

ISSN INTERNATIONAL CENTRE ACTIVITY REPORT FOR 2021



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INTERNATIONAL CENTRE



Introduction

The ISSN International Centre continued its activities despite the difficult health situation in 2021. The team worked mainly remotely until the end of August 2021 and partially thereafter. Weekly coordination meetings helped to maintain a cohesive team and move key projects forward. At the very end of 2021, the team cooked and enjoyed a festive meal for a pleasant moment of conviviality and exchange.

The opening of three national centers in the same year is quite exceptional and proves the dynamism of the ISSN network. Welcome to Austria, Peru and Ukraine and to the colleagues from these countries whose proximity to publishers and libraries improves the overall quality of the ISSN data and contributes to the influence of its services.

Development work on ISSN+ continued, but at a slower pace than expected. The ISSN International Centre, like other organizations, has experienced challenges in hiring staff with the necessary IT skills to offset staff turnover or absences in the summer and fall of 2021. It was not until late 2021 that the IT team could be adequately replenished. The production launch of ISSN+ V1 is planned during 2022 after training of the national centers in spring 2022.

On the production side, the global number of identified continuing resources increased in 2021 with about 60,000 new ISSN assigned and the total number of digital resources reached 322,608 in the ISSN Portal. The ISSN International Centre contributed 2,588 new ISSNs to the database in 2021 and carried on with several projects to improve quality notable with partner services such as DOAJ and Latindex.

The ISSN International Centre communicated extensively in 2021 about its network and services through press releases issued at the time of the opening of new national centers and through inserts in professional journals. The monthly ISSN newsletter, which published its 100th issue in September 2021, is very popular and its subscriber base continues to grow. A beautiful promotional video was also produced for the IFLA annual conference. It is available online, subtitled in the six official languages of the United Nations and will be shown again in 2022.

The consultation with the National Centres on the evolution of the ISSN Manual mobilizes the team in a significant way. The objective is to revise the bibliographic procedures of the ISSN network by the end of 2022 to take into account the recommendations of the RDA Steering Committee, IFLA Cataloguing section and the Marc Advisory Committee. Through its participation in several international working groups, particularly on the issue of persistent identifiers, the ISSN International Centre team promotes the specificity of the ISSN network and contributes to its influence.



1. The ISSN Network

1.1 Coverage and extension of the ISSN Network

In 2021, the ISSN Network comprised 93 member states.

2021 was an exceptional year for the ISSN Network with the opening of three ISSN National Centres. In March 2021, the Ivan Fedorov Book Chamber of Ukraine launched its ISSN services followed by the Hauptverband des Österreichischen Buchhandels in Austria in April 2021. The opening of the 93rd ISSN National Centre by the National Library of Peru was celebrated on August 24th, 2021. Press releases were issued for each opening (see Annexes).

These new centres' staff received appropriate training. They will get all necessary support from the ISSN International Centre to manage their services to publishers and libraries and report to the ISSN Network.

1.2 Activities of the ISSN Network

1.2.1 Governance bodies

Three Governing Board meetings were held remotely in 2021:

- The 87th meeting on 10 February 2021,
- The 88th meeting on 28-29 April 2021,
- The 89th meeting on 21 October 2021.

The meetings were well attended by representatives of member countries who approved several important decisions regarding financial and strategic matters.

1.2.2 ISSN National Centres

The 46th ISSN Directors' Meeting was hosted remotely by the Deutsche Nationalbibliothek (17-19 November 2021). Colleagues from the DNB organised two virtual tours of the DNB premises in Frankfurt am Main and in Leipzig. The ISSN International Centre and the ISSN Network are grateful to the DNB for its excellent organisation and the numerous contributions of its staff.

All sessions were held in English. Online attendance was good. On the first day, 77 ISSN NC representatives participated. On the second day, 69 colleagues attended the workshops. On the third day, 74 colleagues were connected. The three new ISSN National Centres were given the opportunity to introduce their organisations. As usual, the presentations were shared on the extranet. A big thanks to all ISSN colleagues who turned these meetings into a success!

Since April 2016, the ISSN International Centre 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 any session in 2021.

Since 2019, the ISSN International Centre Project Officer has been managing relations with ISSN National Centres and in particular the renewal of working agreements, as well as the collection of information about their activities in line with ISSN International Centre policy and ISO regulations. In 2020, a financial report template was set up to facilitate reporting by the National Centres that charge fees for their services.

71 National Centres filed their annual report and 22 National Centres did not send it. Annual reporting is a requirement as per the agreement between the ISSN International Centre and the National Centres. The ISSN International Centre will monitor the situation closely in 2022 to get all reports in due time.

As of March 2022, 45 ISSN National Centres have signed the new working agreement. The Project Officer is also the contact person for standardization work and cooperation issues (see section 2.2).

1.3 Pursuing the 2024 Strategic Plan

The ISSN International Centre 2024 Strategic Plan was approved by the ISSN International Centre Governing Board and the ISSN Network member countries in April-May 2020.

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 to 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.

The primary focus was on commercial publishers. An internal wiki was set up to identify about 300 multinational publishers, their affiliated publishers and related brands that populate the ISSN database. This wiki is managed by the ISSN International Centre with input from a score of National Centres responsible for identifying and describing the publications of these multinational publishers.

From this list, ISSN International Centre extracted data regarding 50 publishers, each associated with 3 ISSNs and key titles. This data was then submitted to OCLC, which manages the ISNI database, and after some corrections, OCLC was able to process it.

Before loading the metadata for all publishers in the ISSN database, it is however necessary to work on the ISNI data model for this type of organizations. A short report was written by the ISSN International Centre to initiate the reflection on the structure of ISNI records and the method of updating them. A specific committee will be created in 2022 by the ISNI Library Group to carry out this activity.

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

UNESCO has 195 Members and 11 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 International Centre has signed with them.

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

It was an exceptional year for three National Centres to open, in part catching up to delays caused by the Covid-19 pandemic. 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. Peru opened its National Centre on August 24th hosted by the Biblioteca Nacional del Perú.

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 other cluster ISSNs. A survey of our user community in 2019 revealed an interest in what could be called an ISSN-F grouping together titles identified by ISSN-L 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 ISSN 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

A discussion paper submitted in May 2021 was followed by a proposal for the MARC Advisory Committee (MAC) about the creation of a repeatable new tag for cluster ISSNs, the 023, so that a URI subfield in \$0 or \$1 would be unambiguous. The discussion paper used the hypothetical example of ISSN-F, a Family ISSN, to illustrate a possible future new

Cluster ISSN. The boundaries of ISSN-F were unclear at that time and the extent of the “family” and use cases for it were questioned by MAC members and subsequently explored in the ISSN Review Group. The proposal in November presented the resulting ISSN Review Group plan to replace the Family ISSN concept with a plan for the Title History ISSN, ISSN-H, an identifier that will group the successive titles held by a publication over time. However, after initial feedback from the Library of Congress, MARC Committee requested more investigation into the needs of integrated library system vendors and the impact a new tag would have. The proposal was eventually withdrawn before final submission to the MAC. Discussion with industry leaders will be programmed over the course of 2022, and the proposal will be resubmitted based on the results at an appropriate time.

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 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 proposal was passed by the MARC Advisory Committee in January 2021 to include additional types of continuing resources defined for the control field (tag 008 position 21) to reflect the full scope of continuing resources covered by ISO 3297:2020. Three code definitions were revised, and six new codes were added. A change request for the equivalent codes for UNIMARC followed suit in April, and by Fall 2021, the new codes were officially published in both schemes. National Centres using these new codes will see them visible in the ISSN Portal, however official network-wide adoption of the codes will happen with the launch of ISSN+. In the first six months of the availability of the new codes, these are the number of records to be found in the ISSN database: Blogs: 40; Directories: 1; Journals: 268; Magazines: 243; Newsletters: 709; Repositories: 4.

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. The ISSN International Centre does not index the web permanently and systematically as search engines do to retrieve current URLs. Moreover, a number of resources are not freely available on the web and cannot be retrieved. 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 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 International Centre to manage operational resolver handling various types of URLs by 2024.

