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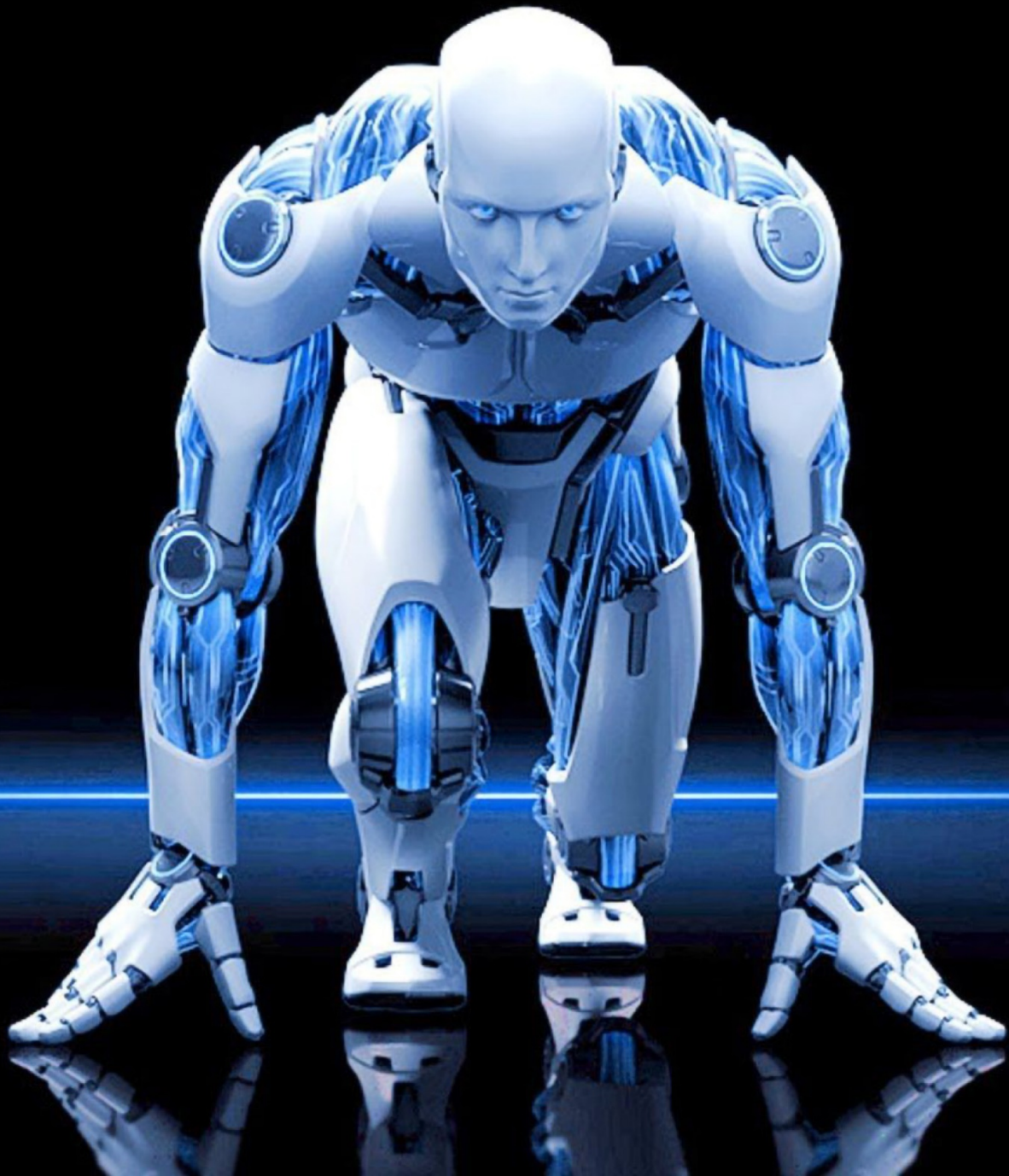
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IT Report **2019**

Driving digital transformation



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Executive summary

Digital disruption is impacting industries across the globe. At the European Patent Office (EPO), we believe that IT is the enabler for an organisation that remains 'future-ready'. After an audit of our IT operations, in 2019 we implemented a major restructuring, building empowered, cross-functional teams focused on delivering value to users. Last year, these teams started work on turning the ambitious IT vision set out in our Strategic Plan 2023 (SP2023) into a reality.

Essentially, our IT strategy is about reimagining future business processes to target multiple workflows with the same technologies. This calls for seamless collaboration between IT and other business units. By gaining a deeper understanding of stakeholders' priorities and embedding their feedback into a continuous delivery cycle, we will create tools that offer an optimal user and customer experience. Our approach can be broken down into five main streams.

