

ISSN INTERNATIONAL CENTRE ACTIVITY REPORT FOR 2020

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Introduction

The ISSN International Centre and the ISSN Network proved in 2020 their resilience and ability to pursue their activities in an international context strongly affected by the Covid-19 pandemic.

In March 2020, the ISSN International Centre (ISSN IC) very quickly deployed remote desktop and instant messaging technical solutions for telecommuting. Thanks to the exceptional mobilization of its team throughout the year, the ISSN International Centre pursued its operations in a nimble way, notably in supporting ISSN National Centres, working on the development of the new ISSN+ production platform, and promoting the Keepers Registry service on the ISSN Portal. The ISSN IC team has demonstrated a great capacity to adapt to the new circumstances, react positively and innovate in its daily tasks as shown in this report.

While a few ISSN National Centres have struggled to maintain the same level of activity, publishers have also scaled back their production in 2020. As a result, the global number of identified continuing resources was lower in 2020 with only 54,494 ISSN assigned, i.e. -7% compared to 2019. However, the proportion of new digital publications issued in 2020 was higher compared to 2019 and the total number of digital resources has reached 295,075 in the ISSN Portal. The ISSN International Centre contributed 3,330 new ISSN to the database in 2020 and led several projects to improve quality, e.g. a specific assignment workflow for Springer-Nature thus achieving comprehensiveness for the identification of this company's serial publications and monographic series.

Regarding ISSN policy matters, though the biennial General Assembly of the ISSN Network was supposed to take place in Paris to discuss the 2020-2024 Strategy, the Member States eventually convened remotely in April -May 2020 and voted on the options for the new strategy through an online system. Comforted by the consensus reached on the seven strategic options that should guide its activities for the next five years, ISSN IC will continue to produce quality information services for publishers, librarians and researchers. The ISSN Portal is indeed a unique and reliable index of print and digital serials and continuing resources from their inception to their long-term preservation. ISSN IC services build upon qualitative data provided by the ISSN Network and cross-referenced with an ever-wider range of partners.

Before engaging with its next strategic plan, the ISSN International Centre can today take stock of actions launched in 2015, the highlight of which was the opening of ISSN data through the new web portal and the implementation of a freemium business model that has not impacted the organisation's financial balance. The ISSN International Centre achieved a good financial result in 2020 and this surplus will be invested primarily in new IT developments and facilities.

1. The ISSN Network and its Strategy

1.1. Coverage and extension of the ISSN Network

In 2020, the ISSN Network still comprised 90 member states. The ISSN International Centre signed two new working agreements, one with the Ivan Fedorov Book Chamber of Ukraine and the other with Hauptverband des Österreichischen Buchhandels in Austria where two ISSN centres are planned to open early 2021.

1.2. Activities of the ISSN Network

1.2.1. Governance bodies

The ISSN 23rd General Assembly, initially planned 29-30 April 2020 in Paris, was held remotely because of the coronavirus pandemic. The one-day international conference that usually precedes the Assembly was cancelled.

Instead of one General Assembly in-person meeting, the staff of the ISSN International Centre organized four 3-hour distant meetings while working from home because of French lockdown:

- April 29th, 2020: 23rd meeting of the General Assembly with Asian member countries,
- April 30th, 2020: 23rd meeting of the General Assembly with European and North American member countries,
- May 5th, 2020: 23rd meeting of the General Assembly (in Spanish) with Latin American member countries,
- May 7th, 2020: 23rd meeting of the General Assembly with African and Asian member countries.

The General Assembly online attendance was good with 52 representatives of member countries. Elections were also held remotely to appoint the ten representatives of member states to sit at the Governing Board beside the representatives for France and UNESCO. The newly appointed Governors for a 2020-2022 mandate represent Brazil, Croatia, Germany, Iran, Mauritius, Spain, Sweden, Tunisia, United Kingdom, United States of America. All five 2020 Governing Board meetings were held remotely.

The governance bodies of the ISSN International Centre functioned effectively in 2020 despite the global pandemic. Meetings and ballots took place online thus enabling the ISSN International Centre to move forward and implement the new strategy approved by the member countries.

1.2.2. ISSN National Centres

The 45th ISSN Directors' Meeting convened remotely in four 3-hour sessions:

- 16 November 2020: meeting in English;
- 18 November 2020: meeting in French;
- 23 November 2020: meeting in Spanish;
- 25 November 2020: meeting in English.

For the first time, the meetings were held in three UN official languages (English, French, Spanish). Furthermore, colleagues from ISSN Algeria, ISSN Belgium, ISSN China, ISSN Colombia, ISSN Iran, ISSN Mexico, ISSN Philippines, ISSN Russia, and ISSN USA delivered presentations which were

subsequently posted on the Community extranet and a specific Vimeo channel was set up to archive videos of the meetings.

Since April 2016, the ISSN IC has been developing a programme which supports the organisation of face-to-face regional information and training sessions for existing ISSN Centres and potential new ISSN Centres. Because of the pandemic, the ISSN International Centre was unfortunately not in a position to organise such sessions in 2020.

Since 2019, the ISSN IC Project Officer has been managing relations with ISSN National Centres regarding notably the renewal of working agreements, and the collection of information about their activities in line with ISSN IC policy and ISO regulations. In 2020, a new financial report template was developed to facilitate reporting by the National Centres that charge fees for their services. The Project Officer is also the contact person for standardization work and cooperation issues (see specific section below).

1.3. Completing the Strategic Objectives 2015-2019 and moving to the 2024 Strategic Plan

1.3.1. 2015-2019 Strategic Program Review

The recently completed strategic plan aimed to make the ISSN a more diverse and inclusive community and to improve its image and governance. To this end, the ISSN International Centre organized more meetings to reconnect with all National Centres, encourage them to produce regular activity reports, and foster their participation in discussions about the strategy of the ISSN Network.

Over the 2015-2019 period, ISSN National Centres and their host institutions supported the strategy through the votes cast during the biannual General Assemblies. Their steady financial contributions helped the ISSN International Centre to achieve its objectives for the ISSN Network.

The extension of the ISSN Network was and still remains a priority aim. The resumption of centre creations, after a period of stagnation, is significant: The Russian ISSN centre opened in 2016 under the responsibility of the Russian Book Chamber and the Panamanian ISSN centre in 2018 under the responsibility of the National Library of Panama. In the first quarter of 2021, the Ukrainian centre will open with the Ukrainian Book Chamber as will the Austrian centre hosted by the Federation of the Austrian Book Trade. These openings of National Centres reflect the renewed dynamism of the ISSN Network and its relevance for the identification and tracking of serial publications.

The ISSN International Centre, as an intergovernmental organization linked to UNESCO, has made a substantial effort since 2015 to disseminate information in the six official languages of the United Nations, both on its institutional website (www.issn.org) and on its service portal (portal.issn.org). The work of the ISSN Network is now widely recognized and is attracting renewed interest from librarians, publishers and researchers around the world.

The information services the ISSN International Centre supplies globally are based on the careful identification and ongoing tracking of print and digital serial titles from their creation by the publisher to their long-term archiving by specialized agencies. The regular provision of metadata by the ISSN National Centres is also essential here. With the liberation of the key identifying metadata on its web portal in 2018, the ISSN International Centre has moved its offering to a freemium model that combines a comprehensive database on serial publications available by subscription with many free services, i.e.:

- ROAD (road.issn.org) which lists online open access scientific publications worldwide,
- ETAS (journaltransfer.issn.org), which tracks title transfers between publishers,

- KEEPERS REGISTRY (keepers.issn.org) which reports on digitized and digital publications archived by partner agencies.

Today more than ever, the ISSN is a key persistent identifier for the exchange of quality metadata enhanced through the cross-referencing of information sources on the web. The ISSN Portal collaborates with third-party indexes, e.g. CrossRef, DOAJ, Latindex Catalogo and Latindex Directorio, Medline, Mirabel, Scopus, and SUDOC, and these strategic partnerships enable the ISSN Network to improve the identification and reporting of continuing resources for the benefit of all. Each ISSN and each ISSN-L now have a canonical URI in the Portal and ISSN metadata is made available in linked data formats. An API is available to our subscribers to automatically update their own databases. In addition, the ISSN International Centre offers a custom metadata cleaning service to help publishers and libraries improve their databases.

In 2018, the ISSN International Centre was confirmed as the registration authority for the management of ISO 4 and ISO 3297 via the signing of an agreement with ISO. The ISO 3297 - ISSN standard has evolved considerably since 2015. A minor revision resulted in 2017 in the removal of any mention of the business model from the text. A more extensive revision began thereafter, culminating in the publication of the sixth edition of ISO 3297 in October 2020. The expansion of resource types eligible for ISSN assignment to include regularly updated ongoing integrating resources, e.g. websites, blogs, institutional repositories, directories and databases is a great development. The principles of ISSN assignment have also been updated to cover the gamut of assignment processes within the ISSN Network: if ISSNs and eISSNs can still be assigned by request, they can also be assigned as part of library activities, e.g. legal deposit and retrospective digitization programs. A very important principle is that the assignment of an ISSN to a continuing resource does not imply any meaning or legal evidence with regard to the ownership of rights to that publication or its contents. Moreover, ISSN assignment does not mean that the ISSN Network endorses the content of the continuing resource. The new version of the standard makes it clear that the assignment of an ISSN does not imply that the content of the identified resource has been assessed and validated by the ISSN Network. The Cluster ISSN concept has been broadened to allow for the identification of multiple groups of serial titles related to one another. Details regarding the construction of the ISSN have been added to specify the UNICODE coding of the identifier. Last but not least, the canonical syntax of the ISSN URI has been recorded in the ISO standard so that it can be reused by external databases to point to the ISSN Portal metadata as the most authoritative source of information regarding serial publications.

Over this period, the ISSN International Centre also improved its technical infrastructure with the opening of its web portal in 2018 and the consolidation of the IT facilities at its Paris offices, allowing for a smooth transition to remote working as of March 2020. However, the production launch of ISSN+, initially planned for the end of 2020, has been delayed by the developments made necessary by the inclusion of the Keepers Registry service in 2019 and by the difficult pandemic context in 2020. ISSN+ will actually be made available to National Centres in 2021 and user testing has already taken place on some of the developed functionalities.