The ISSN International Centre has 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 discussion paper was submitted to the MARC Advisory Committee in December 2021, entitled Enrichment of Web Archive Information in Field 856 in the MARC 21 Formats, with the goal of redefining some of the subfields to track archiving information and persistent identifiers (PIDs) and find a solution to link rot and content drift. Proposals will move forward in 2022 to use PIDs in 856, and develop a new tag for tracking digital archive information.

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.

A meeting with all Keepers agencies was held in June 2021 whereas the Technical Advisory Committee held three remote meetings in 2021. TAC members are Alicia Wise, CLOCKSS, Ted Westervelt, Library of Congress, Maarten Steenhuis, KB – National Library of the Netherlands, Judith Barnsby, DOAJ, Ana Maria Cetto Kramis, Latindex, Wendy Robertson, NASIG, Clifford Lynch, CNI, and William Kilbride, DPC as consultative experts and Peter Burnhill as consultant to the ISSN International Centre Director. Three new agencies have signed a memorandum of understanding with ISSN International Centre in 2021: the Bibliothèque nationale de France for Gallica data, the California Digital Library for Merritt Repository data and the Internet Archive for Fatcat data. There are now fourteen active agencies and two inactive agencies, i.e. the British Library and the Swiss National Library, that no longer update their data. A statistics page has been added to the Keepers Registry site on the ISSN Portal and will be enhanced as the project develops.

Keepers Registry is also a partner of DOAJ, CLOCKSS, Internet Archive and Public Knowledge Project in the JASPER project. Phase One of Project JASPER is a scoping exercise aiming to find a solution that will reduce the number of unarchived open access journals. Starting with a list of diamond open access (i.e. non-APC charging) journals from DOAJ, the five partners are working together to produce an open and sustainable process



that will facilitate the archiving of more journals. The process will be open to a diverse community of archiving services, notably those participating in the Keepers Registry. Other preservation agencies will be invited to join at a later stage once design, implementation, and testing are complete.

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 March 2022, there has been no agreement reached with ISSN National Centres regarding the use of the system. The Governing Board of the ISSN International Centre was informed of the difficulties encountered to achieve this objective, as the National Centres did not show interest in the tool. The ISSN International Centre, with the approval of its Governing Board, decided to abandon this objective in 2022 as the ISSN Portal needs to be overhauled and functionalities will be reviewed.

2. Activities of the ISSN International Centre

2.1 Department of Metadata and Technical Coordination of the ISSN Network (MTCIN)

2.1.1 The development of the ISSN Portal

ISSN Register metrics

At the end of 2021, the ISSN International Register contained **2,235,523** records in the "Confirmed" category, i.e. "Register" records in Virtua.

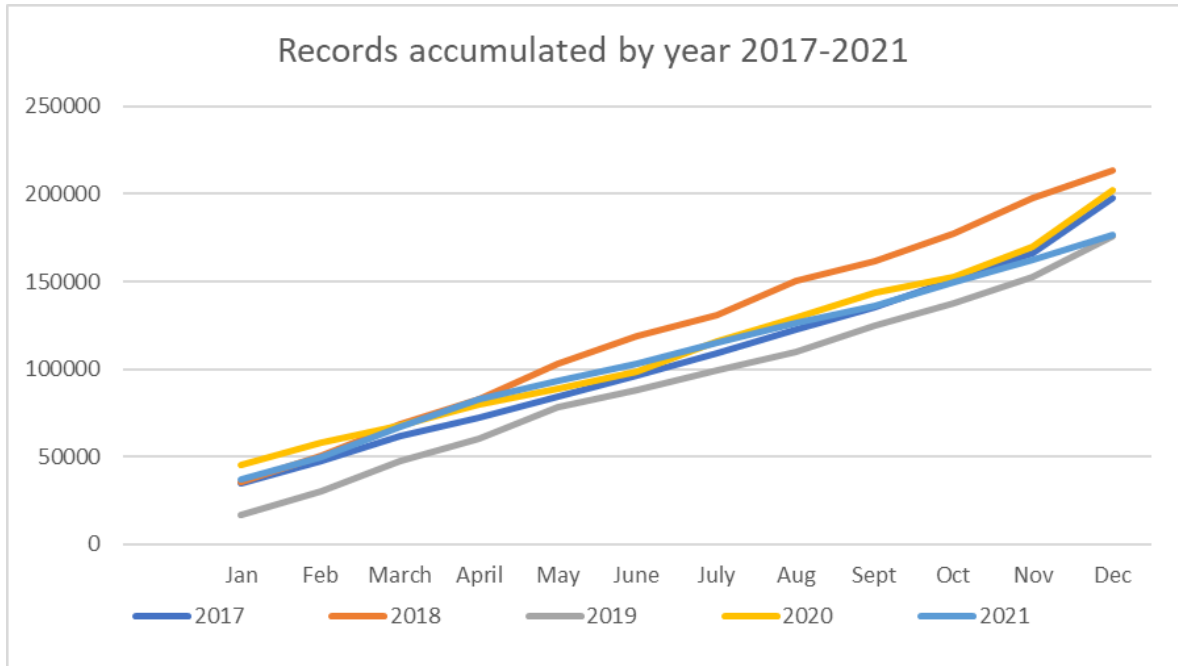
59,910 new records were added to the ISSN Register in 2021.

51 ISSN National Centres sent 176,930 new and updated records which were ingested into the ISSN database in 2021 (instead of 57 centres with 202,473 in 2020). There is a significant decrease (-25,543) in the number of records produced in 2021 by the ISSN network compared to 2020, returning to the production volume of 2019. This may be the consequence of national centres having still to deal with difficult sanitary circumstances.

4,770 errors were corrected by ISSN International Centre staff in records received. Network-produced records were loaded on a daily basis to ensure the accuracy and the quality of the ISSN Register.

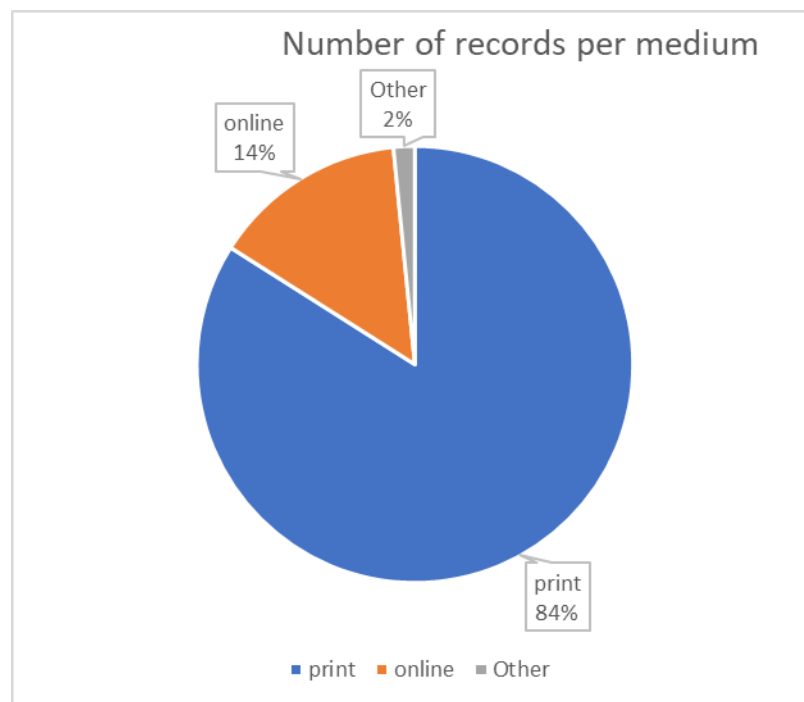


Figure 1 - Number of new and updated records imported into the ISSN Register, 2017-2021



ISSN assignments to digital resources continued to grow steadily. **27,549 new online resources** were identified in 2021, i.e. 46% of 2021 assignments.

Globally, as of January 2022, **322,608 online resources** are identified in the ISSN Register, i.e. 14,5% of records.





2.1.2 Serving publishers

ISSN requests

In 2021, **2,366 new ISSN assignment requests** were handled by the ISSN International Centre, instead of 2,433 in 2020. A slight rise has then occurred, despite the opening of 3 national centres.

