICT processes and procedures using web services. Such integration will result in a procedure with minimized procedural boundaries as well as reduced latency due to the introduction of synchronous communications capabilities with stakeholder systems;
- (c) Offices, applicants, holders and representatives will have the possibility to interact with the electronic registers, directly, synchronously, real time and in self-service mode;
- (d) The IB will establish appropriate client tools that facilitate administrative processes undertaken by system stakeholders in the area of classification translation inter alia.

The ICT strategy for the Madrid and Hague systems is intended to ensure the ongoing attractiveness of these registration systems by:

- (a) Providing real time access to registration information;
- (b) Providing timely information to stakeholders, enabling better quality decision making;
- (c) Enabling, to the extent possible, process integration between the various actors in the international registration procedures;
- (d) Enabling the various actors the choice of dealing with the IB in electronic synchronous communications mode, or preferring remain with a more traditional asynchronous communications mode;
- (e) Eliminating postal delays and related processes such as manual scanning, classification and routing of documents, whilst raising the quality and availability of the resultant IP information for third parties;
- (f) Speedier processing of requests, higher quality examination work products together with more rapid response to customer queries.

Unavailability of seemingly ubiquitous ICT systems in a global service delivery environment is a risk. Madrid and Hague systems stakeholders will increasingly rely on each other's ICT systems to manage their responsibilities. In integrated web service based procedures, non-availability of any system component implies an inability for stakeholders to complete their treaty obligations.

Set against such important considerations, failure to deliver modern web based services will most likely result in the declined market share of the Madrid and Hague systems.

WIPO's Global Infrastructure Sector (GIS) exists to provide services that are enabled by new information and communications technologies, and to coordinate the provision of such services by the key players in the IP world.

The foundation of IP Global Infrastructure is digitized IP data. The sector provides IP institutions with assistance to digitize their data, which must be done according to certain standards, while preserving the integrity and confidentiality of the data, as appropriate. The data must then be incorporated into digitized workflows, which enable IP institutions to provide higher-quality services. A further step in IP Global Infrastructure is developing a multilateral platform, interlinking participating IP offices and authorities, enabling them to perform their business by global transactions and global databases, and providing users of the IP systems with globally efficient and seamless services and access to the digitalized IP data.

The ICT-based services provided by GIS fall into the following categories:

- (a) *Business Systems for IP institutions and offices.* These include IPAS (IP Administration System), EDMS (document management), WIPO Scan (digitization workflow), WIPOCOS (copyright collective management) and GDA (copyright registration). These systems are provided mainly to institutions in developing countries and are highly customizable. They enable IP institutions to provide quality registration and related services to their applicants and to the public, and to participate effectively in the global IP system;
- (b) *Global Databases.* The two main international databases are Patentscope and the Global Brand Database which hold large collections of patent documents and marks, respectively. They are targeted at experts and novices and aim to make IP data globally available and accessible to as wide an audience as possible. The databases are not direct competitors with commercial databases, which are targeted at IP experts, but they do provide advanced features that benefit all users. Global databases include Pluto (UPOV data), Hague and Lisbon databases, and new web databases such as WIPO Green and WIPO Essential;
- (c) *Inter-Office Platforms also known as Global Dossier (GD) based on WIPO CASE and its link to One Portal Dossier (OPD).* Two inter-office platforms are currently in service – WIPO DAS (secure exchange of priority documents) and WIPO CASE (sharing of search and examination results). Both of these platforms are used by IP offices to support their business processes, in particular the exchange and sharing of documents for IP applications. The WIPO CASE system is being extended and integrated with the IP5 “one portal dossier” to complete a key component of the Global Dossier initiative.

Supporting these systems are the WIPO Standards and Classification systems, as well as the program of services for access to information and knowledge. There is a growing need for common standards to promote information sharing and inter-operability.

There are several aspects of the IP system that drive the needs for global IP infrastructure.