The ISSN International Centre is therefore well positioned to roll out its 2024 Strategy.

1.3.2. 2024 Strategic Plan

Early 2019, the ISSN International Centre launched a call for tenders to hire a consultancy organization to work on the definition of the 2020-2024 ISSN IC Strategy. CiberResearch was selected and submitted its final report in July 2019 that encompassed 15 objectives. The ISSN IC Governing Board members subsequently reviewed these options and voted to eventually select seven of them. They also shared comments regarding the overarching goals of the 2020-2024 Strategy.

The ISSN IC Governors requested that the ISSN IC management explore these seven options and assess them at the organizational and financial levels. A report was drafted by the ISSN IC Director

and the ISSN IC Project Officer in 2020 that also benefitted from comments shared by ISSN IC staff during four brainstorming sessions. The report was then submitted to the votes of the ISSN IC Governing Board and a ballot was cast during the meetings of the General Assembly of member countries in April-May 2020. The seven objectives were approved eventually.

OBJECTIVE 1: Develop the global interoperability of the ISSN Portal by improving the management of ISNIs within the ISSN Portal

The ISSN International Centre believes it is important that the ISSN be interconnected with other identifiers and thus be part of the web-based identification ecosystem. The ISSN International Centre has been a member of the ISNI-IA since 2015 and has access to the ISNI professional and curated database. The ISSN International Centre also works with ISSN National Centres that already use ISNIs (ISO 27727: 2012) as identifiers for individuals and legal entities in their own local databases. These ISNIs are retrieved by the ISSN International Centre when records are imported into the ISSN Portal.

The ISSN International Centre wants to use ISNI to create standardized access points for publishers and organizations in the ISSN Portal and thus enhance search query results. The ISSN International Centre will also request the creation of ISNIs for those entities that do not yet have one.

Key Performance Indicator: All organisations and publishers within the ISSN Portal are identified with ISNIs by 2024.

In January 2021, the ISSN International Centre set up a private network wiki to track multinational publishers. Publishers' ISNIs were identified manually. A mapping of ISSN data and data claimed by ISNI IA to retrieve or assign ISNIs was also developed.

A test on 50 publishers will be carried out to check the relevance of the mapping and of the ISNIs retrieved. The mapping will be fine-tuned and if the test is conclusive, the ISSN International Centre will choose between loading ISNI by batch or by API and assess the related costs. A rough estimate has identified 550,000 organizations and 900,000 publishers referenced in the ISSN Portal and to be identified with ISNIs.

OBJECTIVE 2: Encourage the creation of new ISSN National Centres to extend the ISSN Network worldwide

UNESCO has 195 Members and 9 Associate Members, and the United Nations has 193 Member States. In 2020, 90 countries had an ISSN National Centre. Our recurrent strategic objective is to ensure that all countries have a centre where it appears viable, and to encourage low-performing centres to meet standards and good practice. To succeed, it will be necessary to strengthen initial and in-service training and to carry out awareness-raising activities. Our aim is to open at least five new National Centres between 2020 and 2024, to revise the initial training programme and then implement it, to work with the less successful centres, to help set up new infrastructures, to formalise the process of evaluating the application of a new member country, and to create several tools for monitoring the activities of the centres and the agreements ISSN IC has signed with them.

Key Performance Indicator: Five new ISSN National Centres are opened by 2024.

Ukraine and Austria acceded the UNESCO statutes in 2020, despite the considerable roadblocks imposed by the global Covid-19 pandemic which made even the delivery of mail complicated. Peru, despite having acceded the statutes in December 2019, delayed the work agreement negotiation because of the pandemic, and it is hoped that the agreement will be signed in the first quarter of 2021. Ukraine opened its National Centre on March 11th, 2021, hosted by the State Scientific Institution "Ivan Fedorov Book Chamber of Ukraine", Austria opened its National Centre on April 1st hosted by the Hauptverband des Österreichischen Buchhandels

OBJECTIVE 3: Implement the sixth version of the ISSN standard by creating the family ISSN and other cluster ISSNs

Tracking the changes that a serial publication undergoes over time is a long-standing challenge and the relationship between old and current titles is recorded in the MARC bibliographic formats in specific fields. For several years, ISSN-L has been used to collate the different versions of a continuing resource across multiple media. However, it is only with the sixth version of the ISO 3297 standard, which was released in October 2020, that it will be possible to create a cluster ISSN. A survey of our user community in 2019 revealed an interest in what could be called an ISSN-F grouping together titles identified by ISSNs and representing the same family. Discussions within the ISSN International Centre determined that an ISSN-F could be embodied as a URI providing access to a visual representation of a publication's history. This representation could be easily created and managed centrally without additional work for the National Centres as it is already available in the ISSN Portal without yet having a URI or being identified via an ISSN-F.

Key Performance Indicator: Creation of specific fields for cluster ISSNs in data encoding schemes

The ISO 3297:2020 was published in October, making a cluster ISSN officially part of the standard. In preparation for the increased use of URIs, a discussion paper proposing a subfield for the URI in the dedicated ISSN tag (022) was submitted to the MARC Advisory Committee for the annual meeting which took place online in July 2020. The ensuing debate led to agreement that once the ISO 3297 was published, a separate proposal would be submitted for the creation of a repeatable tag for cluster ISSNs, preferably 023, so that a URI subfield would be unambiguous. This next discussion paper will be submitted in May 2021. In other preparations to ensure a cluster ISSN fits into a multitude of bibliographic standards and models, initial discussion with experts suggest that LRM, PRESSoo, and RDA would already be able to cover a new ISSN-F or ISSN Family.

OBJECTIVE 4: Implement the sixth version of ISO3297 - ISSN by assigning ISSNs to various types of continuing resources

Significant changes in the publishing landscape may impact the ISSN over the next years. While there is no doubt that serial publications will continue, questions will arise as to their relative importance. The ISSN needs to better identify and include resources such as academic repositories and databases, and make appropriate investments to consolidate its position in the identifier ecosystem. This objective does not imply a change in the format or definition of the ISSN as it already encompasses integrating resources. The ISSN Network aims rather to raise awareness among producers of all serial publications to ensure that their publications are assigned an ISSN to achieve full implementation of the standard.

Key Performance Indicator: Publication of updated definitions of continuing resources and new data encoding values

A discussion paper was presented to the MARC Advisory Committee in July 2020 to request additional types of continuing resources be defined for the Leader field (tag 008 position 21) to reflect the full scope of continuing resources covered by ISO 3297:2020. The committee invited the ISSN Review Group to develop the paper and submit it as a proposal. Three code definitions were revised, and six new codes were added, and the proposal passed at the January 2021 mid-winter meeting. Making more granular codes available in MARC 21 with the approval of representatives from major national libraries around the world will go a long way in raising awareness about these lesser known continuing resources eligible for ISSN assignment. The next step to ensure the equivalent codes are added to

UNIMARC is underway. Also related to building current awareness, the ISSN USA team published an article on how grey literature is in scope for an ISSN¹.

OBJECTIVE 5: Develop interoperability of the ISSN Portal through the management of persistent identifiers and URLs of digital continuing resources

The ISSN International Centre manages metadata of digital serial publications in the ISSN Portal. According to the ISSN Manual, it is mandatory to include the URLs of electronic publications in field 856 of the MARC 21 record. On the ISSN Portal, the URLs in the 856 tags are used to link to the resource itself. Like all bibliographic databases managing URLs of documentary resources hosted on external servers, such as those of issuing bodies and commercial publishers, the ISSN Portal is confronted with URL obsolescence when online publications cease to be updated, disappear or change hosting server. Our assumption is that only the archived digital resource is stable because it has a persistent URL provided by an archiving agency. Only a minority of digitized or digital journal titles are archived for the time being but digital preservation is a booming activity. On the ISSN Portal, a specific actionable identifier will be used to bring together the URLs of the resource as published originally, the URLs of the successive publishers if applicable and the URLs for the archived version managed by archiving agencies. This new service will add value to the ISSN Portal by aggregating at a single point the URLs provided by publishers and by archiving agencies for a given digital serial resource.

Key Performance Indicator: The ISSN IC to manage operational resolver handling various types of URLs by 2024.

The ISSN International Centre has already set up a URN:ISSN resolver (<https://urn.issn.org/>) which integrates the URLs available in field 856. This resolver could be used as the linchpin for the redirection process linking to current and archival URLs. A pilot using National Library of Finland (NLF) ISSN records will be launched in 2021.

OBJECTIVE 6: Promote and develop Keepers Registry to associate new agencies and increase the number of identified archived resources

Keepers Registry is a free service that aims to inform the library and publishing community about the actions taken by archiving organizations to preserve titles of digitized and digital serial publications identified with ISSNs in order to promote long-term access to these resources and to stabilize scientific references for the research sector.

For the ISSN International Centre, the takeover of the Keepers Registry service in December 2019 was a strategic decision that resulted in the expansion of the ISSN Portal offering: the ISSN International Centre and the ISSN Network together produce an indispensable source of information on periodicals at all stages of their existence, from their identification and description by the ISSN Network to their preservation by partner archiving agencies.

Key Performance Indicator: The number of archiving agencies participating in KR to reach 20 by 2024.

The first meeting of the Technical Advisory Committee for Keepers Registry took place in September 2020. TAC members are representatives from archiving agencies (CLOCKSS, Library of Congress, KB – National Library of the Netherlands) and from the community (DOAJ, Latindex, NASIG) as well as experts, i.e. Clifford Lynch, CNI, and William Kilbride, DPC, and Peter Burnhill, former Director of EDINA, University of Edinburgh. The Memorandum of Understanding between the ISSN International Centre and archiving agencies has been updated and as of February 2021, ten archiving agencies

¹ Regina Romano Reynolds & Karen E. A. Ross (2020): ISSN Is for Black, White, and Many Shades of Grey, The Serials Librarian, DOI: 10.1080/0361526X.2020.1847746



have signed it. The TAC approved in 2020 the ISSN IC joining in the DOAJ led pilot project on the preservation of Diamond Open Access journals. The TAC will start reviewing applications of new archiving agencies in 2021.