Table 1: Number of ISSN requests handled by the ISSN International Centre in 2021, by type of request and status (as of 2 January 2022)

2021	Processed	Provisional	Sub total	Other: incomplete, rejected	Total requests handled
Assignment	1 971	181	2 152	484	2 636
Modification	214	0	214	125	339
Total	2 185	181	2 366	609	2975

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

As of 2 January 2022, the cumulative number of **publishers** registered with the ISSN Portal has more than tripled since January 2018, from 1,557 to **5,435** increasing each year by approximately **1,350** new publishers.

The **classification by country** is quite stable compared with 2020. In spite of the opening of 3 major ISSN centres in Ukraine and Austria in the first quarter, and Peru during the third quarter of 2021, the country ranking has remained consistent. With Ukrainian publishers out of ISSN International Centre scope, Hong Kong publishers' requests ranked first in 2021.



Table 2: Most represented countries handled by the ISSN Centre (cumulative number of ISSN requests since 2018 as of 2 January 2022)

Country	UNESCO Area	Nb of publishers	Nb of processed requests
Hong Kong S.A.R., China	Asia and Pacific	264	1460
International organizations		186	1015
Pakistan	Asia and Pacific	635	957
South Africa	Africa	199	506
Bangladesh	Asia and Pacific	301	489
Peru	Latin America and Caribbean	316	442
Kenya	Africa	119	346
Taiwan, Province of China	Asia and Pacific	266	336
Iraq	Arabic States	457	260
Kazakhstan	Asia and Pacific	166	248

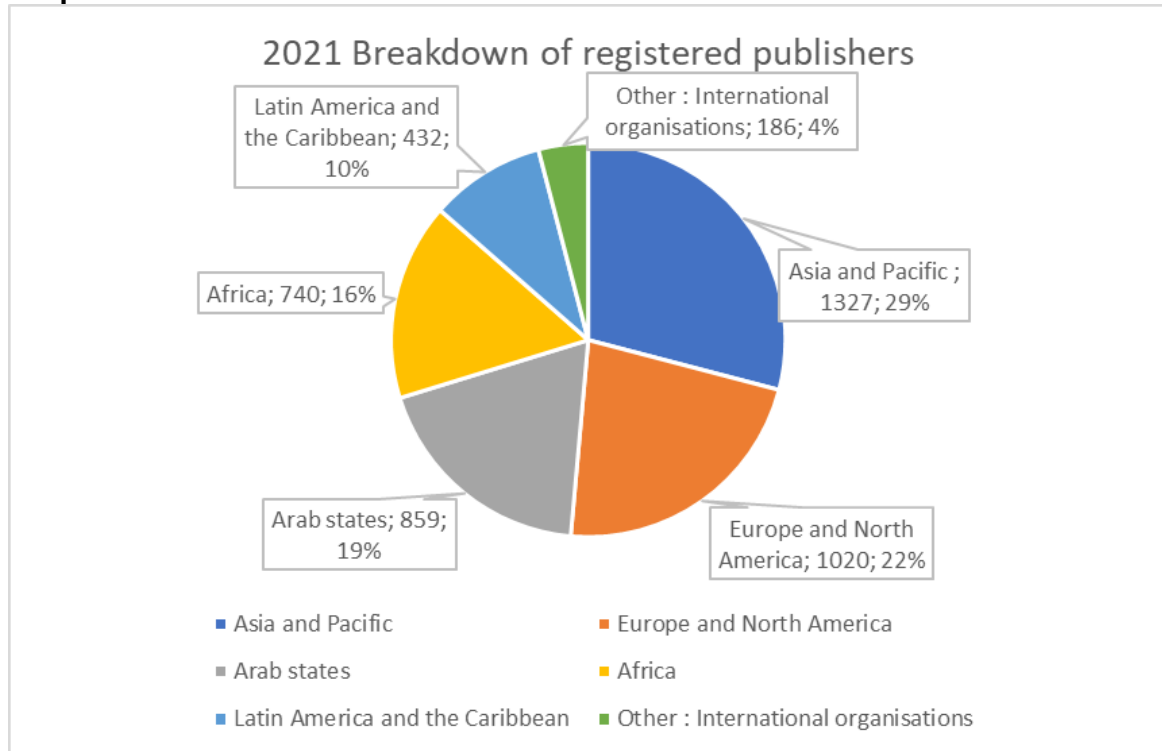
Publishers' countries of operations are associated with a UNESCO region (except for international organizations) and the distribution of registered publishers by region remains very stable over the years.

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

UNESCO region	2021 Breakdown of registered publishers	nb of ISSN requests since 2018	nb of ISSN assigned since 2018
Asia and Pacific	1327	1963	2307
Europe and North America	1020	2464	2748
Arab states	859	1059	1068
Africa	740	1260	1364
Latin America and the Caribbean	432	602	579
Other : International organisations	186	1016	1291
	4564	8364	9357



Fig. 2: 2021 Breakdown of registered publishers by UNESCO region within the scope of ISSN International Centre



ISSN assignments by the ISSN International Centre

The MTCIN department assigned **2,588** new ISSN in 2021, i.e. 2,342 Confirmed records and 246 Provisional records. The assignment activity thus decreased by 22% in 2021 at the ISSN International Centre.

Please note that the figures below do not take into account modifications of existing records.

Table 4: Number of ISSN assigned by the ISSN International Centre from 2016 to 2021, sorted by status and type of media

	Confirmed records				Provisional records			Total	
	Print	Online	Other*	Total confirmed records	Print	Online	Other*		Total provisional records
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
2021	1,129	1,190	23	2,342	153	90	3	246	2,588

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

The pandemic context clearly had an impact on the number of ISSN assignments to resources published in the leading countries served by the ISSN International Centre. Nevertheless, the number of assignments was stable for Asian publications. With the opening of the Peruvian ISSN Centre at the end of August 2021, the number of ISSN assignments to Peruvian publications increased slightly in 2021 as shown in the table below.

Table 5: Number of ISSN assigned by the ISSN International Centre from 2018 to 2021, sorted by top countries (totalling confirmed and provisional records)

Country	Nb of ISSN assignments	Nb of ISSN assignments	Nb of ISSN assignments	Nb of ISSN assignments	Total
	2018	2019	2020	2021	
Hong Kong, SAR	424	346	347	398	1515
International organisations	308	532	300	236	1376
Pakistan	162	205	287	379	1033
Bangladesh	105	408	129	112	754
Peru	105	108	122	185	520
South Africa	83	117	162	135	497
Taiwan, POC	106	91	101	112	410
Iraq	59	112	101	109	381
Kenya	50	86	92	147	375
Kazakhstan	71	63	65	91	290

The semi-automated assignment workflow with Springer-Nature

Between January 2017 and December 2021, **3,162** provisional records were created in the ISSN Register by the ISSN International Centre for Springer Nature publications. Three National Centres are particularly concerned by the 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.

In 2021 alone, **734 ISSN**s were assigned to Springer-Nature publications by the ISSN International Centre, and **394 ISSN records** were updated and confirmed by National Centres.

The **backlog of provisional records** was eventually processed in 2021 thanks to additional staff hired by the ISSN International Centre and updated data provided by Springer-Nature. **1103** records were thus confirmed in the ISSN Register and **263** records remained provisional, due to lack of actual publication or insufficient evidence of publication.

2.1.3 Relationships with ISSN National Centres

Provision of bibliographic expertise

With the opening of three new ISSN National Centres in Austria, Peru and Ukraine, the team of the MTCIN department has been thoroughly involved in the transfer of bibliographic skills and in responding to new colleagues' enquiries. Moreover, a set of training sessions in French was organized and recorded in 2021 for ISSN Senegal, ISSN Benin and ISSN Tunisia. Another session was held for ISSN Mexico in Spanish.



Beside formal training sessions, the guidance provided by the MTCIN team to National Centres is steady and careful. The flow of bibliographic questions from the National Centres has increased with enquiries mostly focusing on the ISSN scope and the assignment criteria, title changes and transfers of responsibility of ISSN records.

2.1.4 Testing ISSN+

ISSN + is the future and bespoke ISSN metadata production tool that will replace the existing one in 2022. This tool is developed under the supervision of the Information Systems (IS) Department with the cooperation of the MTCIN Department. Since September 2019, MTCIN staff have been testing ISSN+ functionalities. The Head of the MTCIN department is responsible for managing the ISSN+ User Group, consisting of the MTCIN team and representatives of a few ISSN National Centres. In 2021, three testing campaigns took place. The feedback proved very useful to the IS Department team to adjust the application (see section 2.4.4 below).