There is increasing demand for global information resources (in terms of geographical coverage and of greater variety and depth in the content). This requires WIPO's responsiveness and scalability. IP data, in particular, is a global public good whose use should be promoted as widely as possible. Basic IP data (published patent, trademark and design data) is now readily available on the internet from IP offices and from private or non-government organizations. However, the mere provision of data does not meet new demands, such as the demand for legal status information for IP rights that have been granted in multiple jurisdictions, or the need for better search and translation tools to find and understand more complex information, or the need for better linkages to other data sources such as pharmaceutical products. IP data now needs to be enhanced with more administrative and legal status information, better search

tools, better classifications and linkages between records, and translation tools. Quality also needs to be improved.

All IP institutions should operate on a level playing field so that they can offer high-quality IP services to local and global industry. This means that WIPO's response needs to take account of a greater diversity of IP institutions which receive WIPO's technical assistance to do this. The services provided by WIPO are targeted at IP institutions in developing countries. However, the nature of the demand is changing and there are more requests from IP institutions from middle-income countries, which share many of the characteristics of IP institutions in high-income countries. Operating on a level playing field means that all IP institutions now need to provide online services to their users, and that they depend completely on their ICT systems to provide many services, much in the same way as WIPO depends on its ICT systems for the operation of the PCT, Madrid and other services. Therefore, the demands for technical assistance are becoming more sophisticated, including demands for more advanced services (electronic filing and publication), and better service and support from WIPO.

There is increased collaboration between IP institutions, implying a need for platforms to share information and data, while respecting the unique nature of IP data including confidentiality. The Global Dossier initiative, the IP5 projects, and regional groupings such as ASEAN, PROSUR and the Vancouver Group all point to more collaboration between offices. At the moment, these initiatives are unconnected and focus on simple exchange of information. It is expected that the initiatives will become more inter-connected in the next few years, and that they will move from simple technical systems to more sophisticated business systems supporting processes such as collaborative examination and direct online interaction with applicants.

In the longer term, the quality of the services offered by an IP institution will not be determined by its ICT systems, but by the IP services-related and knowledge-based services of the office. This means that WIPO's ICT strategy in this area needs to place emphasis on the business needs of IP institutions. For example, some institutions will provide higher-quality patent examination services, or more robust trademark registrations, or better integration with global rights distribution systems. In order to promote a balanced IP system, WIPO can facilitate capacity building in institutions by leveraging on technical infrastructure systems such as WIPO CASE to help them to share knowledge and experience and increase their level of service. Although the systems may be similar, it is the effective utilization of the systems that will differentiate institutions.

In the copyright domain, in addition to the above-mentioned aspects, there are many tensions created by the digital era, the arrival of new players with digital business models, and the interests of entrenched players to maintain their position. There is a significant opportunity, and a significant challenge, to create global platforms that support new business models for copyright, while maintaining and integrating the traditional players.

GIS also needs to link to and support WIPO's Global IP Systems – PCT, Madrid and Hague. Data from those services needs to be integrated into GIS databases and platforms, and GIS services must also enable more global transactions through those services (e.g. the DAS system).

There are several challenges in implementing ICT strategies in the GIS:

- (a) Stakeholders are diverse (geographically, politically, economically, etc.), they have different levels of knowledge and demands are increasing. Solutions must be flexible and must cater to all levels of participation;
- (b) Competition from other IP institutions and from the private sector. WIPO's ICT strategies need to respond to needs for global public goods that cannot be provided

efficiently by the private sector and that should be provided by a global, neutral body rather than by one or more national/regional IP institutions or by a commercial enterprise;

(c) A large and growing number of WIPO Member States use facilities provided by GIS. The level of use needs to be increased in a targeted manner being particularly mindful of the needs of the smaller non-IP5 offices and to harness our collaborations with key Member States as participants in this development. Patentscope is of particular importance in the long term as a prior art search tool for small to medium IP offices;

(d) There are complex governance models for global systems, with different players with different levels of participation and no clear global mandate for some bodies. The interests and demands of all players need to be carefully balanced.