OBJECTIVE 7: Promote the ISSN Portal as a professional tool for the ISSN National Centres to improve the ISSN assignment process

The ISSN Portal provides enhanced functionalities that enable the ISSN International Centre to standardize the metadata provided by the publishers requesting ISSN assignment. The ISSN International Centre would like to offer this tool to ISSN National Centres when dealing with their national publishers' requests for ISSN assignments. The ISSN Portal is a web-based platform that is now available to National Centres that wish to use the system to manage requests from their national publishers. New National Centres will be particularly encouraged to use this turnkey system.

Key Performance Indicator: Two new National Centres to adopt the ISSN Portal service to handle publisher requests for ISSN by 2024

In 2020 and the first quarter of 2021, the request management system was presented to colleagues from the Book Chamber of Ukraine, the Austrian Federation of Booksellers and the National Library of Peru. As of February 2021, there has been no agreement reached with ISSN National Centres regarding the use of the system.

2. Activities of the ISSN International Centre

2.1. Department of Metadata and Technical Coordination of the ISSN Network

2.1.1. The development of the ISSN Portal

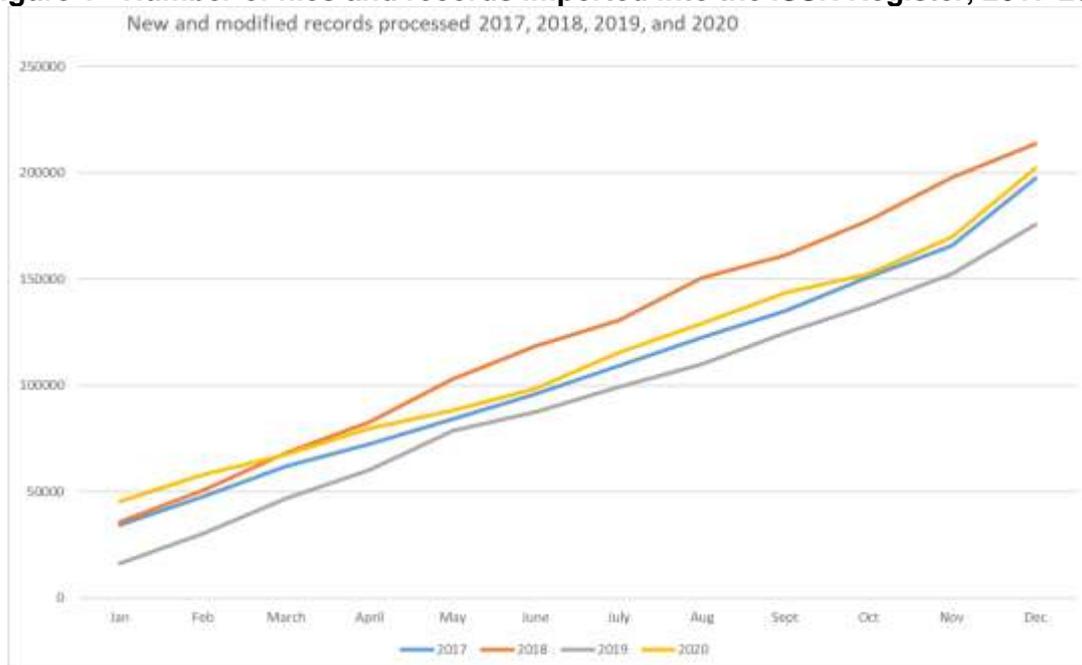
ISSN Register metrics

At the end of 2020, the ISSN International Register contained **2,175,883** records in the “Confirmed” category, i.e. “Register” records in Virtua.

54,642 new records were added to the ISSN Register in 2020, showing an exceptional decrease of 4,000 records compared to the average number of records for the previous years. This can be explained by the lockdown imposed in many countries because of the pandemic that affected the activities of publishers and ISSN National Centres.

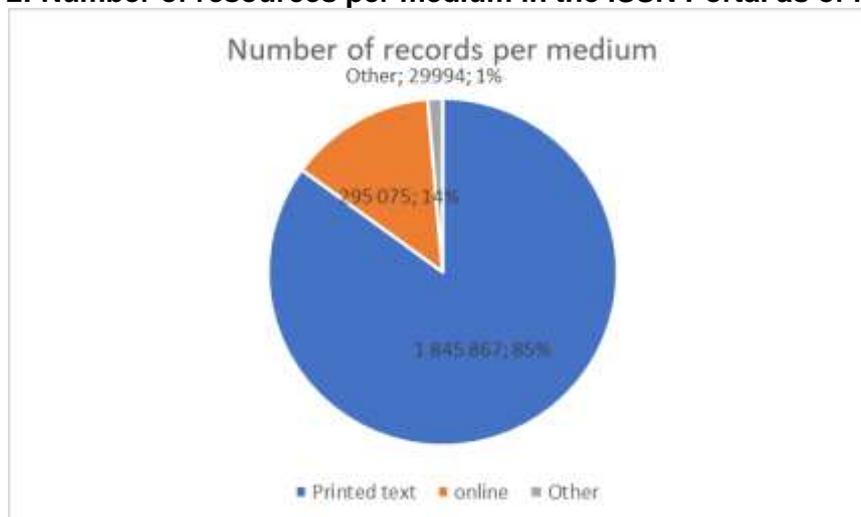
Nevertheless, 57 ISSN National Centres sent **202,473** new and updated records which were ingested into the ISSN database in 2020, thus almost reaching the historical high of 2018. This achievement comes as a result of the exceptional situation of ISSN National Centres, e.g. ISSN Germany, ISSN United Kingdom and ISSN United States, which have taken advantage of remote work situations to correct their data. As a result, updated records compensate the decrease in new records. These records were loaded on a daily basis by the ISSN International Centre to sustain the accuracy and the quality of the ISSN Register.

Figure 1 - Number of files and records imported into the ISSN Register, 2017-2020



ISSN assignments to digital resources continued to grow. **25,207** new online resources were identified in 2020, while the figure in 2019 was 22,643. It stands for almost **46%** of total ISSN assignments in 2020. Globally, there were **295,075** online resources in the ISSN Register as of January 2021.

Figure 2: Number of resources per medium in the ISSN Portal as of May 2021



The ISSN Portal was enhanced with a new functionality to enable any subscriber to the ISSN Portal to set up **alerts** through their personal profile. Once the registered user has saved a search alert with the criteria of his/her choice, relevant new ISSN records for these criteria are delivered by email. A favourite search can be turned into an alert that runs automatically on a schedule thus resulting in email notifications whenever new records are identified.

Both the ISSN Portal's Guidelines for publishers and the [FAQ](#) have been reviewed and enhanced. The guidelines for publishers were translated in the 6 UN official languages, and the FAQ in 3 UN official languages. Both tools were made more accessible in the Portal's [Publishers' area](#).

The communication with publishers via email has also been enhanced and simplified.

2.1.2. Serving publishers

ISSN requests

In 2020, **2,433** ISSN assignment requests were handled by the ISSN International Centre.

Compared to 2019, the number of assignments has increased (**+485 assignments, i.e. +19%**), while the number of modifications submitted and processed is stable.

Table 1: Number of ISSN requests handled by the ISSN International Centre in 2020, by type of request and status (as of 2 January 2021)

2020	Processed	Provisional	Sub total	Other: incomplete, rejected	Total requests handled
Assignment	1 954	148	2 102	331	2 433
Modification	192	0	192	141	333
Total	2 146	148	2294	472	2766

Note: many requests include 2 ISSN assigned (print/online)

As of 2 January 2021, the cumulative number of publishers registered with the ISSN Portal has almost tripled since January 2018, from **1,557** to **4,246**, increasing each year by approximately **1,350** new publishers.

The classification by country is quite the same as in 2019, with Ukraine remaining well ahead with 1,402 ISSNs assigned and 485 publishers registered with the ISSN extranet. A high number of assignments to resources published in Pakistan and South Africa can be noted. The number of publishers applying for ISSNs has more than doubled for all countries compared to 2018, with a considerable increase in the number of publishers from Bangladesh and Pakistan.

Table 2: Most represented countries in the ISSN Publishers Extranet (cumulative number of ISSN resources since 2018 and as of 2 January 2021)