Supporting an agile workforce

In 2019 we began to roll out new laptops equipped with state-of-the-art software for all staff. Coupled with upgraded remote access for teleworkers, these measures gave the EPO a far more flexible workforce. By relocating our service desk to The Hague under a new contract, we also started to provide higher-quality support to users in a digital environment.

Accelerating delivery via a new highway

Based on a new reference architecture (Kubernetes), we launched a technical platform for streamlined continuous delivery (an IT delivery "highway"). After building cross-functional teams and improving co-operation with all areas of the EPO, we began to prepare several pilots and create product teams. These initiatives were designed to pave the way for fast-track digitalisation and paperless solutions for the patent granting process (PGP).

Developing tools for short-term benefits

We continued to improve our existing tools in 2019, delivering short-term benefits for both examiners and formalities officers. These "early wins" included NPL search, easier access to original documents, a higher-performance eDrex (a tool enabling examiners to edit documents digitalised as images) and optimised questionnaires in CASE (Conformity Assurance for Search and Examination – a tool promoting continuous improvement). For our external users, we enhanced tools by launching the new Espacenet and a pilot for eFiling 2.0, as well as expanding the Federated Register, implementing CPC International and participating in WIPO-DAS.

Migrating to cloud-native architectures

One of our goals is to simplify our overly-complex application landscape, replacing it with a harmonised, open source IT architecture. We embarked upon this journey in 2019 by beginning to decommission obsolete hardware and software, and roll out state-of-the-art alternatives. Going forward, we intend to decouple from our legacy systems and migrate to cloud-native architectures. This will positively impact information security, lower operating costs and ensure that our key applications are future-ready.

Creating a continuous learning culture

In 2019 we continued to promote a learning culture that equips our in-house IT experts with the skills to respond effectively to uncertainty and adapt to stakeholders' evolving needs. Learning to fail fast is part of this culture, as it helps to increase our agility. Our approach to upskilling involved using design thinking to engage in the PGP customer journey, adopting lean change management processes and setting up a specialised IT project office. Looking ahead, continuous learning will help us to fill skill gaps and boost staff engagement.

1. Using IT to build an engaged, knowledgeable and collaborative organisation

By the end of 2019 around half of the EPO's workforce was able to work remotely. On top of the 2 400 part-time home workers, a further 1 750 staff had been migrated to a new configuration based on laptops and the latest Windows and MS Office software. We also devised an enhanced rollout approach for 2020, enabling faster, less intrusive data migration and better aftercare. To support the ad hoc teleworking pilot, a generic and secure channel was launched based on virtual private networks. All of these measures are helping to pave the way to a **fully mobile workforce** in 2020.

Digital communication tools are a key component in the shift towards greater mobility. To support the full streaming of live and pre-recorded videos to all staff, in 2019 we ramped up our multimedia communication capabilities. Key content was migrated to the new platform, which was used to host SP2023 communications and interactive "Talk Digital" sessions on the Financial Study.

Anticipating future needs, in 2019 we continued to **enhance our IT support capabilities**. This involved relocating our IT service desk to The Hague and creating a consolidated service that integrates the former first-line and application support teams. Creating this new service desk reduced our incident backlog by 72% by the end of 2019. The new desk was accompanied by a user feedback mechanism, as well as a complaints unit.