The following are the major ICT strategies that are specific to GIS:

(a) *Data Quality*. Now that the coverage of WIPO's global databases is becoming increasingly extensive, it is essential to focus on the quality and depth of the data so that users can have confidence in its use. There is much work to do on ensuring that each collection is complete, numbers are standardized, classifications are applied, and data is correctly categorized. Some of this work may be done by WIPO (using outsourced resources) but there is also significant potential to improve quality by focusing on "quality at source". To the extent possible, the originators of the data should be given the tools they need to check and improve quality before data is made available to WIPO's global databases. Timeliness of data is also an important aspect of quality, and so the originators also need tools to make data available as soon as it is published in their own jurisdictions;

(b) *New Data Resources*. The data now available in WIPO's global databases needs to be enhanced and extended. In the area of patents, it is essential to build a patent family database that will be the foundation of new services and features and that can be integrated with Patentscope, WIPO CASE and ePCT. Legal status and citation information must also be added to the databases, properly classified, and used to provide new services. Trademark data needs to be extended to include more detailed information, particularly about the legal status in different jurisdictions. For all IP rights, multilingual corpora need to be created and/or extended and used for translation and terminology services, making use of the leading position GIS has with machine translation technology. Copyright registration information needs to be collected and made available globally, with appropriate authorizations and controls. Much of this information is not currently available in digital form, and so the originators of the data need to be given assistance and tools needed for capturing the data in the correct formats and making it available for global databases;

(c) *Data Exchange Hub*. The IB currently receives national/regional patent and trademark collections for publication on the global databases, and distributes PCT data to the public and to subscribers. There is demand from the public and from private subscribers for easier access to the data in the collections held by WIPO. A data exchange hub is technically not complex to develop, but there are issues to resolve including distribution rights, pricing, and service levels;

(d) *Service Levels and Support*. As noted above, users are becoming more sophisticated and demand better service levels and support. This can be addressed in several ways, and potentially used to create a revenue stream to offset some costs. For the global databases, "premium" services may be added, such as analytical tools, automated alerts, or unlimited download options. For the systems for IP institutions and the global transaction platforms, a premium Service Level Agreement (SLA) may be offered which guarantees response times (helpdesk function) and prioritization for bug fixes, change requests and new features. These premium service levels would be offered

on an “opt-in” basis, rather than a license model, so that users would voluntarily pay for the additional service levels;

(e) *Consolidation of multiple platforms into a “WIPO Global Dossier or WIPO Virtual IP Office (WVIPO)”*. CASE, DAS, ePCT and Patentscope have evolved to respond to distinct business requirements. The Global Dossier concept is to provide a “one stop shop” for applicants, examiners and other users. Although WIPO cannot, and is not asked to, develop a global dossier, progress can be made on delivering the global dossier concept by better integration of existing platforms. Concretely, Patentscope can act as a gateway to WIPO CASE and to ePCT by allowing users to search and then “drill down” into the detailed documentation for a given application or patent family, provided that the user is authorized. ePCT and WIPO CASE can exchange information in two directions about legal status of PCT applications and search/examination results for PCT national phase entries and other family members. ePCT and DAS are already integrated to some extent as PCT applicants can use ePCT to request that a priority document be retrieved from DAS. If other features are added to the platforms, then further integration between national/regional systems and the PCT can also be envisaged, such as cross-filing of applications;

(f) *Extension of Infrastructure Platforms*. The two current infrastructure platforms (CASE and DAS) are operational and successful. The levels of usage are relatively low because the number of participants is low. Further investment is needed to increase the number of users, and to add new features that will meet the needs of more users and enable them to make better use of the platforms for processes such as collaborative examination;

(g) *New Product Development*. Areas for investment need to be identified and prioritized. The current priorities are: (a) copyright management (WIPO Copyright Connection) to replace and extend the existing WIPOCOS system, (b) online services for IP offices to extend IPAS, including online filing and online publication modules, (c) new databases such as a global copyright registration database based on national/regional voluntary registration systems, (d) new translation and terminology tools to extend the features of the global databases. In particular, the machine translation program implies a need for a visionary HR recruitment policy in this area, (e) promotion and adaptation of Patentscope for use as the tool of choice for examiners in small to medium IP offices.

Several risks have been identified in relation to GIS ICT Strategy:

- (a) Budget constraints fail to keep up with the data and documents infrastructure demands which explode in volume and in complexity;
- (b) Bandwidth constraints limit the feasibility of adequately developing requirements for ever increasing volumes of data traffic;
- (c) Competition from other offices and/or private companies offering public IP information services render GIS facilities uncompetitive and underused.