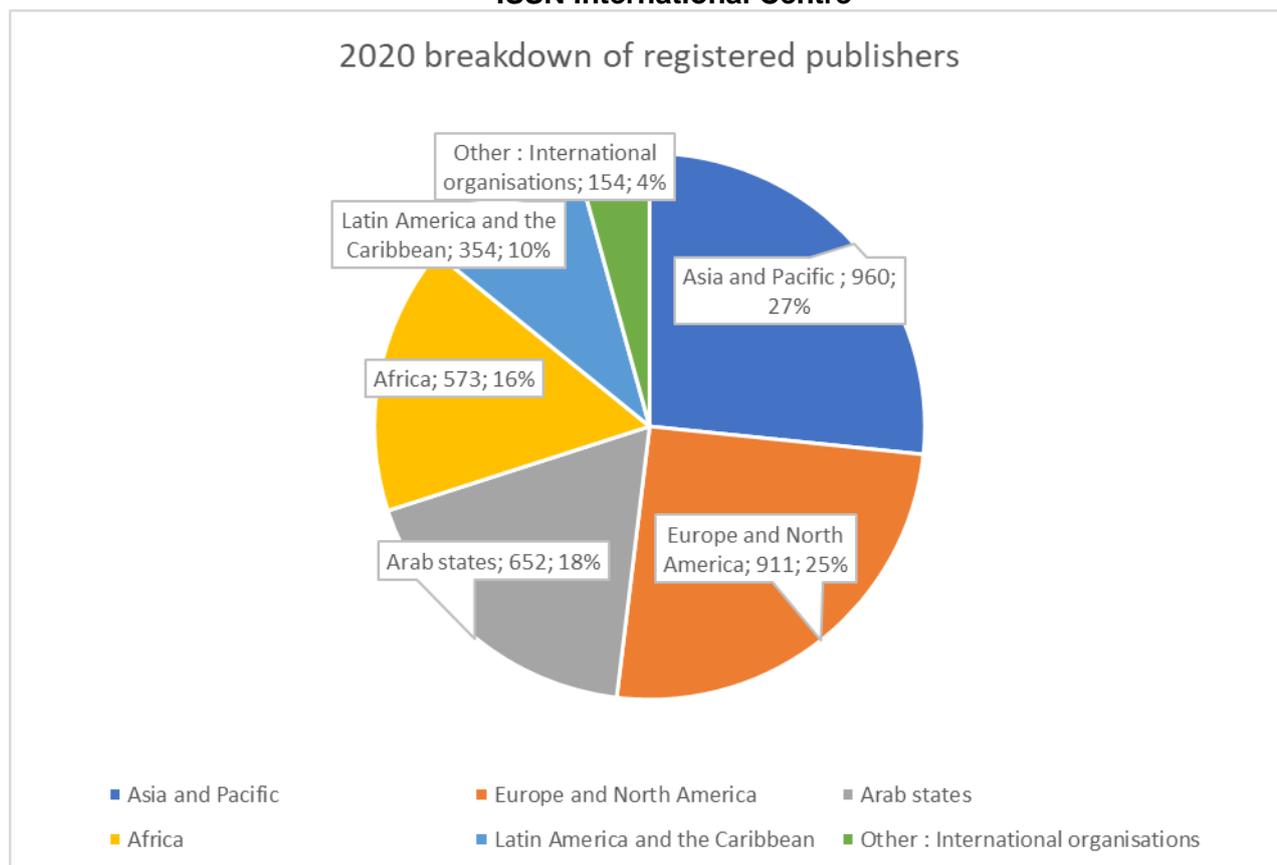
	Country	UNESCO Area	Number of publishers	Number of processed requests	Number of ISSN resources
1	Ukraine	Europe and North America	485	1,291	1,402
2	Hong Kong S.A.R., China	Asia and Pacific	211	1,095	1,144
3	International Organizations		154	778	993
4	Bangladesh	Asia and Pacific	225	490	654
5	Pakistan	Asia and Pacific	439	620	611
6	South Africa	Africa	163	430	437
7	Peru	Latin America and Caribbean	275	371	364
8	Irak	Arabic States	356	364	303
9	Taiwan, Province of China	Asia and Pacific	208	244	285
10	Kenya	Africa	97	223	254

As each publisher within each country is associated with a UNESCO region (except international organizations), the distribution of registered publishers by region is as follows:

Table 3: Number of registered publishers by UNESCO region within the scope of ISSN International Centre

UNESCO region	2020 Breakdown of registered publishers
Asia and Pacific	960
Europe and North America	911
Arab states	652
Africa	573
Latin America and the Caribbean	354
Other : International organisations	154
	3604

Figure 3: 2020 Breakdown of registered publishers by UNESCO region within the scope of ISSN International Centre



ISSN assignments

The assignment activity at the ISSN IC continued to be high, with a total number of **3,330** new ISSN assigned in 2020 (3,054 Confirmed records and 276 Provisional records). These figures are steady compared to the preceding two years.

The figures below do not take into account the modification of existing records.

Table 4: Number of ISSN assigned by the ISSN International Centre from 2016 to 2020, sorted by status and medium

	Confirmed records			Total confirmed records	Provisional records			Total provisional records	Total
	Print	Online	Other*		Print	Online	Other*		
2016	2,111	1,306	35	3,452	433	143	8	584	4,036
2017	2,139	1,424	26	3,589	254	73	4	331	3,920
2018	1,917	1,019	21	2,957	142	46	5	193	3,150
2019	1,455	1,496	31	2,982	163	88	3	254	3,236
2020	1,638	1,396	20	3,054	160	112	4	276	3,330

* Any other type of media: CD, DVD, USB sticks, etc...

The low number of provisional records in 2020 compared to the 2016 figure is the outcome of regular follow-up actions with publishers leading to a higher rate of validation for provisional ISSNs.

The pandemic context has had a slight impact on the number of ISSN assignments to resources published in the leading countries served by the ISSN IC and international organizations. Regarding Asian publishers (Hong Kong SAR, Taiwan POC), and publishers in Pakistan, South Africa and Peru, the number of assignments was stable. The increase in ISSN assignments for Singapore was due to the improved workflow between the ISSN International Centre and Springer-Nature (see specific report below). Finally, the ISSN International Centre's long-standing partnership with the French academic library consortium ABES regarding retrospective ISSN assignments resulted in an increase in assignments for publications from Cambodia and Madagascar.

Table 5: Number of ISSN assigned by the ISSN International Centre from 2016 to 2020, sorted by top countries (totalling confirmed and provisional records)

Country	Number of records				
	2016	2017	2018	2019	2020
International organisations	▲ 623	▲ 534	▼ 308	▲ 532	▼ 300
Ukraine	▲ 715	▬ 571	▬ 468	▬ 464	▼ 312
Bangladesh	125	145	105	▲ 408	▼ 129
Hong Kong, SAR	312	351	424	346	347
Pakistan	▬ 303	▲ 396	▼ 162	▼ 205	▬ 287
Peru	224	193	105	108	122
South Africa	222	203	83	117	162
Taiwan, POC	218	209	106	91	101
Singapore	NA	38	76	107	267
Cambodia	3	25	2	5	159
Madagascar	11	6	3	7	148
i. Iraq	▼ 47	▲ 111	▼ 59	▲ 112	▲ 101

The semi-automated assignment workflow with Springer-Nature

Since 2017, the ISSN International Centre has centralised the assignment of provisional ISSNs to Springer-Nature resources one year to six months prior to actual publication, including online resources, regardless of the place of publication and covering all Springer Nature Group trademarks.

The records remain in a provisional category in the ISSN Portal until Springer informs the ISSN International Centre that these resources have been published. The ISSN International Centre relies on the cooperation and support of the ISSN National Centres to complete the records and validate them in the Confirmed category.

The aim of this important project is to provide Springer-Nature with a single point of contact worldwide for all new ISSN assignments from 2017 onwards, making the assignment workflow more efficient and faster. In addition, once a provisional ISSN has been assigned, it can be used as a key identifier within Springer-Nature's internal workflow and the data is shared immediately with the ISSN National Centres via the ISSN Portal. Last but not least, this project enables the coverage of the ISSN Registry to expand more quickly.

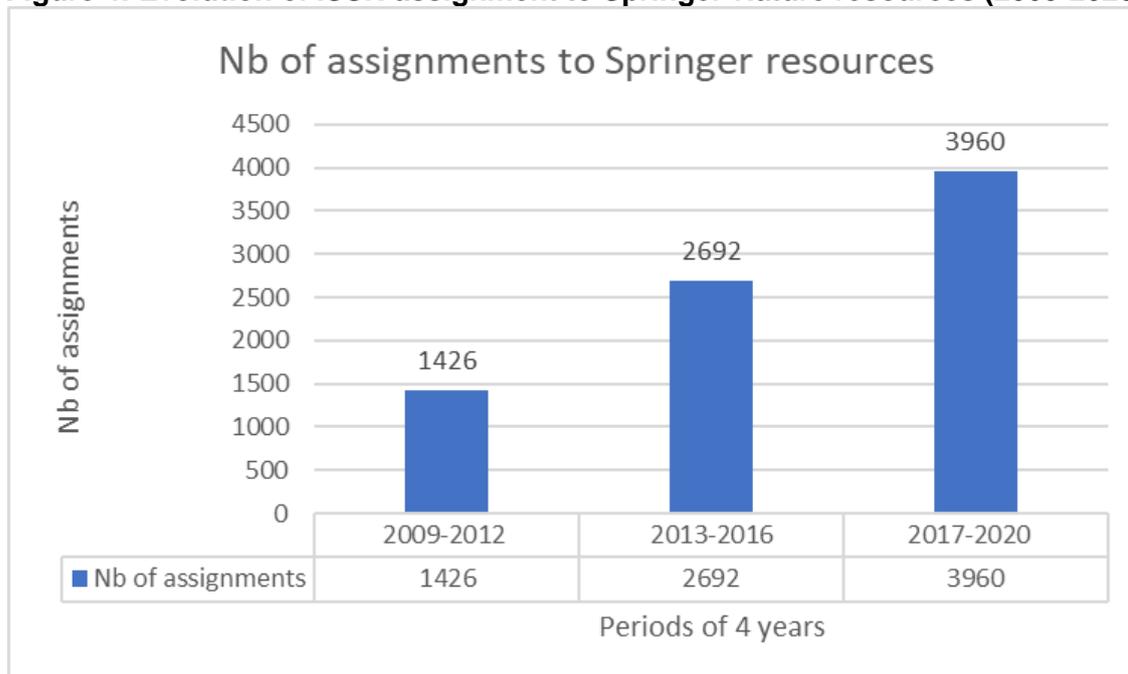
Between January 2017 and December 2020, **2,561** provisional records were created in the ISSN Register by the ISSN International Centre. Three National Centres are particularly concerned by the new workflow, i.e. ISSN Switzerland, ISSN Germany and ISSN Singapore, in decreasing magnitude. Since Summer 2020, the workflow between Springer, the ISSN International Centre and the ISSN National Centres for current assignment has been very fluid, from provisional assignment to validation of records in the Register/Confirmed category, thanks to a process set up by Springer-Nature regarding the notification of new publications, accompanied by basic metadata that is verified by ISSN National Centres to complete the description of resources. The average monthly number of ISSN assignments for all Springer-Nature publications is stable with approximately 60 ISSN assigned.

Table 6: Summarized Statistics re ISSN assignment to Springer-Nature resources

Total assignments 2017-2020	2 561
Out of which	
Serial monographs	2 141
Journals	420

As of 10 February 2021, **1,686** ISSN out of 2,561 were validated and made visible to free users of the ISSN Portal. This cooperation has enabled the ISSN Network to better track Springer-Nature publications for the benefit of its users.

Figure 4: Evolution of ISSN assignment to Springer-Nature resources (2009-2020)



In the end, the outcome is in line with the project objectives: the workflow between the ISSN Network and Springer-Nature is reliable and simpler with only one contact person at the ISSN International Centre. The ISSN Portal is more regularly updated and contains more comprehensive data.