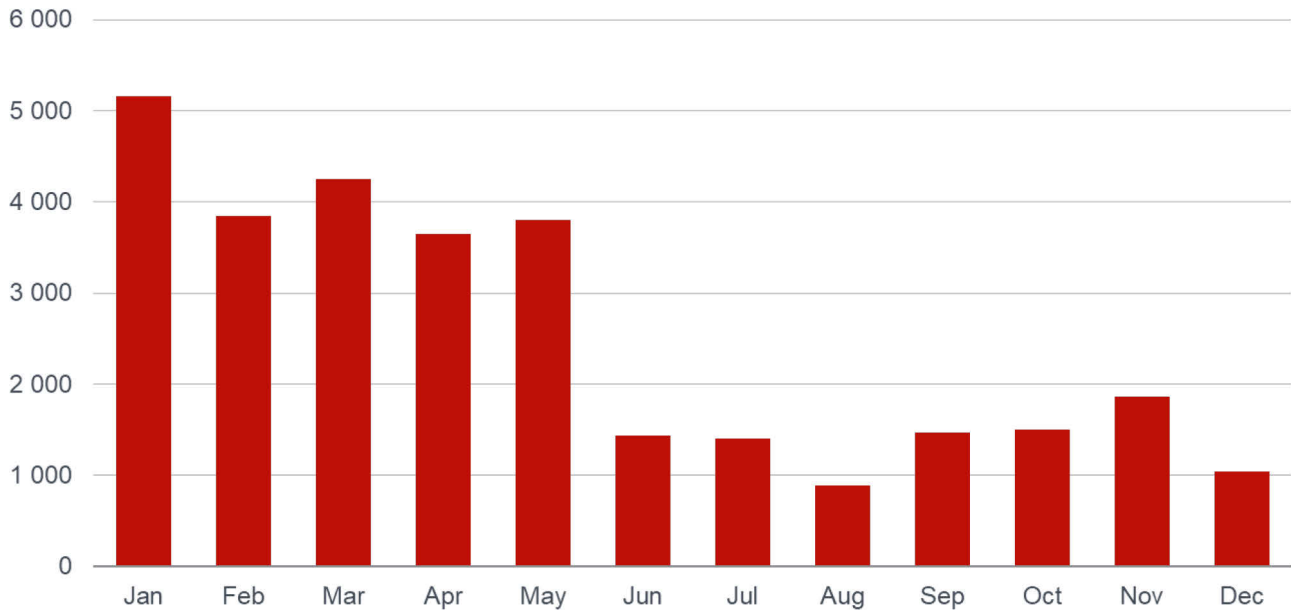


Figure 1: Service Desk incident backlog

2. Simplifying and upgrading IT systems

2.1 Delivering high-quality products and services in PGP and search

Based on in-depth exchanges with partners from our core business, we formalised a number of detailed scenarios for paperless search and the PGP in 2019. These scenarios were condensed into "programme passports" that outline our implementation plans over a multiple-year time span. In parallel to this planning exercise, we also achieved a number of early wins in 2019.

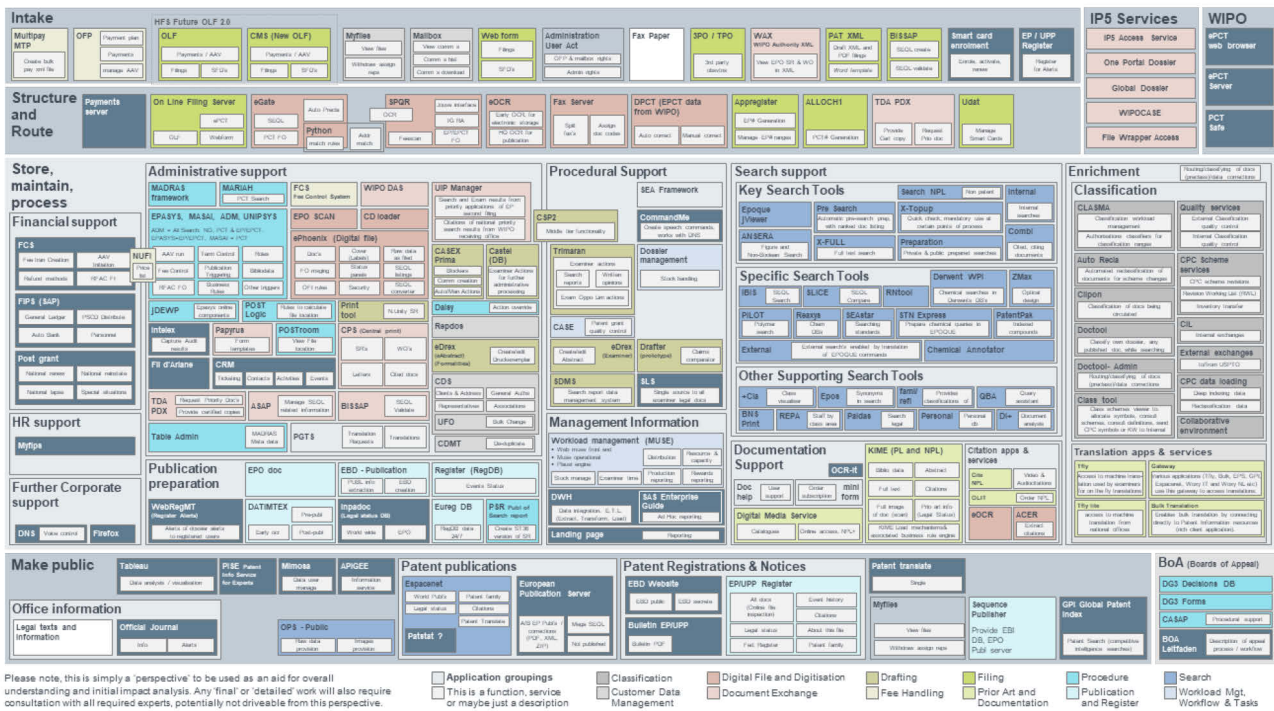


Figure 2: Mapping the PGP application landscape

One of these achievements was to **improve the quality and completeness of the EPO's prior art collection** by obtaining citations from national files (from France, Italy, Netherlands, Belgium, Luxembourg, United Kingdom), as well extracting them from EP and PCT files. This adds to the value of citations and provides a rich source for other tools. Moreover, all third-party observations and filings in opposition can now be made directly available to examiners.