2.1.5 Quality Plan for ISSN Data

Quality of ISSN data is a key element to increase future usage on the ISSN Portal and the ISSN IC extranet, attract new customers and set up partnerships with database vendors, aggregators and other information providers. The plan emphasized the accuracy of the bibliographic data, the coverage of ISSN identification, the enhancement of processes and workflows and the interoperability with partners' data.

Corrections made when importing records from the National Centres are invaluable to the quality plan. The ISSN International Centre has also been working closely with several ISSN National Centres to jointly amend **900** records which could not be displayed in the ISSN Portal because of missing data elements.

Projects with partners provide great opportunities to correct mistakes and check the structural validity of the ISSN records in their databases. In 2019, a project was initiated with Latindex aiming at **adding or correcting title proper field** based on the key title information. In 2021, the project was completed and resulted in a batch of **1,900** corrected Latin American titles.

From 2020 to 2021, **2,043** records describing Ukrainian resources containing erroneous Cyrillic characters were corrected by the Russian-speaking librarian at ISSN International Centre. Adding entries in original characters makes it possible to enrich the ISSN records. Therefore, the Ukrainian centre, after receiving proper training by the MTCIN team, took on a project of systematic cyrillization of all text fields (titles, issuing body and publishing statement) in **5,200** records.

A Premium service request from an Austrian customer resulted in the revision of approximately **200** records.

Partnerships are also an opportunity to enhance ISSN coverage. **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, involving more than 3,400 libraries nationwide. In the framework of their activity,



cataloguers adding data to SUDOC may identify periodicals and other ongoing resources lacking an ISSN, or ISSN records needing an update.

The objective of CIDEMIS is to manage the requests for ISSN assignments and amendments to records regarding continuing resources in SUDOC, and ensure an efficient workflow between all stakeholders. As of late December 2021, **10,305** requests sent between 2015 and 2021 were processed, resulting in **7,422 ISSN assignments** by the ISSN Network. **2,289** amendment requests resulted in **1,344 updated ISSN records** over the same period.

Table 6: Number of requests processed by type (cumulative numbers)

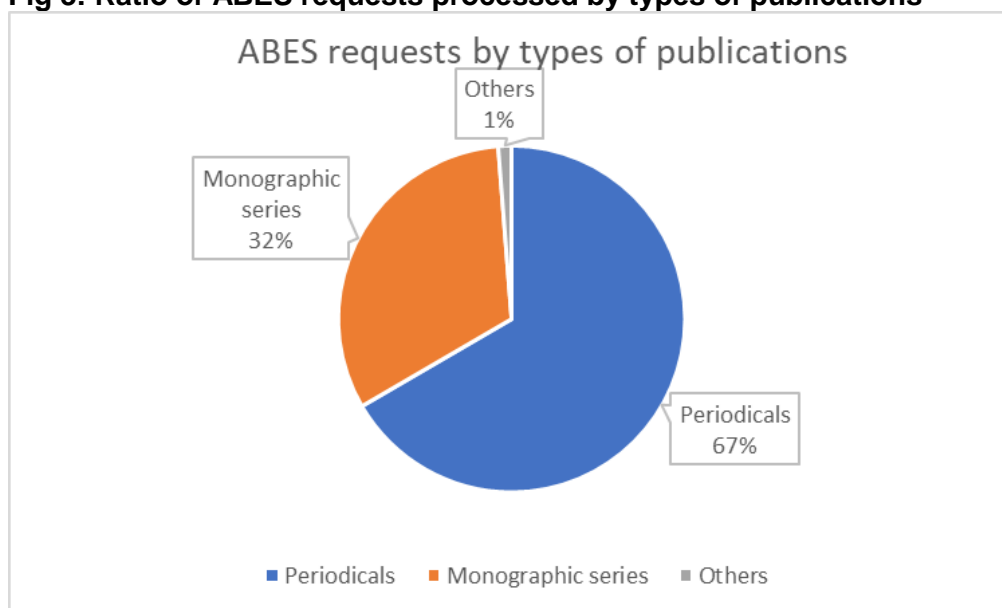
2021			
Type of requests	Accepted	Pending	Total
Assignment	10 305	12 409	22 714
Correction	2 289	3 499	5 788

Table 7: Number of ABES requests processed by country (cumulative numbers)

2021			
Country of publication	Assignment requests	Correction requests	Total
Germany	2 030	280	2 311
United States	1 729	401	2 130
Italy	1 177	155	1 333
Belgium	546	198	749
Spain	600	89	689
Switzerland	439	64	508
Netherlands	295	179	474
Canada	247	50	299



Fig 3: Ratio of ABES requests processed by types of publications



In 2021, 680 ISSNNs were assigned through this workflow (compared to 1,930 in 2020), out of which 156 by ISSN USA, 100 by ISSN UK and 90 by ISSN Germany. 110 amendment requests were processed by all national centres (against 246 in 2020). There was thus some slowdown in the processing of ABES requests by the ISSN Network in 2021.

DOAJ is another important partner that supports ISSN International Centre efforts to improve data quality. Both partners spotted a discrepancy in the number of titles identified in DOAJ and ROAD; all DOAJ journals should appear in ROAD. 6,078 titles referenced in DOAJ were eventually added to ROAD and 472 eISSNs were created to feed DOAJ. Both partners intend to work on a better technical coordination between their databases in 2022.

Data supplied by Keepers Registry archiving agencies is matched with ISSN data and demonstrates that archived resources have a digital version. New records are thus created in the ISSN database and eISSNs are assigned by the ISSN International Centre and the ISSN network when needed.

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 2022, 35,548 ISNIs are present in the ISSN database and identify issuing bodies and international organizations. MTCIN staff contribute to ISNI database enrichment by signalling duplicate entries and enhancing ISNI records with names in original alphabet and links pointing to issuing bodies' institutional websites. Since Autumn 2021, the ISSN International Centre is a member of the newly created ISNI Library Advisory Group, notably to advocate the assignment of ISNIs to publishers.

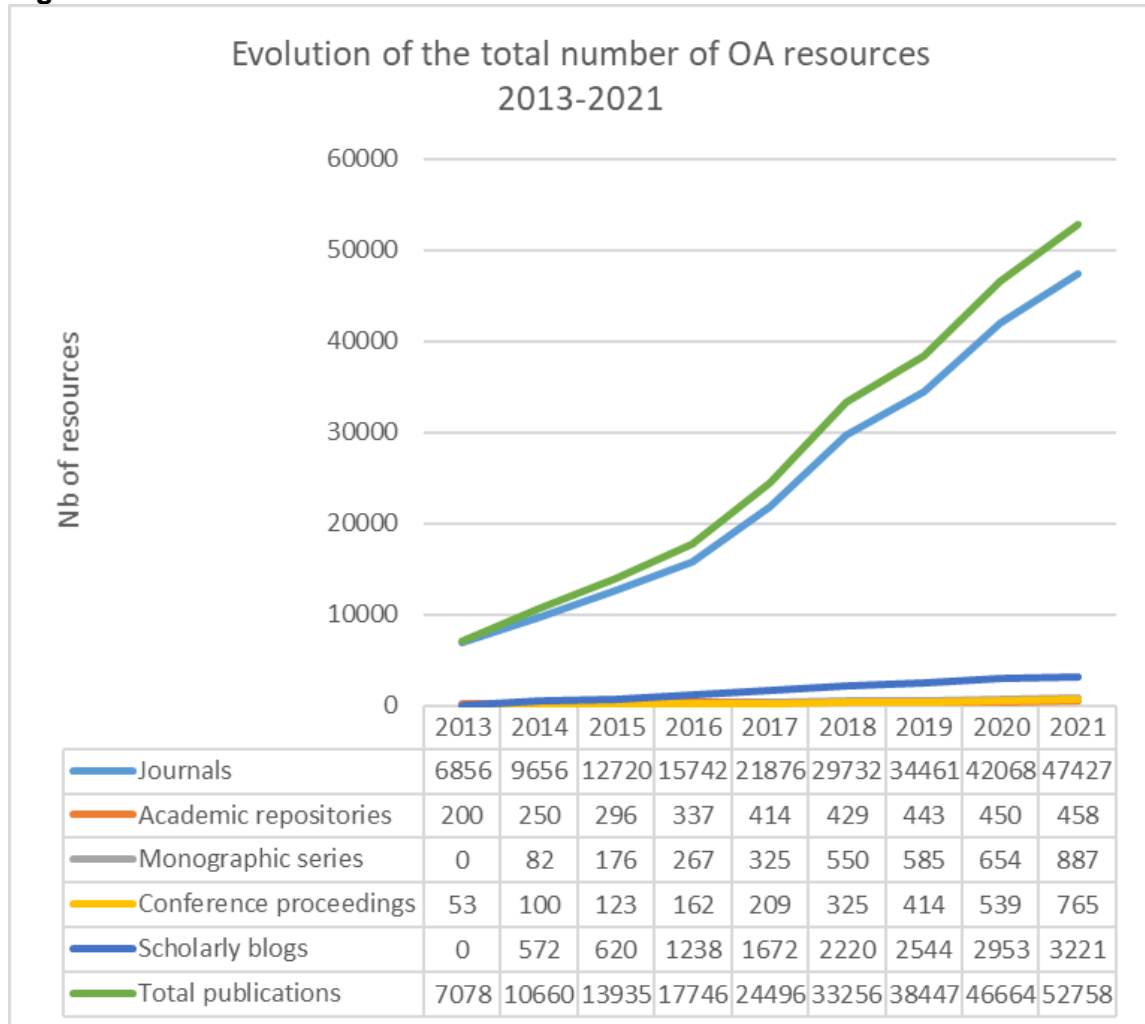
2.1.6 The development of the Directory of Open Access Scholarly Resources (ROAD)