Better identifying the production of multinational publishers with a new tool

The list of agreements between ISSN National Centres for ISSN assignment to continuing resources issued by multinational publishers was overhauled to make it scalable and more cooperative. Following the collection of information from external sources, notably the STM Association's Publishers' imprint list, the existing list of multinational publishers has been checked, augmented and enriched, in particular by linking to the publishers' ISNIs if they exist. This list has been available since Autumn 2020 through a wiki implemented by the IT team. It will serve as a basis for discussion with the National Centres for sharing responsibilities over specific multinational publishers' outputs. The goal of this project is to create a list of multinational publishers and brands that will be useful to the library community, and cooperate with VIAF and ISNI databases to better identify publishers globally.

2.1.3. Relationships with ISSN National Centres

The flow of bibliographic questions from the National Centres was steady, the topics covered concern mostly the ISSN scope and the assignment criteria, but also title changes and transfers of responsibility between National Centres.

ISSN IC librarians have been providing a bibliographic support to a few National Centres in their own languages. This is the case for the National Centres of Russia, Kyrgyzstan, Uzbekistan, as well as Uruguay, Ecuador and Mexico. A particular attention is set on Morocco, Nepal, Turkey and Senegal. A set of training sessions was postponed due to the pandemic crisis and will be re-scheduled in 2021 for Senegal. Beside formal training sessions, the MTCIN team advises the staff of 23 National Centre on a regular basis.

Participation in the test campaign for ISSN+

ISSN + is the future ISSN production tool that will replace Virtua and developed by the ISSN IC and its contractor. Since September 2019, ISSN IC staff are regularly requested to test ISSN+ modules. An ISSN+ User Group was set up consisting of ISSN IC staff and a dozen representatives of ISSN National Centres. Three test campaigns took place in 2020 and were an opportunity for the National Centres to take ownership of their future cataloguing tool and express their needs in terms of functionalities. The feedback proved very useful to enhance the application (see section 2.3.4 below).

Quality Plan for ISSN Data

Quality of ISSN data is key to increase future usage on the ISSN Portal and the corporate extranet, attract new customers and set up partnerships with database vendors, aggregators and other information providers.

In 2017, the Metadata Department defined how the Quality Plan would be implemented according to the objectives, the context and the resources available at the ISSN International Centre and within the ISSN Network. On a theoretical side, the Quality Plan identified the various domains where quality should be improved: quality of the bibliographic data (i.e. the ISSN records themselves), enhancing the ISSN coverage (developing the ISSN Register with more identified resources), quality of the processes and workflows (within the ISSN Network and with users of ISSN services), and adding more links to related identifiers.

Quality of bibliographic data

The ISSN International Centre has been working with several ISSN National Centres to jointly amend incorrect records which could not be displayed in the ISSN Portal as they were not compatible with the ISSN bibliographic rules. Globally, **830** records catalogued by 6 National Centres were corrected by the ISSN IC Metadata team in 2020.

Projects with partners provide great opportunities to correct mistakes and check the structural validity of the ISSN records in their databases. In 2019, on Latindex request, a project was initiated aiming at **completing MARC 21 title proper field** from the key title information. In 2020, the project resulted in **9,200** updated records from Latin American countries, i.e. Argentina, Chili, Colombia, Mexico, Peru and Uruguay. The project will be completed in early 2021 with additional **390** records from Central American countries to be processed.

1,600 records describing Ukrainian resources and containing erroneous Cyrillic characters were corrected by ISSN IC. Adding entries in original characters makes it possible to enrich the ISSN records.

Therefore, a project of systematic cyrillization of all text fields (titles, issuing body and publishing statement) regarding **5,200** records was taken on by ISSN Ukraine after receiving proper training.

Enhancing ISSN coverage

CIDEMIS is another example of enhancing ISSN data through cooperation. CIDEMIS is the automated system developed in 2015 by ABES, i.e. the French Bibliographic Agency for Higher Education, the National Library of France (BnF) and the ISSN International Centre. ABES manages SUDOC (<http://www.sudoc.abes.fr>), the French Higher Education Union Catalogue, to which about 3,400 libraries nationwide contribute. In the framework of their activity, cataloguers working with SUDOC may identify periodicals and other ongoing resources lacking an ISSN or ISSN records needing an update. The objective of CIDEMIS is thus to manage the requests for ISSN assignment and the correction of continuing resources' records described in SUDOC, while ensuring an efficient workflow between all stakeholders.

As a whole, since 2016, out of the 10,360 assignment and correction requests sent by SUDOC network, **5,974** requests have been processed and **1,000** have been declined. In total, **5,200 ISSN**s have been assigned and **775** ISSN records have been updated by the ISSN National Centres in cooperation with SUDOC librarians.

In 2020, **2,143** requests sent between 2015 and 2020 were further processed, resulting in **1,883** ISSN assignments and **259** updated records. In particular, ISSN Germany, ISSN United Kingdom and ISSN USA have made significant efforts to process their backlogs of CIDEMIS requests.

CIDEMIS helps to improve the quality of the ISSN Register in terms of coverage (assignment requests) and accuracy (correction requests).

Building on Keepers Registry to improve data quality

Whenever the data supplied by our partner archiving agencies is updated in Keepers Registry, a significant number of records indexed by the Keepers Registry fall under the Provisional category, thus making these records invisible to free users of the ISSN Portal. The ISSN IC updated and enriched **2,400** records in 2020 which were sent to National Centres for inclusion in their local database. This project has become an ongoing activity as regular updates are delivered by partner archiving agencies.

Reusing other identifiers to cross-check data

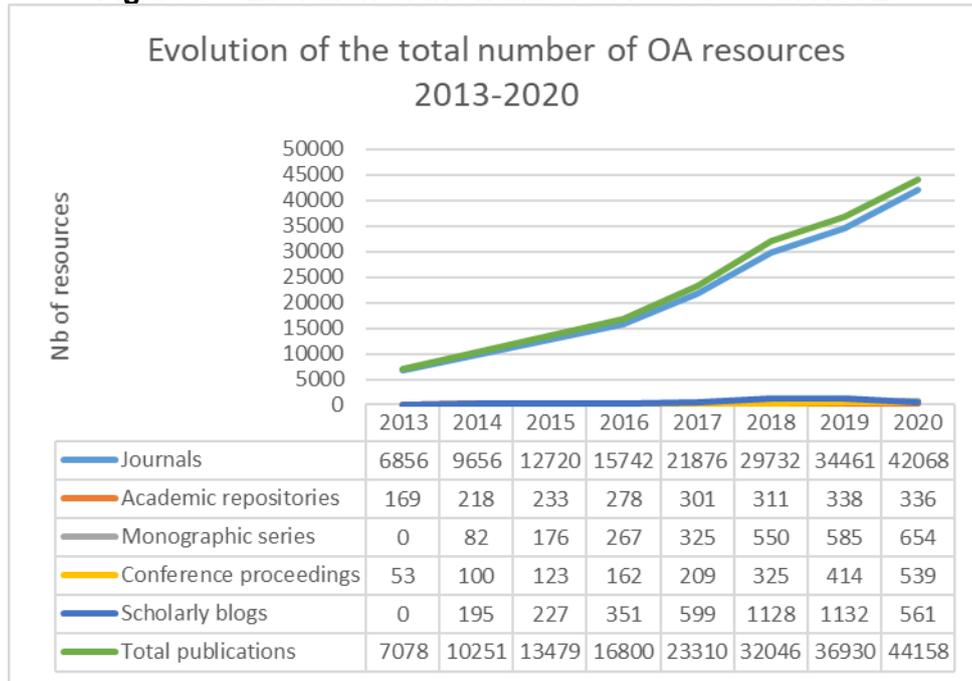
Adding Geonames' URIs and ISNIs to the ISSN database is also an ongoing process. The alignment with **Geonames** is a work in progress aiming at obtaining a refined geolocation under the shape of URIs. A process was set up in 2018 to automatically add a geolocation to new ISSN records in the Portal (field 926). The ISSN IC has aligned the coordinates of cities indexed in Geonames with the data catalogued in the Publishing statement (260\$a) and country (044\$c) fields of the ISSN records. However, there are various causes to matching failures, which requires a manual alignment work. As of 28 February 2021, there were **2,244,466** records with a Geonames URI in the ISSN Portal.

Since 2018, **ISNIs** (International Standard Name Identifiers) have been added progressively to ISSN records, thanks to the National Centres that include ISNIs in their records. As of early January 2021, there were **29,900 ISNIs** in the ISSN database, most of these corresponding to issuing bodies and international organizations.

2.1.4. The development of the Directory of Open Access Scholarly Resources (ROAD) in 2020

7,228 new ISSN records describing Open Access (OA) resources were added to ROAD in 2020 and as of January 2021, ROAD gathers **44,158** OA titles. Open access resources represent **15% of online publications** identified and described in the ISSN Portal.

Figure 5 – Evolution of the number of resources in ROAD



The number of scholarly open access publications has increased six-fold since ROAD launched in December 2013.

The ranking per country remains the same as in 2019, with Indonesia still in the lead with **10,307** resources, followed by India, the United States, Turkey, the United Kingdom and Iran, each with about 2,000 resources. The top 12 countries together account for 65% of all open access titles in the ISSN Register (29,067 records).

