Case study: The Argentine Science and Technology Information Portal

http://datos.mincyt.gob.ar

1. Overview of the initiative

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Name of initiative:	The Argentine Science and Technology Information Portal
Web Site:	http://datos.mincyt.gob.ar
Objective:	Open accessibility of scientific and technological information, research data and digital publications of scientific papers, and their free availability and accessibility to a broad audience for use in many contexts
Type (strategy, policy, bill of law, ...):	National strategy and regulatory initiative
Responsible policy making bodies:	Leading Ministry: Ministry of Science, Technology and Productive Innovation of Argentina
Responsible implementing bodies:	Governmental body: Secretariat of Scientific and Technological Articulation of the Ministry of Science, Technology and Productive Innovation of Argentina
International reference framework (if relevant):	OECD recommendations; OECD policy papers as *Making Open Science a Reality*; *Open Science, Open Innovation and the Digitalisation of STI*; and *Data-Driven Innovation: Big Data for Growth and Well-Being*; openNASA; OpenAIRE; LA Referencia; OCDE Frascati and Oslo Manuals; RICYT Bogotá Manual
Target audience:	The broad scientific community and target stakeholders within the broader STI system, such as researchers, curious citizen, policymakers, entrepreneurs, computer developers, journalists
Total duration of initiative (years):	Permanent, began in 2017
Total budget of initiative (in national currency):	Budget of initiative in 2018: USD 310,000. Regular budget staff cost USD 205,000; external budget (International Bank for Reconstruction and Development, IBRD) USD 105,000
Sectorial focus (if relevant):	Not relevant
Type of data concerned (data from research, public sector information, private sector information):	Data from research, public sector information, private sector information
Target audience (scientific community, business, civil society, general public)	Scientific community, business, civil society, general public
Expected results:	The optimization of the impact of publicly-funded scientific research facilitating access to scientific and technological information, research data and digital publications of scientific papers in Argentina, and the re-utilization of the open data in science and technology by any user

2. Rationale, motives and key drivers

- *Policy context prior to the initiative*

1. Law number 25,467 that structures the National System of Science, Technology and Innovation promulgated in September 2001 and its amending and complementary regulations;

2. Decree number 443 of 2004 formally creates the Argentine System of Scientific and Technological Information (SICYTAR). Its main objectives are: to develop methodologies, tools and information systems for managing and administrate basic resources for the scientific and technological sector; to create and maintain updated unified national records of scientists and technologists, of R&D groups and projects in which they intervene, and of the institutions that integrate the National System of Science, Technology and Innovation, as well as the basic nomenclatures used for categorizing and classifying this information; and to promote the exchange of information and technical cooperation with international organizations related to the management of scientific and technological information systems.

3. Law number 26,899 of Open Access of Institutional Digital Repositories promulgated in December 2013 and the operative regulation issued by Resolution No. 753 in 2016 of the Ministry of Science, Technology and Productive Innovation. This Law establishes the public policy of Open Access to the scientific-technological production and to the primary data of the scientific investigations carried out with funds from the National State.

4. Decree number 117 of 2016 that instructs the Data Opening Plan for the National government. Such Plan must detail the data assets under its jurisdiction and / or guardianship, as well as the publication schedule applicable to them. This Decree also states that among the policies to be implemented in the framework of the modernization of the State are those related to Open Government, whose implementation requires the adoption of measures that favor the management of the systematized datasets digitally preserved by the different Ministries, Secretariats and Decentralized Bodies of the National Government as a civic and governmental asset of strategic nature.

5. Law number 27,275 on the Right of Access to Public Information promulgated in September 2016 and its amending and complementary regulations.

6. The design and implementation of the third OPEN GOVERNMENT NATIONAL ACTION PLAN (2017-2019) within the "Alliance for Open Government" in which Argentina is a country member.

7. The Ministerial Resolution number 640-E of 2017 through which the "Open Data Program in Science and Technology" is created. The Program's objectives are: a) to coordinate and manage the actions related to the publication and update of MINCYT's open data; b) to manage the Argentine Science and Technology Information Portal; c) to understand and advise the dependencies and agencies under the jurisdiction of the MINCYT that produce and/or store data and information and articulate joint actions on issues related to the adoption of standards for open government and open data in Science and Technology in order to promote the increase of transparency, access to information, accountability, citizen participation and collaboration, and the use of technology and innovation; d) to provide technical assistance to the provincial jurisdictions and the Institutions members of the Inter-Institutional Council for Science and Technology (CICYT) for the adoption of Open Government and Open Data policies in Science and Technology; e) to coordinate the elaboration of the conceptual and methodological definitions and the generation of the functional, communicational and design requirements pertinent to the subject, as well as the technological

architecture necessary for the correct operation of the Program; f) to encourage the development of applications that allow the integration, exploitation and visualization of data contained in the Portal; g) to position the Argentine Republic as a pioneer country in Latin America in open science, technology and productive innovation.