6,094 new ISSN records describing Open Access (OA) resources were added to ROAD in 2021. Globally, as of 2 January 2022, ROAD contains 52,758 OA titles (+8% compared



to 2020). There has been a significant increase in the number of journals, monographic series and blogs. Progress is good despite the definition of new inclusion criteria and a review of 3,368 publications that were not indexed by any partner database.

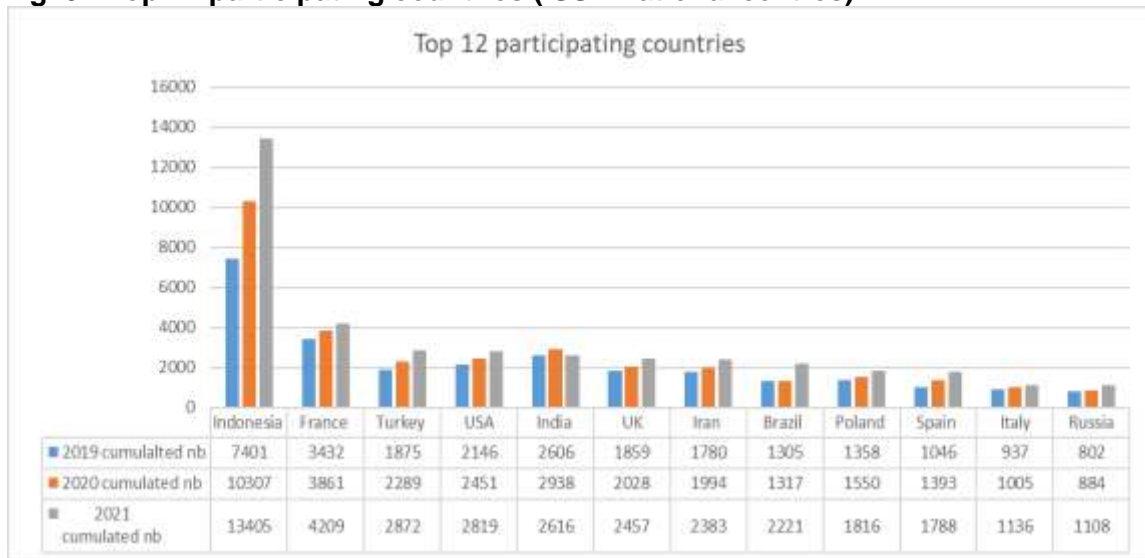
Fig. 4 – Evolution of the number of resources in ROAD



The **ranking per country** has changed significantly. If Indonesia is still in the lead with **13,405** resources, it is now followed by France, whose number of open access resources has increased considerably. Turkey ranks third and then come the United States, India, the United Kingdom and Iran, each with more than 2,000 resources. There has also been a significant increase in the number of OA Brazilian publications in ROAD. The top 12 countries together account for 73% of all open access titles in ROAD.



Fig. 5 - Top 12 participating countries (ISSN national centres)

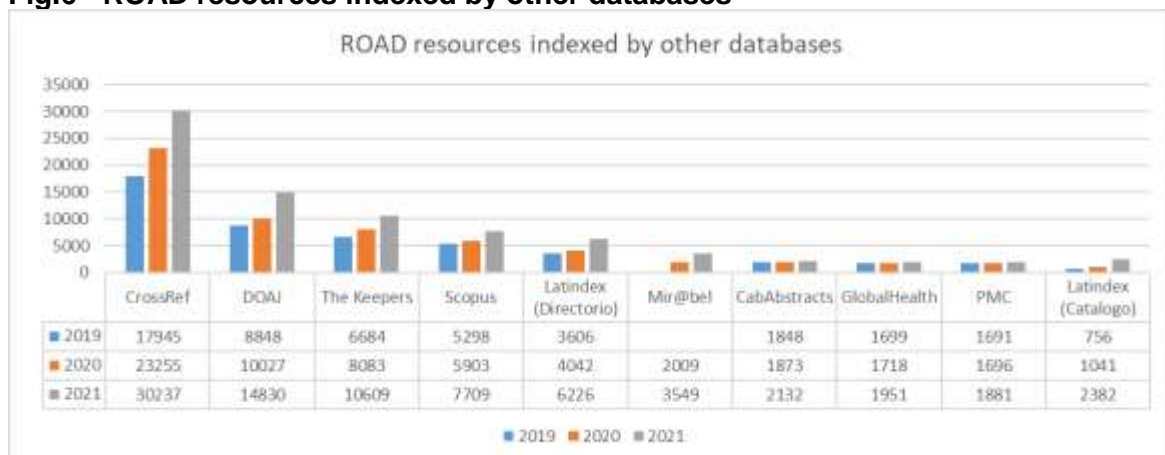


When checking how ROAD resources are indexed by other databases (see Fig.6), the following observations can be made:

- Nearly half of the OA titles have title-DOIs (30,237);
- only 20% of OA titles are being preserved and reported in The Keepers' Registry (10,609);
- 28% are indexed in the Directory of Open Access Journals (14,807), + 6% compared to 2020;
- 29% are indexed by Scopus (7,709), + 16% compared to 2020;
- 17% (9,397) are indexed by both Crossref and Keepers Registry,
- 12% (6,260) are indexed by Crossref, Keepers Registry, and DOAJ.

ROAD is thus complementary with other services indexing OA resources.

Fig.6 - ROAD resources indexed by other databases



Open access resources only represent **16% of online publications** described in the ISSN Register. As a matter of fact, numerous online continuing resources remain unidentified by an ISSN, notably in Africa, the Middle East, and in Latin America. This lack of identification



for online resources can be observed as well on regional open access platforms like African Journals Online with which contacts have been initiated.

Re-assessing ROAD inclusion criteria

The criteria for inclusion in the Directory of Open Access Scholarly Resources (ROAD) have been revised and approved by the ISSN Review Group in Summer 2021. They have been published in six languages on the ISSN International Centre institutional website: <https://www.issn.org/services/online-services/road-the-directory-of-open-access-scholarly-resources/> and on the Portal FAQ: <https://portal.issn.org/faq10>.

ROAD indexing criteria were initially defined in 2013. In 2021, ROAD was found to encompass more resources than most similar databases. The ISSN Network may have been too quick in including journals in ROAD. It seemed an appropriate time to review ROAD criteria to make them less inclusive and more in line with current selection practices that aim at excluding questionable publications. The new ROAD criteria are much inspired by those used by DOAJ, Latindex and the Committee on Publication Ethics (COPE).

Based on these revised criteria, **3,368 ROAD resources** were reassessed and reviewed since they were not referenced in any other partner database. After careful assessment, **1,750 resources** were removed from ROAD in 2021, though of course they still appear in the ISSN Portal.