VII. ICT IN WIPO ADMINISTRATION AND MANAGEMENT

The main functions deemed to fall under Administration and Management for the purposes of this ICT Strategy are Finance, Human Resources, Procurement and Program Planning.

WIPO has traditionally made a lower level of ICT investments in its internal systems dealing with Administration and Management, relative to the external customer facing systems. As a result, these systems remained, for years, a patchwork of standalone systems that have struggled to keep pace with the organizational and business changes. New functionality was needed, in particular, to allow for more organizational control and to better service the revenue generating sectors of the Organization, in particular the PCT, Madrid and Hague Systems. These systems have a very high dependence on Administration and Management, because they account for more than 90 percent of WIPO's income, employ approximately half of all WIPO personnel and account for the most of WIPO's ongoing procurement expenditure.

For these reasons, WIPO, in recent years, has embarked on a process to put in place more modern and more integrated administrative and management systems. It is now making rapid progress towards their implementation.

The key factors that have driven the ICT strategy and system implementation of these new systems thus far are the need to:

- (a) Continuously increase service levels to all program sectors of WIPO with a special emphasis on the revenue generating sectors;
- (b) Increase productivity through automation so that business and organizational growth can be supported without increasing headcount in the administrative and management functions;
- (c) Ensure risk-free and well controlled administrative and financial operations;
- (d) Improve the quality and accessibility of information to the Member States and audit and oversight entities;
- (e) Comply with accounting standards and the regulatory frameworks that govern the UN system of organizations; and
- (f) Improve information provided to operational and senior management to facilitate better decision making (business intelligence).

The ICT landscape for Administration and Management is dominated by the Enterprise Resource Planning system (PeopleSoft) and Enterprise Performance Management (Hyperion Planning) which currently includes comprehensive functionality for the following:

- (a) Financial Operations and Management (since 2005);
- (b) Procurement and Travel Management (since 2010);
- (c) Human Resource Operations (2013);
- (d) Program Planning and Budgeting (2013).

The key results achieved in the short term are full compliance with the International Public Sector Accounting Standards (IPSAS) and our regulatory framework, the retiring of obsolete legacy technology and systems, and most importantly, the ability of the administrative departments to cope with growing workloads without increasing headcount.

The next two years will see this landscape being more integrated thus improving productivity of processing transactions and reliability, as well as consistency of administrative, management

and HR information. This information will then be mined and disseminated to managers through Business Intelligence dashboards that are currently being planned and designed. Additionally, WIPO will seek to improve collaboration, work flow and the management of documents including archiving and record management through an integrated Enterprise Content Management (ECM) solution that is integrated with the ERP system.

The Organization faces many challenges in implementing the above, including the need to:

- (a) Reskill existing staff multiple times during their careers in new technologies. This has led to rethinking the business model and staffing structures, so that WIPO staff focus increasingly on functional and business requirements, as well as project design and management, while outsourcing technical development;
- (b) Establish an Organization-wide approach for Master data management and enterprise architecture. This has been recognized and WIPO is in the process of establishing these new disciplines within the central Information and Communication Technology Department;
- (c) Increase engagement with business areas to ensure that the systems designed and implemented meet their needs and are owned widely across the Organization as opposed to just by the central administrative teams. Multiple strategies are being followed to address this, including representation on project boards from business areas, early involvement in business users in the design phase and identification of concrete improvement opportunities to make the systems more useful for the business;
- (d) Contain and manage costs of support for the expanded ERP and EPM systems: the current key strategy is to use off-shore resources where relevant and applicable to reduce the cost of development and support. A second strategy is to minimize customization based on a thorough review of costs and benefits of the requirements.

IX. THE ROLE OF THE CIO AND ICTD

Unlike many other international organizations, information systems at WIPO are tightly integrated into the fabric of its business with high reliance on the internet. As WIPO's ICT operations progressively mature and become increasingly complex, the characteristics and focus of ICT management have also evolved in response to the demands for higher levels of availability, responsiveness, interoperability, cost-efficiency and fiscal discipline. A transformation is already underway to enable WIPO to effectively mobilize resources in response to organizational priorities, while minimizing the cost of total-ownership of ICT solutions.