Figure 6 - Top 12 participating countries and ISSN National Centres

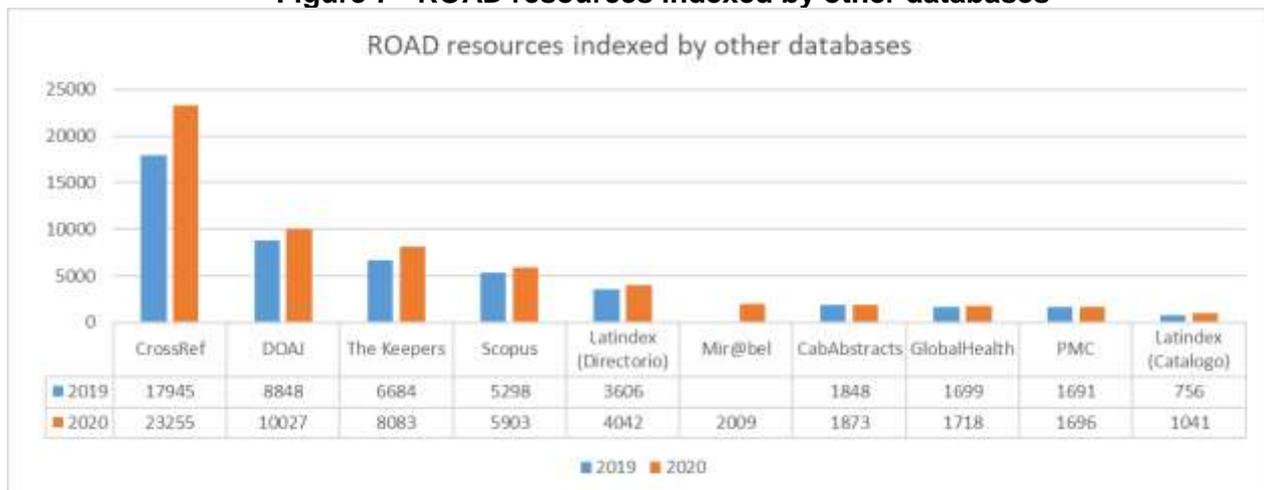


When checking how ROAD resources are indexed by other databases (see figure 7 below), one can notice that on a total of 44,158 titles:

- More than half of the OA titles have title-DOIs (23,255);
- only 18% of OA titles are being preserved and reported in The Keepers' Registry;
- 22% are indexed in the Directory of Open Access Journals (10,027);
- 13% are indexed by Scopus;
- 16% (7,104) are indexed both by Crossref and Keepers, and 9% (4,233) are indexed jointly by Crossref, Keepers and DOAJ.

Of note this year is the cooperation established with Mir@bel, the French portal for reporting access to electronic scientific journals in the humanities and social sciences.

Figure 7 - ROAD resources indexed by other databases



2.1.5. Standardization and International Cooperation activities

ISSN Review Group (ISSN RG)

The ISSN Review Group met seven times in 2020, and 6 additional volunteers joined the group in October to work on the ISSN Manual review. Among many different topics, the ISSN RG and ISSN liaisons have been working on:

- the harmonization between RDA, ISBD and ISSN;
- the review process, best practices and appropriate collaboration tools, and the reviews of the ISO standard 3297, the ISSN Manual, ISBD, and the IFLA Standards Procedure Manual;
- the relationships between ISSN National Centres and multinational publishers (notably through the creation of the Multinational Publisher Wiki);
- the addition of external metadata in ISSN records (notably links to National Centres' host catalogue records);
- several other bibliographic issues, either during the meetings or by email;
- the developments in linked data (a presentation on ISSN IC's Linked Data projects was given at the Linked Data For Production conference in July 2020).

ISSN Manual

The project to update the ISSN Manual was launched by the ISSN Review Group after the Directors' Meeting in New Delhi in 2019. A broad multilingual survey was conducted and data analysis of common cataloguing errors was undertaken in the first two quarters of 2020 before the policy review and rewriting phase began in July. The project team now has 17 members spanning 4 continents.

Activities in the framework of the International Standard Organisation (ISO)

Since September 2017, the ISSN International Centre has been involved with the revision of ISO 3297 -- International Standard Serial Number and has organized monthly meetings with the experts appointed to the working group in charge of the revision (ISO TC46/SC9/WG5).

The final ballot for ISO 3297 was launched in the summer of 2020 and the sixth edition of the standard was issued in October 2020. As part of an agreement with ISO, ISSN National Centres were able to receive one copy of the standard free of charge.

International Federation of Library Associations (IFLA)

At IFLA, the ISSN International Centre is represented in and works with various sections and working groups:

- the Serials and Other Continuing Resources Section (SOCRS),
- the Standing Committee of the Cataloguing section,
- the ISBD Review Group,
- the Bibliographic Conceptual Models Review Group,
- the PRESS₀₀ Review Group
- the IFLA Standards Procedure Manual Revision Working Group
- the Linked Data Technical Sub-Committee, which aims to support the publication of IFLA namespaces for the diffusion of IFLA bibliographic standards via the semantic web.

The annual World Library and Information Congress which was supposed to be held in Dublin, Ireland was cancelled due to the global pandemic. Mid-term meetings were maintained, and held online for the most part, but a large amount of work on the projects listed in action plans were delayed.

The LRMoo Working Group together with the CIDOC CRM Special Interest Group (part of ICOM) started replacing FRBRoo at the same time as harmonizing it with the CIDOC CRM, by mapping all entities, attributes and relationships in IFLA LRM to OO classes and properties. This streamlining is now expected to be complete in June or July 2021. It was agreed that minor editorial work which will result for PRESS_{oo} to align it with LRM_{oo} should not prevent the PRESS_{oo} namespace from being created.

Further to the work done by the “ISBD Editorial Group”, launched in 2018 to work on the ISBD review, an ISSN IC bibliographic expert is a member of the ISBD for Manifestation Task Force which had an online kick-off meeting in February 2020 and 5 online working meetings during 2020. The Task Force has been working on completing the alignment of the ISBD to the IFLA LRM at the Manifestation level, and has been working out an element set for the alignment. This is phase 1 of the ISBD revision, which concerns the Manifestation entity, so the work started with the identification of transcribed elements, and continued to identify non-transcribed, or “recorded”, elements. The different areas in the ISBD Consolidated edition 2011 was divided up between Task Force members in order to do this so called “shredding” process, which intends to dissect, fix, and reassemble the ISBD. This process will continue in 2021 and the goal is to have a first version of the "ISBD for Manifestation" document ready at IFLA WLIC 2021.

RDA

In June 2015, the ISSN International Centre signed an agreement with the RDA Steering Committee (RSC) in order to “support the maintenance and development of functional interoperability between data created using the RDA and ISSN instructions and element sets”. Since then RDA has become a global standard and in 2019, it is now aligned with the IFLA LRM.

The beta version of the RDA toolkit launched in June 2018 and became the official toolkit as of December 15, 2020. The answer to the question of as whether the next revision of the ISSN Manual be added as an RDA Toolkit Application Profile seems to be that it would take quite a lot of time and should not be the priority for the moment.

Also under ongoing discussion at ISSN Review Group meetings are the possible conflicts in cataloguing practice caused by the RDA Toolkit’s implementation of the “WEM lock” principle of the LRM model. Recommendations are being made in particular to ensure RDA options for a new description do not conflict with the ISSN Manual.

Other standardization activities

The ISSN International Centre is a member of EDItEUR, the UK-based organization in charge of developing and maintaining standards for the publishing industry, such as ONIX and ICEDIS (ONIX for serials). An ISSN IC representative participated in the meeting held in April 2020, and gave a presentation of Keepers Registry.

2.2. Department of Sales, Marketing and Communication

For 2020, SMC activities were focused on:

- The renewal of ISSN current subscriptions in order to maintain the ISSN turnover,
- Promoting and setting up test accounts for the ISSN API,

- New ISSN subscriptions to the ISSN Portal and services associated to ISSN Data,
- Extensive communication about Keepers Registry.

2.2.1. Sales

The sales turnover from ISSN subscriptions increased by 2.95 % compared with 2019 turnover.

The main services invoiced remain access to ISSN Portal (54,89 %) and ISSN Data File (21,62 %).

The distribution of the turnover slightly changed in 2020:

- The ISSN Portal turnover increased slightly as most customers renewed their current subscriptions in 2020 and purchased additional accesses for staff working remotely;
- 12 customers did not renew their subscriptions to the ISSN Portal due to budget restrictions;
- The ISSN Data File turnover decreased compared with 2019 figures;
- The OAI-PMH turnover remained stable;
- Regarding the ISSN API, test accounts were opened in 2020 but prospects decided to postpone subscribing because of budget restrictions.

The sales of ISSN credits increased by **6%**. The ten first countries representing **76,58%** of ISSN credits turnover are Hong Kong S.A.R., China, International organizations, Pakistan, Ukraine, Taiwan, Province of China, Peru, South Africa, Kazakhstan, Austria, Bangladesh.

During the year 2020, due to Covid-19 issues and its economic impacts on the publishing community, the ISSN IC carefully monitored the activity of ISSN publishers registered with the ISSN Portal and ISSN credits invoiced were quite stable along the year.

2.2.2. Contributions from member countries

In 2020, the actual contributions represented **97 %** of the total amount called up. The ISSN International Centre also recovered overdue contributions. At the end of year 2020, ten member countries had outstanding invoices and unpaid ISSN contributions.

2.2.3. Communication and marketing activities

Due to the Covid-19 pandemic and related restrictions during the year 2020, all exhibitions booked by the ISSN IC and conferences planned were either cancelled or carried out remotely. The ISSN IC participated in various online conferences, delivered several distant presentations and sponsored a few conferences.

The ISSN IC focused its communication on the integration of Keepers Registry in the ISSN Portal targeting professional publications and newsletters in different geographical areas. Below is a list of articles published and actions conducted:

Association of Research Libraries (ARL) published an article about Keepers Registry in ARL News January 2020;

DOAJ issued a Tweet regarding the ISSN IC Director's guest blog post about the integration of Keeper Registry in the ISSN Portal:

<https://mobile.twitter.com/DOAJplus/status/1236911844129943552>

Latindex published a Facebook article : <https://www.facebook.com/notes/latindex/the-keepers-registry-is-now-available-on-the-issn-portal-httpsportalissnorg/1041489816222742/>

NISO published an article on its website: <https://niso.org/niso-io/2020/03/keepers-registry-now-available-issn-portal>

Research Information June-July 2020 with interviews of archiving agencies' managers : <https://content.yudu.com/web/tzly/0A43y1e/Rljun20/html/index.html?page=8&origin=reader>

UKSG Enews, March 2020, <http://www.uksg.org.uk/civcrm/mailing/view?reset=1&id=350>

WAN-IFRA (World Association of News Publishers), March 2020, <https://www.wan-iffra.org/articles/2020/03/04/the-keepers-registry-is-now-available-on-the-issn-portal>

a brief article entitled Did you know Keepers Registry was circulated to ISSN IC contacts in March 2020

Information Today published an article with interviews in its MAY/JUNE 2020, VOL. 37, ISSUE 4: <http://pubarchive.infotoday.com/index.php?gf-download=2020%2F06%2FInformation-Today-2020-0506.pdf&form-id=1&field-id=3&hash=90e5c848f1f99111ca17ee67bd748cc7b0261b26124a10e9566aed56edb9ae0b>

Online Searcher published an article in its June 2020 issue:

<http://pubarchive.infotoday.com/index.php?gf-download=2020%2F05%2FOnline-Searcher-2020-05061.pdf&form-id=1&field-id=3&hash=b7781df10ccb43e552a0c8a651b4e9a78819a8f290fe539d5f3c10a736bb96d2>

a NASIG 35th Annual Conference presentation is available online:

<https://www.youtube.com/watch?v=C8h802F8eF4>

An article on Keepers Registry and some testimonials of Keepers' archiving agencies were published in an issue of Research Information, Oct/Nov 20. The article (in English) is available through this link: <https://www.researchinformation.info/feature/irreplaceable-source-information>.