2.1.7 The development of Keepers Registry

As of March 2022, 14 agencies share their preservation data with the ISSN International Centre on a regular basis. The Bibliothèque nationale de France, California Digital Library and Internet Archive joined the initiative in 2021. The British Library and the Swiss National Library withdrew from the project in 2019-2020 and updates are no longer made available to the service.

76,258 titles are preserved by partner agencies and **20,231 titles** are archived by three agencies at least. More statistics can be found at <https://keepers.issn.org/stats>.

2.1.8 The development of TRANSFER

As of March 2022, **98 receiving publishers** were registered in the ISSN Portal.

ISSN International Centre collaborates with NISO's Transfer Group to disseminate information about changes in publishers of journal titles. ISSN International Centre operates the Transfer Alerting Service (<https://journaltransfer.issn.org>) which publishes information about these changes free of charge. Information is made available via an RSS feed, a mailing list and an API.

10 new publishers joined Transfer in 2021 and were registered on the ISSN Portal, which they use to report title transfers. **116 title transfers** were reported by Transfer participating publishers. Wiley, Oxford University Press, and University of Chicago Press acquired 49, 15, and 11 titles, respectively. The Institution of Engineering and Technology transferred 37 titles.

Work was also undertaken to update the publisher contacts in close collaboration with the NISO Transfer Group. ISSN International Centre contributed to the update of the Transfer



FAQ (<https://www.niso.org/standards-committees/transfer/transfer-faq>), notably by creating an explanatory video (<https://www.loom.com/share/e315909ff5a84698ab698d493f7de3b4>).

2.2 Standardization and International Cooperation activities

2.2.1 ISSN Review Group (ISSN RG)

The ISSN Review Group met thirteen times in 2021.

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 ongoing development of the Multinational Publisher Wiki);
- the developments in linked data.

2.2.2 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. The policy review and rewriting phase began in July 2020 and remains ongoing. The tool which will be used for the approval process, and for publication and ISSN network access, is a customized wiki built using Xwiki software. It is expected the final draft will be ready for approval at the end of 2022.

2.2.3 Activities in the framework of the International Standard Organisation

The sixth edition of ISO 3297 standard was made available to the public in October 2020. A minor revision was voted in 2021 to introduce editorial amendments. The final vote will take place between March and May 2022.

2.2.4 International Federation of Library Associations (IFLA)

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

- the Advisory Committee on Standards,
- 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 PRESSOO 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 (WLIC) which was supposed to be held in Rotterdam, Netherlands, was held entirely online due to the global pandemic. A large amount of work on the projects listed in committee action plans were delayed.

The LRMoo Working Group together with the CIDOC CRM Special Interest Group (part of ICOM) replaced 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 completed but still under review for approval. It was agreed that minor editorial work which will result for PRESSoo to align it with LRMoo should not prevent the PRESSoo namespace from being created as quickly as possible, though this work has also been put on hold.

Further to the work done by the “ISBD Editorial Group”, launched in 2018 to work on the ISBD review, the ISSN International Centre contributed to the ISBD for Manifestation Task Force which held monthly online meetings in 2021. The work of this group has resulted in a first list of elements for "ISBD for Manifestation", which were presented at IFLA WLIC 2021.

2.2.5 RDA

The beta version of the RDA toolkit that was launched in June 2018 in the 3R project became the official toolkit as of December 15, 2020. No major library which is a member of EURIG or the ISSN Network has yet made the switch from the original RDA Toolkit to the current one, due to the complexity of creating policy statements and application profiles, and updating training materials. The ISSN Manual will include equivalency tables of ISSN terms to RDA terms, however a ISSN RDA Toolkit Application Profile is not the priority for the time being.

The ISSN International Centre participates on the RDA-FR Continuing Resources Subcommittee developing France’s adaptation of RDA that incorporates the LRM conceptual model.

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.

2.3 Department of Sales, Marketing and Communication (SMC)

In 2021, SMC activities were focused on:

- The renewal of ISSN current subscriptions in order to maintain the International Centre ISSN turnover,
- Promoting and selling the ISSN API subscription which attracts new customers;
- Encourage new subscriptions to the ISSN Portal and services associated with ISSN Data,
- Communicate about ISSN services and the importance of the ISSN Network expansion.



2.3.1 Sales

The sales turnover from ISSN subscriptions decreased by 0.2% in 2021 compared with 2020 turnover. The sales of ISSN credits increased by 9.86 %.

The main services invoiced remain the access to ISSN Portal (54,53 %) and the ISSN Data File (21,37 %). The distribution of the turnover slightly changed in 2021.

- The ISSN Portal turnover decreased slightly as a few customers did not renew their current subscriptions in 2021 due to budget restrictions;
- This was partially balanced by the acquisition of new customers for the ISSN and the ISSN API.
- The ISSN Data File turnover is stable compared with 2020 figures.

- In 2021, the OAI-PMH turnover decreased.

- Test accounts for the ISSN API were activated in 2021 and a few organizations eventually subscribed to this service.

2.3.2 Contributions from Member Countries

Contributions paid represented 89% of the total budgeted amount, a lower collection rate than in 2020 (97%). However, the ISSN International Center has collected some overdue contributions. At the end of 2021, nine member countries had outstanding invoices and unpaid contributions.

2.3.3 Communication and marketing activities

Due to COVID-19 pandemic issues during the year 2021, all exhibitions and conferences the ISSN International Centre planned to attend were either cancelled or carried out remotely. The ISSN International Centre participated in various online conferences, delivered several distant presentations and supported virtual conferences as sponsor and partners.

Each year, the ISSN International Centre defines its communication plan and the 2021 communication plan focused on:

- ISSN services: ISSN Portal, API, OAI-PMH, subscription to the ISSN Portal;
- Issuing press releases for the creation of three ISSN National Centres, and the Springer Nature project;
- Various ISSN news published through social networks, the ISSN institutional website, the ISSN Portal;
- Redesigning our communication materials;
- The ISSN Network and its major role in identifying continuing resources; our aim is to encourage national libraries, publishers' associations, scientific and research institutes in targeted countries to set up an ISSN National Centre.

Below is a list of actions taken regarding communication as well as links to information content created by the ISSN International Centre.



▪ Promotion of ISSN services

The ISSN International Centre promotes regularly its ISSN services and projects. Below a list of the main ads issued:

- UKSG ENews issue 526, March 2021: <https://www.uksg.org/civCRM/mailling/view?reset=1&id=526>
- the Suppliers' Directory of Research Information, issue April/May2021 (page 29) <https://content.yudu.com/web/tzly/0A445j2/RIapr21/html/index.html?page=30&origin=reader>
- Research Information, issue June/July 2021 (page 2), a product spotlight (page 7), a suppliers' directory (page 33), ISSN services (page 35): http://email.europascience.com/files/amf_europa_science/project_26/RIjun21_web.pdf
- DOAJ published an insert about the collaboration between DOAJ and ISSN and promotes ISSN services (March 2021): <https://blog.doaj.org/2021/03/10/all-about-the-issn-portal/>
- Latindex published a Facebook article (March 2021): <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 (March 2021): <https://niso.org/niso-io/2020/03/keepers-registry-now-available-issn-portal>
- Latindex published the ad re ISSN services (March 2021): https://m.facebook.com/story.php?story_fbid=1333313870373667&id=179602442411488 and <https://www.facebook.com/Latindex.org/posts/1341031362935251>
- Against the Grain published the ad about ISSN services (April 2021, page 15): <https://www.charleston-hub.com/2021/05/v332-april-2021-full-issue/>

▪ Press releases on ISSN New National Centres and Springer Nature

The ISSN International Centre issued a press release to announce the creation of ISSN National Centres in Austria, Ukraine and Peru. Below is the list of sites for this press release:

- UKSG, March 2021: <https://www.uksg.org/newsletter/uksg-eneWS-488/ukraine-becomes-newest-member-issn-network>
- NISO, March 2021: <https://niso.org/niso-io/2021/03/ukraine-newest-member-issn-network>
- Information Today, March 21: <http://newsbreaks.infotoday.com/Digest/ISSN-Adds-New-National-Centre-for-Ukraine-145807.asp>
- DPC, March 21: <https://www.dpconline.org/news/ukraine-newest-member-issn>
- Research Information, end of March 21: <https://www.researchinformation.info/news/expansion-issn-network>
- UKSG, April 2021: <https://www.uksg.org/newsletter/uksg-eneWS-489/second-issn-national-centre-and-iso-3297-registration-agency-launch-2021> and <https://www.uksg.org/civCRM/mailling/view?reset=1&id=549>
- Research Information, August 2021: <https://www.researchinformation.info/news/new-issn-international-centre-peru>