Part of this transformation involves the shifting of focus of the Office of the Chief Information Officer (CIO) and the Information and Communication Technology Department (ICTD) onto the following strategic areas:

(a) ICT Coordination and Enterprise Architecture

This covers the coordination of technology and business alignment, ICT investment prioritization, business process and data management, technology standards, directions and architecture. It also covers ICT management practices and methodologies etc.

(b) Infrastructure and desktop operations and support

This covers the planning and service provision of network, storage, computer physical or virtual servers, fixed-line and mobile telecommunication, internet services for data exchange or remote connectivity, desktop and mobile computing environment etc.

(c) *Information assurance*

This covers information security policy and procedures formulation, risk assessment and mitigation, security related internal controls and verification, and security incident response, etc.

(d) *Procurement and contracting*

This covers all ICT software, hardware and service contracts, including consulting and software development contract, etc.

(e) *Project initiation, coordination and performance verification*

This covers the registration of ICT projects, coordination of resources and priorities, and verification of project effectiveness and benefit realization etc.

(f) *Technical training*

This covers specialized technical training to support the technology standards and direction.

In order to meet the diverse range of challenges and expectations, adequate ICT governance is needed to navigate through the evolving, sometimes conflicting priorities. For this purpose, the following practices will be further developed and enhanced:

- (a) Business alignment;
- (b) Project/program selection and delivery;
- (c) Technology selection;
- (d) ICT investment and financial management;
- (e) Sourcing;
- (f) Risk management; and
- (g) Performance measurement.

Whenever feasible, online services will be strategically co-located outside Geneva. The evolution of cloud computing, which allows ICT services to be cost-effectively distributed and consumed over the internet, will be one of the major opportunities for WIPO to implement this ICT strategy and make access to its public domain data equally responsive to all its global clients, regardless of where they are. It may also provide a technically and financially viable alternative for hosting large amounts of non-confidential data. Other technologies will also be deployed with a view to achieving the same effect.

Working with other organizations within the United Nations (UN) system and other trusted partners, information systems containing sensitive information will also be replicated in multiple locations. Combined with the measures mentioned above, WIPO will be in a stronger position

to ensure business continuity, sustain 24/7 operations, and better response times, regardless of the geographical location of users.

ICT infrastructure for WIPO's External Offices will be enhanced to enable better local data processing capability as needed, and secure communication and data transmission between the Offices and the Headquarters. Special technologies and techniques will be adopted in the development of internal administrative systems so that they will be easier to use over the internet, especially when the applications cannot be cost-effectively deployed to the External Offices.

Information assurance will become one of the main pillars of WIPO's ICT services to sustain the necessary confidence in WIPO's ICT systems. Traditional perimeter centric defenses will give way to multi-facets approaches focusing on securing data. Technologies and services, including enterprise encryption technologies, will be deployed or enhanced to defend WIPO's information systems, with measures covering WIPO's external service providers all the way to specific data sources, while making data access easier and more reliable. More robust internal processes and automated controls, as well as management practices, will also be identified and implemented.

The drive for innovation will accelerate. New technologies and services, such as the cloud, business intelligence tools (including those for managing Big Data), enterprise content management systems and practices, mobile device management solutions, advanced conferencing solutions and others will present WIPO with an unprecedented array of opportunities to provide better customer experience and operational efficiency and effectiveness.

As a result of the above initiatives, the following results are expected in the short to medium-term:

- (a) Critical ICT systems will be able to withstand localized major disasters with little or no downtime and will be able to recover within agreed parameters from large scale city-wide or regional disasters;
- (b) WIPO's global users will enjoy good response times of the Organization's online services regardless of where they are;
- (c) A higher level of maturity of, and confidence in, WIPO's ability to manage information security will be achieved;
- (d) More diversified, responsive and cost-effective sourcing strategies will be available for hosting WIPO's information systems outside Geneva;
- (e) Communications with External Offices will be improved and WIPO's internal applications will be more easily accessible from those Offices;
- (f) Electronic document workflow management will become part of WIPO's routine operational capabilities and will significantly improve the efficiency of document handling and retrieval.

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