In terms of data enrichment, we **enhanced our citation and full-text (published and unpublished) data management** by centralising its storage in a single database. For patent literature, we also developed an automated enrichment solution, using natural language processing and based on adding annotations. Going forward, this solution will also be used to further facilitate a more extensive use of annotations (e.g. for chemical entity and physical quantity).

Our **participation in the WIPO-DAS** framework enables users to electronically retrieve priority documents from all major national offices and automates the exchange process. The digital access service (DAS) is used for the systematic exchange of priority documents between the IP5 offices without human intervention.

In 2019, we also **adjusted our systems** in line with amendments to PCT Rule 54bis1(a) and 69.1(a). With the early start of examination becoming the default, automated file status checks give examiners faster access to files ready for examination. This not only complies with the PCT rule change, but also improves the quality and timeliness of delivery of international preliminary examination reports.

The EPO also continued to **invest in enhancing existing tools** such as ANSERA (Another Search ERA, our internal, semi-automatic search engine for patent information). As of mid-2019 a growing number of examiners are now able to use ANSERA to search non-patent literature too. Leveraging a network of ANSERA experts across the organisation, we developed and refined a number of new features through pilots (e.g. highlighters, improvements to the viewer). We also ramped up training on this platform, leading to a 20% increase in citations coming from ANSERA.

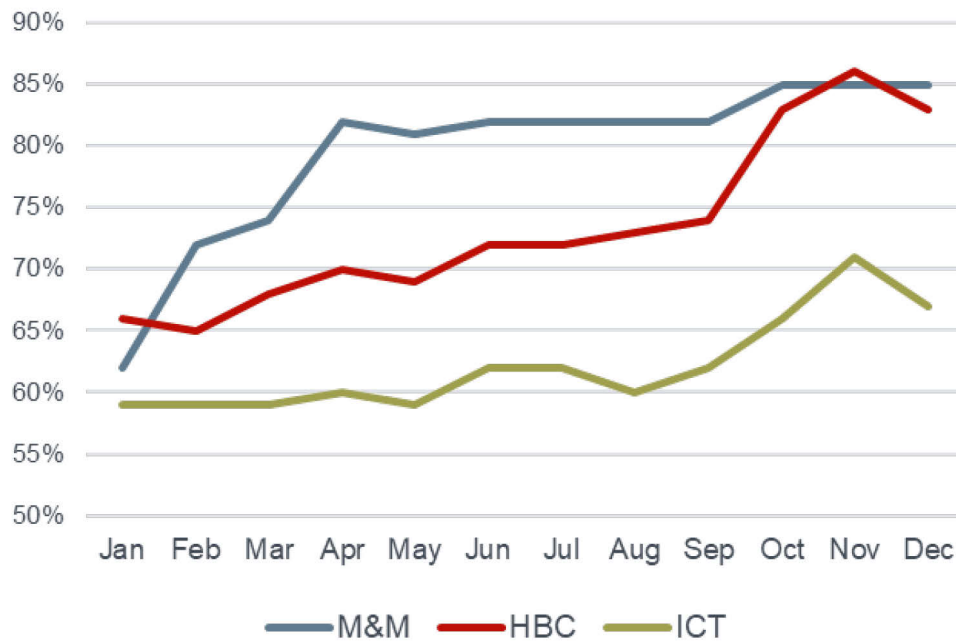


Figure 3: Growth in use of ANSERA per sector

What does this mean at a practical level? Examiners now benefit from improved access to original submissions from applicants, and can reuse the text and display in colour, without having to carry out manual OCR. The original PDF is now directly accessible from the viewer, and image quality has also been enhanced by upgrading one of the underlying elements of PHOENIX, our electronic file system. Looking ahead, these **improvements will feed into to the creation of the digital file** under SP2023.

A range of improvements to eDrex were made in 2019 in terms of:

- **Performance:** we reduced start-up and PDF generation time by 50%
- **Publication output:** we improved the accuracy of eDrex and made it easier to create amendments, leading to fewer errors and improved clarity of amendments.
- **Usability:** we made the tool easier to use for the first examiner and the rest of the division. We also interlinked eDREX and CASE to facilitate user interaction.