CISPC 2020 – Challenges in the scholarly publishing cycle: the ISSN IC sponsored for the first time this online event and issued a lightning talk on November 30th, 2020: <https://cispc-event.com/> also available on <https://vimeo.com/485968455/f0b56d401f>

The ISSN IC submitted an article on the collaboration between ABES, the French academic union catalogue and the ISSN IC in the online newsletter Fil'ABES, November 2020

The ISSN IC published several ads in various Russian professional journals: Библиотековедение in May and October 2020; Обсерватория культуры in November 2020; Вестник Библиотечной Ассамблеи Евразии in October 2020.

The ISSN IC issued several single page-campaigns entitled "Did you know" that were sent to the ISSN Network through the mailing list, and to publishers and customers subscribing to the ISSN Portal.

2.2.4. Enhancing the ISSN Portal

The ISSN Portal is available in Arabic, Chinese, English, French, Spanish and the Russian version was implemented in 2020.

The ISSN IC added one specific statistic page on Keepers (<https://keepers.issn.org/stats>) providing information about the following items:

- Number of archived resources per archiving agency and date of last update; users have the possibility to display search links to retrieve corresponding ISSN records;
- Level of archiving stewardship;
- Resources archived per publisher and per archiving agency, users have the possibility to display search links to retrieve corresponding ISSN records.

2.2.5. ISSN on Social Media

In 2020, the institutional ISSN website (www.issn.org) was enhanced with news and other information contents published in the six official UN languages.

The ISSN Facebook page (<https://fr-fr.facebook.com/ISSNInternationalCentre>) reached **2,771** likes in February 2021 (**2,505** likes in February 2020) and **3,012** followers in February 2021 (**2,669** followers in February 2020). The ISSN Facebook page is regularly updated with news, photos, and videos from the ISSN Network.

The Slideshare page (<https://www.slideshare.net/ISSNIC40>) is also regularly updated with ISSN IC and ISSN Network presentations. There are currently **45** presentations published, and 12 followers.

As of 10 February 2021, ISSN_IC Twitter account (https://twitter.com/issn_ic) had approximately **973** subscribers (906 in October 2020; 790 in February 2020). The ISSN IC Twitter account gets 16-24 new subscribers per month. **171 tweets** were issued by the ISSN IC in 2020 and each one was seen 1000 times, i.e. **171,000 impressions**. The Keepers Registry Twitter account (<https://twitter.com/keepersregistry>) is now also under the management of the ISSN IC, and has 183 followers.

2.2.6. ISSN Newsletter

The ISSN Newsletter consists of a press review about the topics relevant to the ISSN community and partners. Upon the acquisition of the Keepers Registry, digital preservation was added as a newsletter category. As of January 2021, the newsletter had **10,301** subscribers compared to 9000 subscribers in January 2020. 100 to 120 new subscribers were registered monthly in 2020.

2.3. Information Systems Department

The IS Department continued to provide its technical services to ISSN IC staff, the ISSN Network and external customers and partners such as monitoring the web sites and applications, and providing regular data exports. The IS Department also took charge of several "ISSN Premium" activities over the year to check and update external partners' ISSN/Title lists.

2.3.1. Technical support to the ISSN International Centre

The cooperation with the contractor in charge since 2016 of the monitoring and management of the local computer system infrastructure at the ISSN IC has been ongoing in 2020 and allowed for a smooth running of the office infrastructure.

Progress was made in 2020 thanks to the contractor's excellent responsiveness:

ISSN IC benefited from a very quick setting up of a "remote desktop" framework at the very beginning of the first "lockdown" in France (both hardware and software), thus allowing for an almost instantaneous transition to full teleworking,

a messaging service was installed, which proved to be very efficient and useful in this difficult period,

In October 2020, the temporary second-hand server which had been installed in March 2020 was replaced by a new one, thus allowing for a long-term efficient working solution,

A new version of the wiki software was implemented and set up, thanks to which ISSN IC now develops wiki applications which can be made available to external partners and users.

ISSN International Centre staff members are thus able to access all their data and working tools wherever they are.

2.3.2. Maintenance and updating of the ISSN Portal

Thanks to the hiring a developer in January 2020, the ISSN International Centre is now in a better position to manage more aspects of the ISSN Portal /Extranet and to engage into a more efficient cooperation with our technical provider. Statistics regarding the usage of the ISSN Portal can be found in the annex.

Tapping external data to enhance the ISSN Portal

Various new external sources from the world of continuing resources identification and description have been added to the data offered through the ISSN Portal, thanks to the ISSN used as a linking key:

- Links to Wikipedia pages corresponding to identified resources (in the different languages),
- Links to Wikidata entities corresponding to identified resources,
- Links to Mirabel serial database (<https://reseau-mirabel.info/>),
- Links to the FATCAT database set up and maintained by Internet Archive (<https://fatcat.wiki/>),
- Links to ABES SUDOC records (<http://www.sudoc.abes.fr/>).

Linking data from these different external sources is automatically maintained and updated on a daily basis (except for SUDOC records).

Updating the Keepers Registry

This service has been added to the ISSN Portal and has now been up and running for more than a year. The statistics page has been significantly enhanced and now offers links from most figures to the corresponding ISSN Portal searches, in order to display the corresponding records. The links are dynamically displayed through Javascript in order to avoid an overload of the server due to the activity of numerous search engine bots. The updating process is regularly improved and semi-automated, so as to make it less dependent on human interventions and monitoring.

Existing data sources are being fine-tuned (addition of "triggered resources" for Clockss and Portico, as well as the corresponding hyperlinks). New data sources are being tested and considered.

Cooperation with Wikidata and Wikicite

Following the participation in the annual Wikicite/Wikidata meeting in Berkeley in November 2018, a feasibility study was launched in order to check the possibility of inputting basic validated ISSN metadata in Wikidata. Links are now established automatically on a daily basis from individual ISSN Portal pages to the corresponding Wikidata entities. Using these links between ISSN records and Wikidata entities and metadata extracted from the ISSN Register through a script, a specific “ISSN Bot” was developed which adds basic free ISSN data elements to Wikidata pages corresponding to journals already identified with at least one ISSN (addition of e-ISSNs, ISSN-L, key title, URLs, etc.). The bot is run on a regular basis, so as to make sure that Wikidata entities are properly curated.

Implementing a URN resolver

A URN:ISSN resolution server was set up mid-2019 and provides basic URN resolution service for ISSN and ISSN-Ls. A fully-fledged home page for the service was designed in 2020 and is now implemented (urn.issn.org). The server was also rewritten so as to make sure that enriched data can be easily plugged in to manage direct resolution to the various journal URLs.

Cooperation with ABES re ROAD data

The French higher education bibliographic agency ABES has expressed an interest in the ROAD dataset for their BACON database that provides access to metadata for the management of online resources. ISSN IC has set up a KBART-compatible version of the ROAD dataset of MARC records which is made available on BACON and can be reused by various partners.

2.3.3. Deployment of IT tools

Setting up of XWIKI

The ISSN International Centre has been using the XWiki software for a number of years in order in particular to manage its technical documentation. The software was upgraded in 2021 and made accessible to external partners. It is being used for the management of the multilingual help pages for ISSN+.

ISSN IC has also developed a dedicated application to manage in a cooperative way the multinational publishers’ serial output. This is a first step towards the management of “authority entries” for publishers, identified through ISNI, so as to add new “authority control” features to ISSN+.

These first successful experiments with the XWiki software should enable ISSN IC to manage other shared resources which require cooperative input, such as the ISSN Manual, potentially with the support of the company developing the software.

Setting up of a specific ISSN IC Github repository

The ISSN IC now has its own specific Github repository for the storing and management of the various scripts and code contributions. It is of specific importance for the access to the code of the ISSN Portal and of ISSN+ in due time.

2.3.4. Development of ISSN+

As in 2019, ISSN+ has been the major activity in 2020.

The first phase of the project, using agile methods with a team of developers to reach a level of 6 contributing developers for an FTE of approximately 3 and teleworking in three-week sprints, was coordinated by a “scrum master” and came to an end in May 2020, after a total of 16 sprints.

It was assessed that the initial benefits from this first phase had reached their limit, and that a new type of cooperation with the contractor was needed which would be more based on a “delegation of skills” with two developers cooperating directly with the ISSN IC developer. An extension of the contract for 160 “man days” was signed in July 2020. This was the basis for the work performed until February 2021. A further extension of this contract was signed in January 2021 for 70 more “man days”.

It should be stressed that the new phase of developments in a different context exposed a number of technical debt issues in the code, inherited from the first phase, which had to be solved before new features could be added to the software.

The main components of the software are:

- Elasticsearch as the search engine,
- PostgreSQL as the relational database,
- Vue.JS framework for front end development,
- Python language for back end modules and APIs.

The following functionalities have already been developed for ISSN+:

- Management of ISSN blocks,
- Search functions (simple and advanced),
- Display and facets,
- Index browsing with backlinks to the record searches,
- File imports,
- Export function (direct by user and through API),
- Admin functions,
- User management,
- Data import mechanisms,
- Validation rules (structural validations, part of logical validations),
- ISSN assignment through API and web form,
- Cataloguing (expert and assisted),
- Management and display of error state records and archived versions,
- “ISSN family” searches,
- Help pages (managed through XWiki),
- Full MARC 21 data model with ISSN specific amendments (used for controls, online help etc.),
- Automated transliteration for Cyrillic.