- NISO, August 2021: <https://www.niso.org/niso-io/2021/08/new-issn-national-centre-opens-peru>
- UKSG, August 2021: <https://www.uksg.org/newsletter/uksg-enews-497/opening-new-issn-national-centre-peru>

The ISSN International Centre issued a press release on the cooperation between Springer Nature and the ISSN International Centre. This press release was displayed through different media channels:

- Information Today, July 2021: <http://newsbreaks.infotoday.com/wndreader.asp?ArticleID=147846&view=all>
- Charleston Hub, July 2021: <https://www.charleston-hub.com/2021/07/springer-nature-completes-pilot-for-streamlined-issn-workflow-plus-more-atg-news-announcements/>
- UKSG E-News, issue 495, July 2021: <https://www.uksg.org/civcrm/mailling/view?reset=1&id=599>
- UKSG website, July 2021: <https://www.uksg.org/newsletter/uksg-enews-495/issn-centre-and-springer-complete-new-centralized-process-new-issns>
- NISO website, July 2021: <https://www.niso.org/niso-io/2021/07/issn-international-centre-completes-pilot-springer-nature>
- Latindex Facebook Page, July 2021: <https://www.facebook.com/ISSNInternationalCentre/photos/pb.452192671499526.-2207520000./4429561407095946/?type=3&theater>
- EchosDoc, July 2021: <http://www.echosdoc.net/2021/07/centralisation-des-demandes-issn-pour-springer/>

▪ News published on the ISSN institutional website and through social media

- Institutional website

27 news articles were published on www.issn.org in 2021. All news were translated in six languages.

- Social media

The ISSN Facebook page (<https://fr-fr.facebook.com/ISSNInternationalCentre>) reached **2,939** likes in March 2022 (**2,771** likes in February 2021, **2,505** likes in February 2020) and **3,180** followers in March 2022 (**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 International Centre and ISSN Network presentations. There are currently **46** presentations published.

- As of March 2022, the ISSN International Centre Twitter account (https://twitter.com/issn_ic) had approximately **1,223** subscribers (**973** subscribers in February 21, **906** in October 2020; **790** in February 2020). The ISSN International Centre Twitter account gets 16-24 new subscribers per month. **149 tweets** were issued by the ISSN International Centre in 2020 and each one was seen an average of 966 times, i.e. **144,000 impressions**.

- <https://fr.linkedin.com/company/issn-international-centre>: an institutional LinkedIn page was created in October 2021. As of March 2022, this account has **209 connections**.



All press releases in various languages, ads, new brochures, ISSN National Centres logos are available through the ISSN institutional website "ISSN Community": www.issn.org

▪ **The ISSN Newsletter**

- The ISSN Newsletter is edited by the department of Metadata and Technical Coordination of the ISSN Network. It consists of a press review about the topics relevant to the ISSN community and partners. A new design of the ISSN Newsletter was implemented for its 100th issue in September 2021.
- As of late February 2022, the newsletter had about 13,183 subscribers compared to 10,301 in January 2021 and 9,000 subscribers in January 2020. Approximately 240 new subscribers were registered monthly in 2021 compared to 100 to 120 new subscribers in 2020.

▪ **Redesigning our communication materials**

In 2021, the ISSN International Centre worked on a new design for some of its communication materials.

- A new slide master was created for our PowerPoint presentations. Various designs were created and aligned with our different products.
- All commercial materials were redesigned by product.
- The SMC department contributed to the design of a logo for project JASPER.
- The SMC department added the text "Keepers Registry" to the Keepers Registry logo so people can better identify the service.

▪ **The ISSN Network and its major role in identifying continuing resources**

The three new National Centres issued testimonials on the benefits of opening a National Centre in their countries. A specific insert was published by Research Information in October 2021 and Against the Grain in November 2021 during the 2021 Charleston Conference.

▪ **Participation in professional events**

Because of the ongoing pandemic, most "in person" events and exhibitions were cancelled and replaced by online exhibitions. The ISSN International Centre participated in two distant exhibitions during the year 2021:

- UKSG, 12-14 April 2021 The ISSN International Centre participated and sponsored this event.
- IFLA WLIC 2021, 17-19 August 2021 (<https://www.ifla-wlic2021.com/>): the ISSN International Centre participated in this event as "premium exhibitor" and the ISSN International Centre page was available publicly one week before the event. As premium exhibitor, the ISSN International Centre could post a 3-minute video about the ISSN Network directly on its exhibitor page. The video is now available online at <https://vimeo.com/588852349> and subtitles are available in the six United Nations official languages.
- CISPC 2021: The ISSN International Centre participated and sponsored this event organized by Research Information journal..



- FORCE11: The ISSN International Centre gave a presentation during this online event (7-9 December 2021) and was also a platinum sponsor. Information is available here: <https://www.force11.org/meetings/force2021/force2021-sponsorship>. The promotional video was made available on FORCE 11 website.

2.4 Information Systems Department (IS)

In 2021, the IS Department continued to provide its technical services to ISSN International Centre staff, the ISSN Network and external customers and partners such as 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.

2.4.1 Technical support to the ISSN International Centre

The cooperation with the Normaprint company, in charge of the monitoring and management of the local computer system infrastructure at the ISSN International Centre, continues since 2016. The main improvements introduced on top of regular maintenance were to set up a new server in order to ensure that teleworking offers the same conditions as the physical office framework and to improve security.

At the request of the IS department, Normaprint designed and set up an external framework of dedicated servers, hosted by OVH company. This infrastructure allows the ISSN International Centre to fully control a range of virtual servers which are automatically backed up. They are used for the safe hosting and management of our major professional applications, i.e. the ISSN Portal and the metadata production tool ISSN+. It will also be used, as a next step, for the other applications and web services made accessible to the external world and our user community. Our objective is to rationalize the hosting and management of these different applications.

2.4.2 Maintenance and updating of the ISSN Portal

At the beginning of July 2021, the IS department started to manage the hosting aspects of the ISSN Portal server directly, as well as the daily administration of the application. The application provider Progilone, now taken over by TECH'advantage, manages code maintenance. A thorough analysis of the code of the application was performed by the IS department and a technical documentation project was launched in cooperation with TECH'advantage in order to obtain a better shared knowledge of the different modules developed or customized by them.

Statistics regarding the usage of the ISSN Portal can be found in the annex.

Managing the transition to the new ISSN Portal API and to the OAI-PMH service

The IS department has regularly cooperated with the SMC department in order to help ISSN Portal users and customers wishing to use the ISSN Portal API or the new OAI-PMH service. In particular, several management issues were detected in the API design and corrections were introduced.



Updating the Keepers Registry

The Keepers service is a stable part of the ISSN Portal. The different data updating streams corresponding to the participating agencies as well as the overarching ingesting and checking process were fully automated over the course of 2021.

The statistics page has been significantly enhanced and automated and now offers a “coverage overlap chart” which helps with the assessment of intersections between the title holdings of the different archiving agencies.

Cooperation with ABES re ROAD data

The French higher education bibliographic agency ABES had expressed an interest in the ROAD dataset for their BACON database that provides access to metadata for the management of online resources. So the IS department developed a KBART-compatible version of the ROAD dataset of MARC records which is made available on the BACON site through a daily updating process and can be reused freely.

2.4.3 Deployment of IT tools

▪ **A multi-purpose WIKI**

The ISSN International Centre has been using the XWIKI software for a number of years in order to manage IT technical documentation. With the support of Normaprint, the software was upgraded in 2021 and made accessible to the external world. It is being used for the management of the multilingual help pages for ISSN+.

▪ **Identification of multinational publishers registered within the ISSN database**

A dedicated application has been developed to handle the identification of multinational publishers with National Centres and to distribute the management of their publications within the ISSN Network. The application has been customized to take into consideration various user requirements. 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+.

In this framework, a script was created for the generation of ISNI assignment requests sent to the ISNI server, in order to gain a better understanding of the potential process.