Our **core PGP tools were fine-tuned** in 2019 to stabilise functions that caused a significant number of incidents and calls to the service desk. It is now also possible to access the machine translation that will be sent to the applicant. Based on feedback, these enhancements clearly improved user satisfaction.

The **Single Legal Source (SLS) system was enhanced** to improve the search functionality for the Boards of Appeal, the user interface and the presentation of PDF results. SLS is a single repository that consolidates the various legal texts that our examiners use in their daily work under a single, web-based interface.

In terms of workload management, **MUSE** (a DG 1 management tool) **was updated** to optimise work scheduling for PCT Chapter II, so that examiners can start work earlier, improve their timeliness and enhance their planning. Overall time tracking has been improved to allow for easier tracking of non-core activities and better reporting, enabling us to optimise our use of formalities officers' capacity.

By incorporating a number of examiner actions into an **automatic dispatch framework** for organising oral proceedings, we reduced the risk of errors through manual coding, streamlined our formalities workload and improved efficiency via electronic notifications, thus avoiding printing and saving paper. We also streamlined the loading of DPCT data from WIPO. This reduced the manual processing of applicant and inventor data received at the EPO, making it simpler to add applicant data.

On top of these improvements, in 2019 we also **proactively replaced obsolete technologies** and decommissioned a number of modules that had become redundant. While this remains a long-term endeavour, last year we totally or partially switched off several systems, including BLI, DPCT phase I, FTM Phase I, CLASS-OQC, PA-OQC and IRIS. The iCDS system was migrated from the mainframe to a new technological platform, which will serve as the potential basis for future client account management.

2.2 Upgrading online tools

Enhancing our online presence will remain a key focus in the years ahead. To structure our long-term activities, we prepared a detailed new programme passport covering a wide range of **improvements to our online presence**. In parallel to these planning activities, however, we also achieved a number of key milestones in 2019.

After a successful pilot, a **new version of Espacenet** was released for the general public. This latest version offers several new features, including a dynamic query builder for easier searching, a richer, cleaner and quicker result list, results filtering, an improved legal status overview covering the entire patent family, and responsive design for searching across different devices and screen sizes.