A first testing period with the help of a number of ISSN National Centres was organized end of 2020, thanks to which a number of bugs and necessary fixes was identified. New tests will be organized by the end of 2021.

The minimum viable product, i.e. the version necessary for a switch to production, should be ready in Fall 2021. A number of core functions are still currently being developed, such as ISSN-L management.

Transition activities will also have to be implemented such as the transfer of the “continuous integration process” to the new ISSN IC context, the modification of existing auxiliary scripts, security checks, etc.

Conclusion

2020 has been a challenging year for the continuity of the ISSN International Centre's and ISSN Network's activities. The ISSN International Centre thrived to carry on supplying quality services to publishers, scholars, information providers and libraries while cross-referencing ISSN data with partner information services.

The cooperation with ISSN National Centres is stronger than ever to foster the dissemination of cultural, scientific and technical information, promote open science and emphasize the importance of long-term preservation for digital continuing resources.

The ISSN International Centre is eager to work with new ISSN National Centres in 2021, consolidate its technical infrastructure, offer upgraded production tools to the ISSN Network, adjust its identification and description policy and contribute to projects involving notable national libraries, research consortia, and archiving agencies. Its sound financial situation enables the ISSN International Centre to contemplate 2021 with confidence and renewed enthusiasm.

ANNEX: 2020 ISSN Portal Statistics

1/ Indexing and traffic generated by Google

Sitemap files containing in a standardized format the URLs of all ISSN records have been produced through a dedicated script on a daily basis since mid-2019 and are regularly harvested by the major search engines (in particular Google).

The indexing of the ISSN pages by Google is monitored through the Search Console which seems to show that the indexing process is probably a bit lost due to the various possible URLs corresponding to any given ISSN (linguistic variants, ISSN-L, linked data formats, etc.) in spite of the unique reference stated in the sitemap files for each number.

We have now reached a level where **1,070,000 ISSN** records (950,000 in 2019) are officially indexed through their canonical URLs by Google, i.e. approximately 50% of all confirmed records (2,186,379 as of January 2021).

This massive indexing by Google, even if not yet systematic, contributes to a regular significant increase in the visibility of the ISSN Portal and in the corresponding traffic.

Figure 1: Google search performance analysis mid-2019-2020 (from Google Search console)

Notes: The data shown starts in August 2019 when the sitemap files started being fed to Google and other search engines; Impression: number of times Google users saw a link to the ISSN Portal, CTR: percentage of "impressions" that resulted in a click, Average position: average position in search results

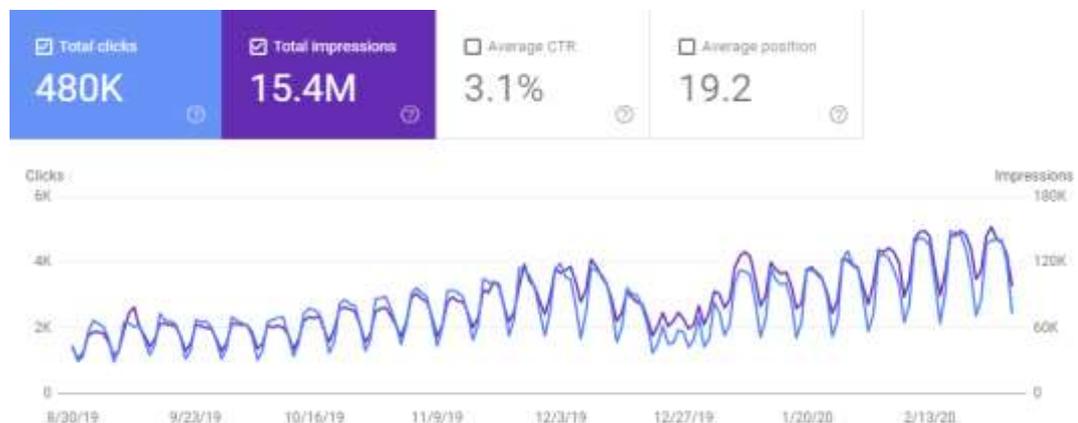


Figure 2: Google search performance analysis mid-2019- Jan. 2021 (from Google Search console)



The comparison between the two graphs shows a dramatic increase (by a factor of 3 or 4) in traffic generated by Google searches between 2019 and 2020

We have now reached a level where, on working days, there are on average **6,000 daily clicks** (4,500 in 2019) on Google search results corresponding to ISSN Portal.

This has obviously an impact on the overall traffic of the ISSN Portal which has been growing steadily over the last year.

2/ Overall traffic on the ISSN Portal

On working days, there are **8,500** daily unique visitors (6,000 last year) on the ISSN Portal, i.e. two thirds coming from search engines, one third by direct entries and linking from other web sites and pages.

On a typical day, the following traffic parameters can be observed:

Figure 3: ISSN Portal unique visitors per day/country in 2020 (from Piwik)

COUNTRY	UNIQUE VISITORS
India	1,117
United States	828
Brazil	575
Indonesia	333
Spain	332
United Kingdom	259
Turkey	235
Germany	233
France	231
Russia	206
Totals	8,505

Figure 4: Average day traffic map on the ISSN Portal in 2020 (from Piwik)



Figure 5: Monthly traffic on the ISSN Portal in 2020 (from Awstats)

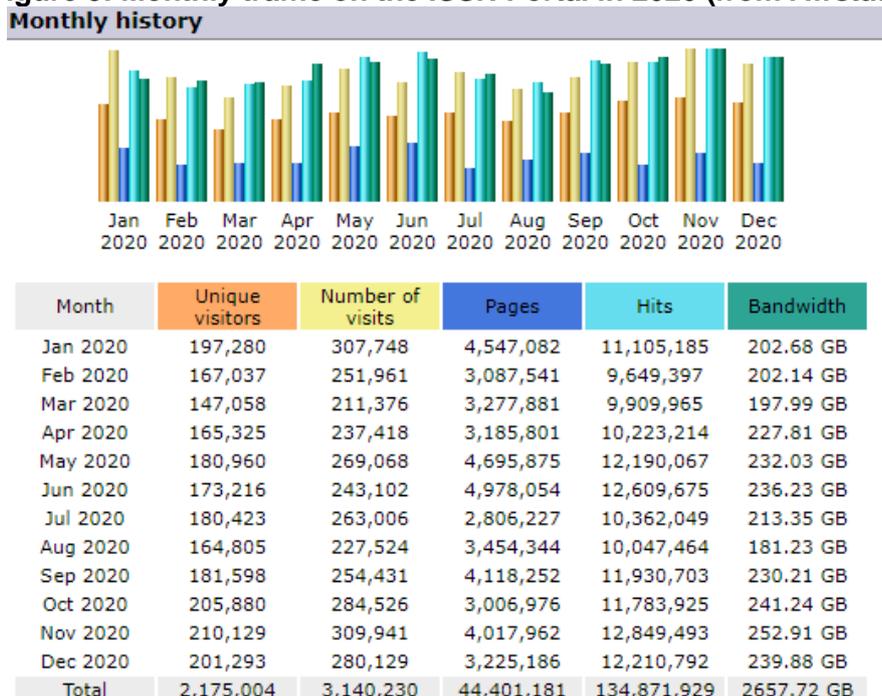


Figure 5 shows a massive increase in traffic in 2020 compared to 2019 with **+36% hits** and **+25% pages viewed**.

However, a decreasing number of pages viewed per visit (**14.13** in 2020 compared to **24.31** in 2019) can also be noted which could relate to a greater proportion of non-professional visitors finding ISSN pages through search engines or Wikidata. Such visitors would not be as interested by other pages and links in the Portal or they may find information more quickly.

ETAS web site traffic (<https://journaltransfer.issn.org>)

As of January 2021, **51** receiving publishers and **663** transferring publishers were registered in the ISSN Portal.

In 2020, **145** title transfers (vs 137 in 2019, 167 in 2018) were filed by receiving publishers and posted on ETAS. Taylor & Francis with **492** titles acquired (473 in 2019) and SAGE Publishing with **480** titles acquired (466 in 2019) have been the most active receiving publishers since the inception of ETAS in 2010.

The table below shows the ETAS service received **313,343** visits in 2020, i.e. +22% compared to 2019, and **990,031** pages, i.e. +25% compared to 2019, were viewed over the same period.

Figure 6: Traffic data for <https://journaltransfer.issn.org> over the last 12 months

Summary by Month										
Month	Daily Avg				Monthly Totals					
	Hits	Files	Pages	Visits	Sites	kb F	Visits	Pages	Files	Hits
Dec 2020	1875	1793	1640	770	4543	407506	23892	50849	55600	58153
Nov 2020	1908	1804	1619	889	4999	376654	26697	48588	54135	57263
Oct 2020	2068	1981	1774	838	4245	421015	26000	55018	61423	64110
Sep 2020	8178	7698	7766	823	4688	796906	24698	233009	230957	245357
Aug 2020	2484	2333	2269	877	3773	655657	27209	70361	72351	77013
Jul 2020	2517	2373	2236	971	3460	482623	30115	69338	73576	78044
Jun 2020	2643	2466	2255	914	3891	504014	27425	67668	73997	79319
May 2020	2721	2618	2419	959	3825	545564	29745	75002	81162	84377
Apr 2020	3517	3328	3189	897	3783	673940	26927	95687	99853	105513
Mar 2020	3393	3240	3095	774	3175	676519	24019	95965	100452	105186
Feb 2020	2595	2612	2308	756	4891	520699	21944	66940	72855	75257
Jan 2020	2285	2209	1987	795	5396	465380	24672	61606	68498	70837
Totals						6526577	313343	990031	1044859	1100429

Note: Hits: requests of any kind received by the server; Files: file requests received by the server (typically html pages + images + css files etc.); Pages: web page requests received by the server (may trigger several file requests); Visits: number of « sessions » (set of requests coming from the same IP identified over a short period of time); Sites: number of uniquely identified « visitors ».