▪ **Management of various linguistic editions of the ISSN Manual**

The IS department has implemented various linguistic versions of the ISSN Manual currently under revision. The ISSN Manual will be linked to the user documentation for ISSN+.

2.4.4 Development of ISSN+

ISSN+ has been a major activity for the IS department in 2021.

As was already the case in the later part of 2020, two developers from Anybox continued their work on ISSN+. The Head of the IS department is the project owner and as such defines and plans the “user stories” based on the initial specifications document which are regularly fed to



the developing team. The IS section has also been supported by with Six et Dix company and L'informatique communicante company that help monitor the project.

The following major functionalities were developed and added to ISSN+ in 2021 on top of numerous bug corrections and minor improvements:

- Automated management of ISSN-L linking pISSN and eISSN,
- Export of ISSN / ISSN-L matching table for external users,
- Management of ISSN cancellations and suppressions for the ISSN Network only,
- Script for the management of automated reverse links between ISSN records,
- Management of the List of Title Word Abbreviations based on the ISO 4 standard,
- Internationalization of the tool through automated translations based on test outsourced APIs, e.g. GoogleTraduction and DeepL,
- Record duplication and linking, e.g. print record reused as a basis for the creation of a linked record corresponding to an online edition,
- Management of ISSN centre code and publication country code that can be changed by the ISSN International Centre when necessary,
- Management and archiving of successive versions of ISSN records including faulty records that need amendments.

Furthermore, the following modules were substantially improved:

- The Marc 21 data model was upgraded to fully implement validation rules to check the structure of ISSN records,
- Improvements of the title index browse functionality, in particular to retrieve the records corresponding to multiple selected entries,
- User authentication (in a web application, the issue of a proper monitoring of users once they are logged in through a given session is crucial)

A security audit was performed by L'Informatique Communicante company following which a number of security issues were corrected in the code.

A test period was organized in April 2021 with the contributions of a number of ISSN National Centres leading to a few bugs being fixed.

The ISSN+ application was transferred from the AWS framework managed by Anybox to virtual servers set up on OVH as the hosting platform of major ISSN International Centre applications. Similarly, the platform hosting the code was moved from the Anybox framework to the Gitlab managed by the ISSN International Centre.

▪ **ISSN+ provisional prototype**

In the meantime, the ISSN International Centre makes use the local ISSN+ prototype for diagnostic purposes and deep drilling. This prototype was initially developed by the IS department and is updated daily with the same data file used to feed the ISSN Portal. An automated email is sent daily by the prototype to the colleagues concerned with a number of quality indicators linked to corresponding record searches. The goal is to monitor the evolution of the ISSN database. This feature will be added to ISSN+ in due time. It is notably used to

monitor the intersections between ISSN data and external sources using ISSN in their metadata structure, e.g. Library of Congress catalogue and Zeitschrift Datenbank.

- **Prototypes for future ISSN+ modules**

In 2021, the IS department also developed prototypes for two important activities:

- A script for the submission of lists of ISSNs to retrieve metadata extracted from the corresponding ISSN records, as well as ISSN-L “families” and the “ISSN history” of the corresponding titles; the data retrieved is displayed in a tabular file,
- A script for the submission of lists of titles retrieving a list of potentially matching entries to be sorted out and selected by the user in order to generate a tabular file of confirmed matches.

These scripts are used internally in order to perform the data retrieval activities requested in the framework of Premium requests.



Conclusion

In 2021, thanks to the investment of the ISSN International Centre team and colleagues from partner organizations, the ISSN Network expanded dramatically with the opening of three national centers that will provide local service to publishers and libraries while improving the identification and description of continuing resource production globally.

The diversification of the ISSN International Centre's services is enhanced with the more selective inclusion criteria in ROAD, the growing number of archival agencies in the Keepers Registry, and the expansion of the number of publishers complying with NISO Transfer code and publishing their information on the Transfer Alerting Service. The ISSN International Centre joined the JASPER initiative for the preservation of open access journals led by DOAJ, which remains a key partner for the ISSN International Centre.

The ISSN International Centre continues to pursue an ambitious strategic plan with objectives that address issues of bibliographic standardization, interoperability of persistent identifiers, and improvement of the data produced by the ISSN Network and its dissemination. This strategy will be supported by an IT plan that will allow us to launch our new production tool, ISSN+, to update the ISSN Portal and to implement collaborative tools for the network members.



ANNEX

2021 Usage Statistics for the ISSN Institutional website (www.issn.org) and the ISSN Portal (<https://portal.issn.org>)

1/ Usage of the institutional website

The ISSN International Centre has enhanced its institutional website by providing information in all 6 official languages of the United Nations. As a result, the statistics show that this website is now used widely and the outreach has been improved. **560,764 users** were counted in 2021. **87,7%** were new visitors and **12,3%** returning visitors. The English-speaking (37%) and Chinese-speaking (19%) audiences are the most represented.

Table 1: Global visit distribution per country in 2021

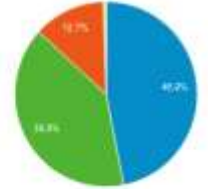
	560 764 % du total: 100,00 % (560 764)
1.  China	118 747 (21,33 %)
2.  India	51 004 (9,16 %)
3.  United States	46 393 (8,33 %)
4.  Mexico	25 548 (4,59 %)
5.  Spain	20 094 (3,61 %)
6.  France	15 810 (2,84 %)
7.  Brazil	13 435 (2,41 %)
8.  Indonesia	12 023 (2,16 %)
9.  United Kingdom	11 914 (2,14 %)
10.  South Korea	10 572 (1,90 %)

Visits to the ISSN website come from search engines (46%), direct access (39%) and from other websites (12%), e.g. Elsevier, Wikipedia in English, Bing, Researchgate, Yandex, Baidu. Social media do not generate much use.



Table 2: Acquisitions of the institutional website in 2021

	560 764 % (of total: 100.00 % (560 764))	560 764 % (of total: 100.00 % (560 764))
1. Organic Search	269 455	48.05 %
2. Direct	228 857	40.81 %
3. Referral	73 224	13.06 %
4. Social	2 853	0.51 %
5. (Other)	7	0.00 %
6. Email	7	0.00 %



2/ Usage of the ISSN Portal

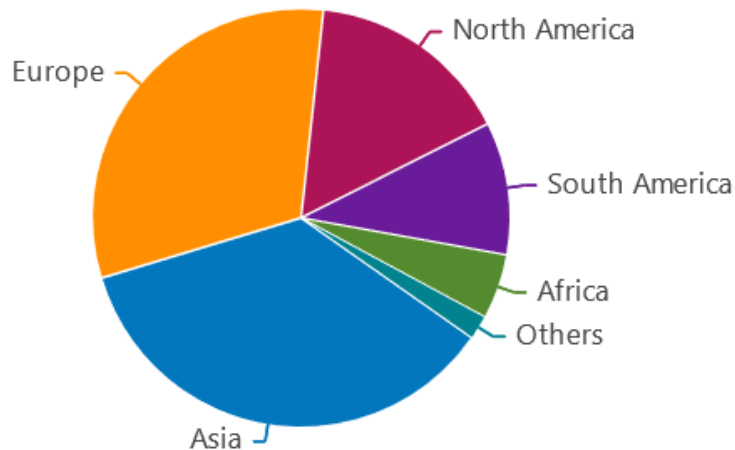
Between 1st April 2021 and 31 March 2022, **3,071,250** visits were counted on the ISSN Portal with an average visit duration of **3 min 11s**. 61% visits have bounced, i.e. left the website after one page. On average, there were 3 actions (page views, downloads, outlinks and internal site searches) per visit.

Visits come mostly from **India** (392,081), the **USA** (372,821), **Brazil** (184,413), Indonesia (133,850) and Spain (104,736).

6,989,647 pages were viewed over the period and there were **5,173,697 unique pageviews**. Users performed **1,105,415** total searches on the portal using **4,313** unique keywords. There were **50,727 downloads** among which 44,952 unique downloads.

Fig. 1: Distribution of visits per continent in 2021

— Visits





As shown below, search engines (55%) are the main route to the ISSN portal for users. Direct entries (31%) are the second route. Websites rank third and users of DOAJ website are about 87,000 to visit the ISSN Portal.

Fig.2: Acquisitions of the ISSN Portal in 2021

— Visits