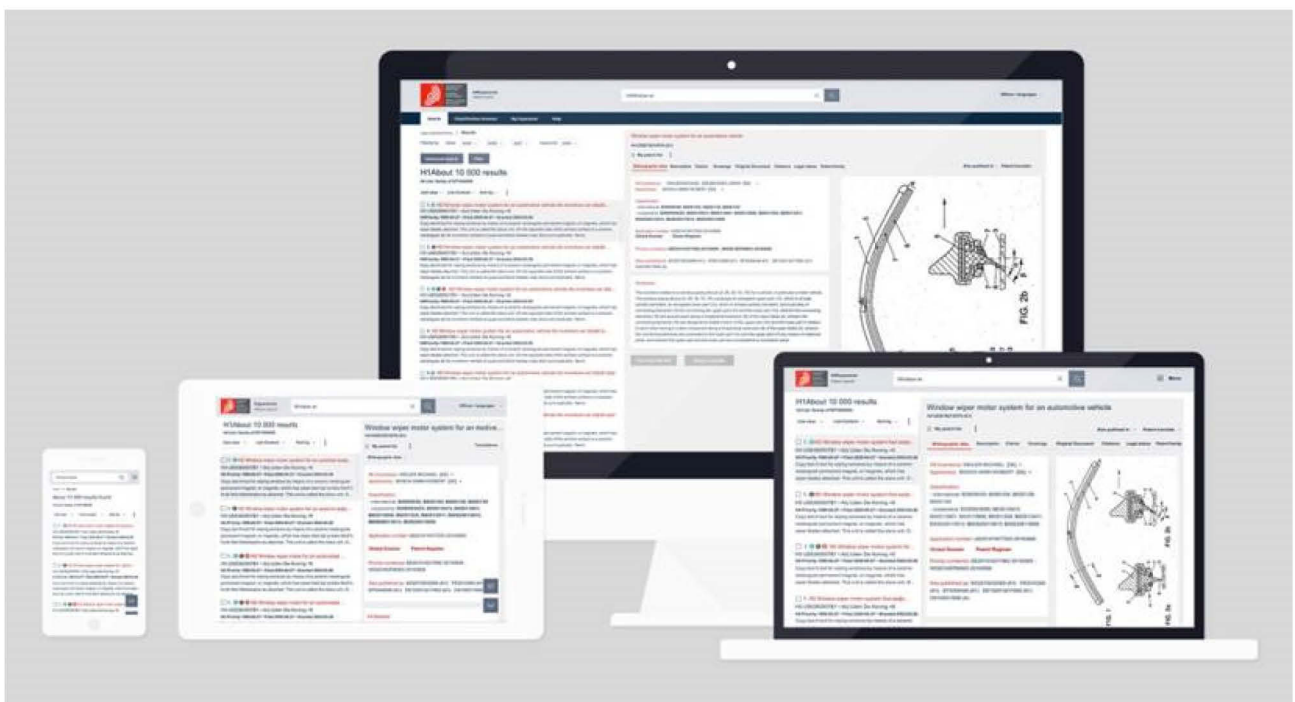


Figure 4: New Espacenet

Work on a **pilot for eFiling 2.0** continued with a view to running the pilot in 2020. The new eFiling 2.0 will be tested using a limited number of forms, and will include the DOCX functionality. The solution was tested internally throughout 2019.

In co-operation with the USPTO, 2019 also saw the launch of the **new online CPC International platform** to unify the allocation of classification symbols. Initially, the USPTO and the EPO will align classification practices. Other national offices may follow suit. This is expected to encourage more national offices to use the CPC and will provide a more stable and reliable CPC data exchange system.

A policy revision reflecting advances in payment methods resulted in the **abolition of payments by cheque** for both the EP and PCT. Harmonised EP and PCT procedures improved both compliance and user satisfaction. Moving away from manually processing cheques also increased efficiency, reduced paper consumption and cut banking costs. We also improved the Federated Register, which started retrieving official bibliographic and legal status information from the French Register and displaying it in the European Patent Register as of 1 November 2019.

2.3 Supporting corporate functions with advanced tools

In 2019 we improved efficiency and empowered our corporate support functions by launching tools with more advanced functions.

By introducing **time and capacity management functions** as part of their standard tools, we enabled formalities officers to record the time they spend on different activities. With these new indicators, formalities officers can better manage capacities, use automatic reporting and take more effective decisions. As for managing invoices from service providers, we continued to automate their handling in 2019. This spiked the automatic processing matching rate via automatic recognition to 50% versus 14% in 2018, while accelerating invoice processing and cutting out margins for clerical error.

We also took major strides forward in **vendor management for IT providers**, which was identified as a problem area by the IT audit. We started by consolidating 60+ separate contracts for licenses and software subscriptions under a single framework contract, awarded via a transparent tender procedure, for the selection of a software acquisition channel operator. In parallel, the IT vendor management function in co-operation with Central Procurement has launched a series of major tenders, including the selection of a software development and maintenance supplier to support SP2023.

In terms of **office automation tools**, the rollout of new laptops to all staff, configured with the latest Windows10 and MS Office versions, was accompanied by a general software upgrade and simplification. Upgrading the internet browser to a standard Chrome version updated on a monthly basis, for instance, meant that applications relying on an obsolete version of Firefox had to be updated. This resulted in a more sustainable and secure configuration for users.

Other **software decommissioning initiatives** in 2019 included replacing the unsupported platform Lenya used for several EPO websites, including the pensioners', IP5 and national offices centre sites, with a supported alternative. We also upgraded several document repositories to facilitate the implementation of the strategic project on document and knowledge management, launched a new intranet search engine and decommissioned a number of systems (Showtime, fee capturing system).

2.4 IT infrastructure and cybersecurity

Improving IT system availability was a top priority in 2019. Thanks to several initiatives, we significantly reduced the number of search, examination and opposition products lost due to downtime to 470 in 2019 (-37% versus 2018). We also **upgraded our videoconferencing** infrastructure and migrated to a newer system. This new system continues to support remote attendance at oral proceedings in examination, which rose from 33% in 2018 to 45% of scheduled sessions in 2019.

We also prepared a plan to extend our **corporate WiFi availability** to all areas of our buildings to facilitate a seamless transition between individual offices, shared areas, meeting rooms, and so on. This is a prerequisite for enhanced co-operation and creating a more flexible workspace.

Last year we also made significant progress towards **migrating the EPO's systems to a new data centre** in Luxembourg. By April 2019, the racks, cables, power and cooling had been installed and audited. Connectivity between Munich and The Hague was set up in May. Servers for the new data centre were delivered to The Hague in June, and testing took place over the summer. In the autumn, firewalls and other networking equipment were installed in Luxembourg and the first servers were moved at the end of the year. We plan to continue this work in 2020.

In parallel, we also invested in improving the **disaster recovery server capacity** in our PH VII building in Munich. At present, 82% of physical servers, 70% of CPUs and 90% of our memory capacity is available in case of a disaster. A secondary mainframe in the PH VII building also supports legacy systems. This is sufficient hardware to cope with a crisis, but we will enhance our reaction times and switch-over strategies under SP2023.

In November 2019, we were informed of a **cyber attack** on one of our main IT subcontractors. The attack was based on a mix of BitPaymer, Dridex and Emotet malware. A taskforce was set up to contain the attack and isolate our assets from any possible spread. Over the following weeks, we took a number of steps to ensure the integrity of our data, which included upgrading our cyber defences.

Alongside proactive initiatives to continuously improve IT system availability, we also invested in **replacing obsolete and legacy technologies**. Older servers running on outdated software platforms, as well as old VTS and DS8800 storage units, were taken out of commission. The whole SAS platform for the data warehouse was migrated from the IBM mainframe to an open platform running Linux.

The canteen payment system was also migrated into a **consolidated single-card solution**, avoiding the need to use a separate card to access our buildings and pay for catering services. In the same project, card pre-charging stations were installed to accelerate payment at the tills.

3. Driving the delivery of high-quality products and services

One of our key achievements in 2019 was the drafting of a **roadmap for the "Mastering the prior art"** programme, including plans to develop several cutting-edge classification-oriented tools. A number of tools were also adapted to align them to newly-introduced classification KPIs. This helped to boost classification completeness at publication to 59% in 2019 (2018: 38%), enabling more comprehensive searches and improving the quality of products and services.

4. Upscaling IT co-operation with member states

Between July and September 2019 our IT experts conducted a series of **technical visits to national patent offices** in our member states. This gave us a far clearer picture of their IT capabilities, constraints and willingness to go forward, enabling us to better define a range of IT co-operation projects.

The Technical and Operational Support Committee subsequently identified **priorities for future IT projects** based on key principles and information gathered during the visits. It also discussed an implementation model, based on expert technical groups from participating POs actively contributing to developing solutions. An initial portfolio of projects was submitted to the Administrative Council in December 2019.

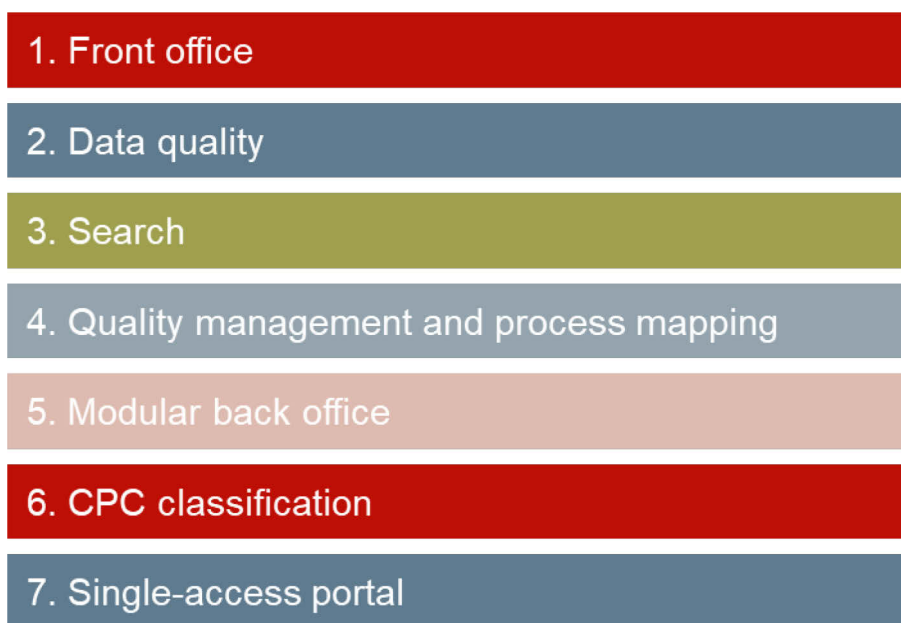


Figure 5: IT co-operation priorities

5. Contributing to long-term sustainability

In terms of our long-term sustainability, the end-to-end digitisation of the patent granting process is a strong contributor to bridging the financial gap identified in the Financial Study 2019.

In 2019 we also completed preliminary analysis work to prepare for the Finance 360 programme, which foresees a major simplification and modernisation of our financial systems. This strategic programme will be launched in 2020.

Business continuity and disaster recovery are important building blocks for ensuring long-term sustainability, especially in the event of a disaster. The IT disaster recovery plan was aligned and integrated into the corporate disaster recovery strategy in 2019. As a result, crisis management exercises at each site were adapted to include IT disaster recovery.

To help track our progress towards the five goals of SP2023, we launched a portal providing information on the 15 KPIs featured in the new Balanced Scorecard.

6. Transforming our IT

The IT audit highlights a number of areas in which we need to undertake a major digital transformation. These areas include upskilling and cultural transformation, enhancing our target operating model, designing a PGP customer journey, developing a target IT architecture and improving governance.

Most importantly, the audit also revealed a major skills deficit in our IT organisation. To address this situation, in 2019 we defined 34 job profiles and learning paths for 16 key roles. Based on those learning paths, we drew up individual development plans for almost all of our IT staff by the end of the year. To make optimal use of our in-house expertise during the upskilling process, BIT redefined the responsibilities of over 100 staff, giving them an opportunity to reduce these skill gaps.

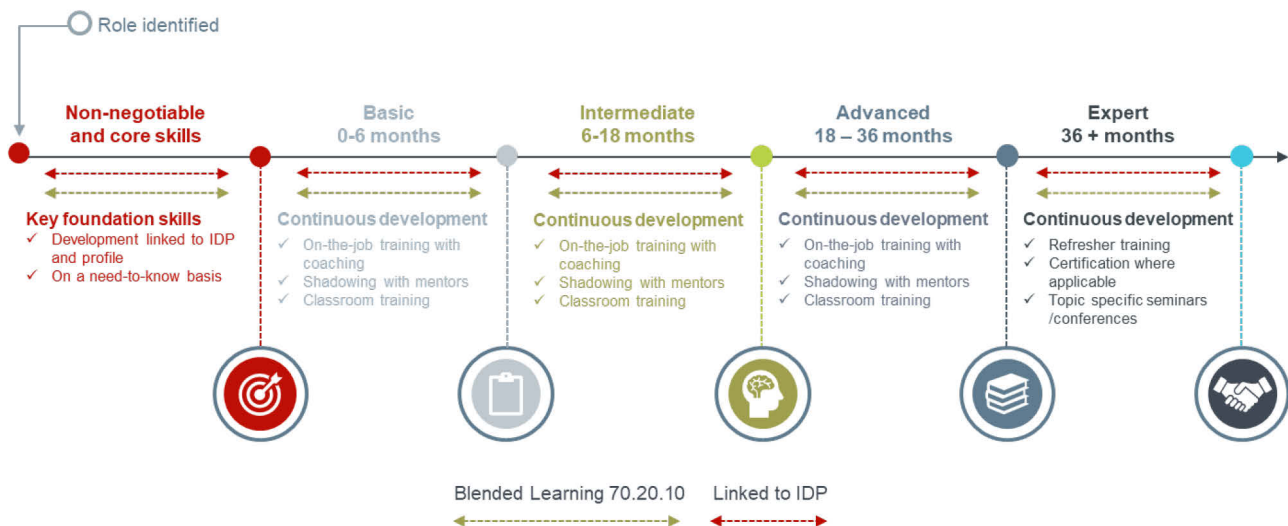


Figure 6: Generic timeline for IT upskilling

A number of training courses were organised via peer learning and coaching on topics such as the single patent granting process, design thinking, domain-driven design, data platforms, change management, stakeholder engagement and Python. In-house experts also held a total of 11 webinars (attended by 1 179 participants between September and December 2019) on a range of topics. On top of these internal initiatives, our IT staff participated in dozens of external training events and conferences over the course of the year.

Our activities were reorganised in 2019, resulting in a flatter structure that brought together former IM and PD automation support functions. This simplified structure with fewer hierarchical layers created more clearly-defined responsibilities and will boost our efficiency and effectiveness. Introduced on 1 May 2019, the new structure consists of a CIO and CTO supported by six directors.

In parallel, we promoted collaboration by creating project spaces in Munich and The Hague, a digital news channel for sharing information on ongoing activities and achievements. We also organised frequent townhall meetings and online webinars, and opened up management meetings to wide audiences at all levels within our IT department.

Our IT operating model also evolved during 2019, with a more agile Change Advisory Board, the creation of multifunctional product teams and the launch of multiple initiatives. This laid the foundations for us to accelerate our digitalisation efforts, and most notably the launch of several paperless solutions for parts of the PGP process in 2020.

Our overall IT governance was fully transformed to align it with SP2023. A modern IT risk framework was implemented as a basis for future professional certifications (ISO, etc.), ensuring that decision-making is driven by clear priorities and a healthy balance between stability and transformation.

Additionally, IT projects have been either transformed into strategic projects or operational activities or cancelled where the business case was weak or the chances of success low. Continuous improvement actions follow a leaner, more transparent approval process based on benefit analysis. This ensures that improvement requests do not clash with strategic priorities. A specialised IT project office has also contributed to significantly improving the maturity of our project governance.

In many ways we used 2019 to lay the foundations for a full-speed implementation of the SP2023 in 2020. Some of our activities, such as upskilling, for example, will nevertheless be monitored on a long-term basis.