Figure 1. Legislation and regulation related to the initiative
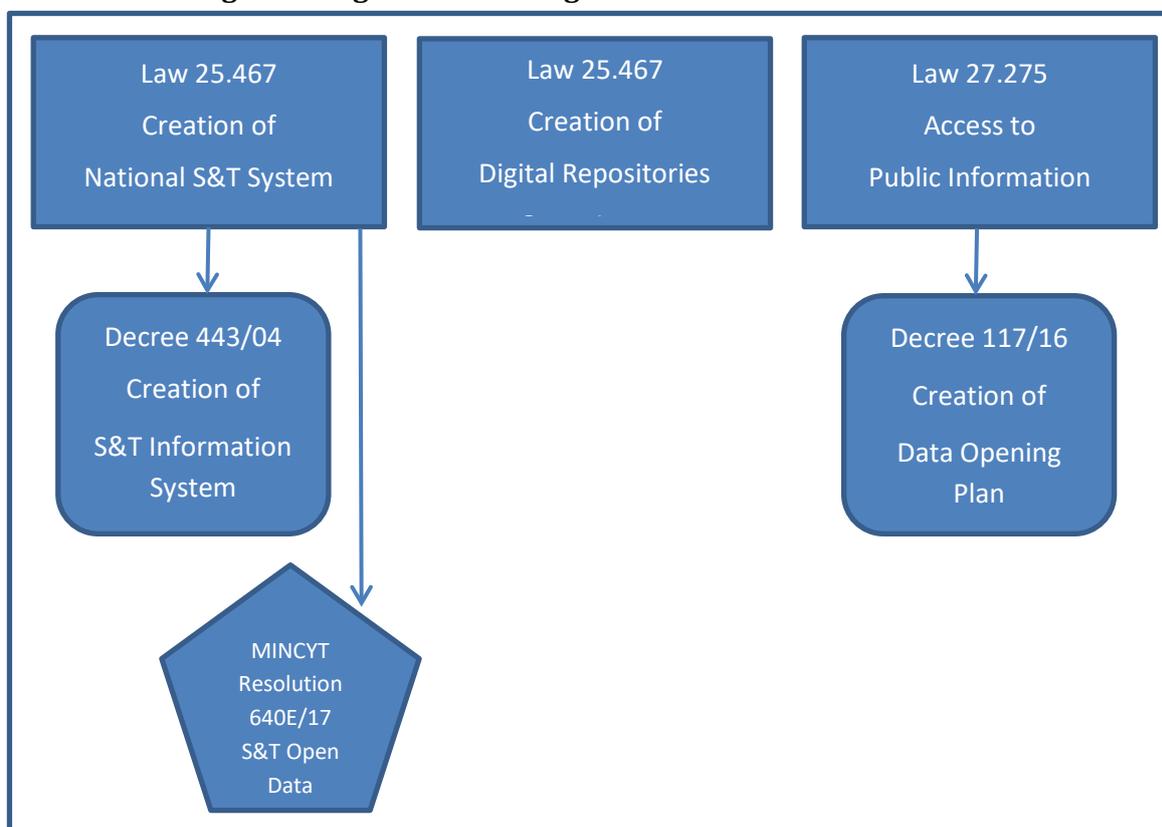
Prior to the initiative, Argentina had a legal particular background regarding the creation of the National S&T System and the S&T Information System, which led to the development of certain initiatives related to information, in the first instance, regarding S&T personnel - which were designed for administrative purposes but that had great potential in terms of information on S&T activities-.

Later on, the Law of open access to science was sanctioned, leading to the subsequent conformation of information initiatives of digital repositories and publications in open access. This Law was a creation due more to the interests and the impulse of a certain sector of the scientific community itself, than to an inductive process of the daily practices of scientific work with respect to open access.

Finally, the Law on access to public information and the Decree on the opening of information were sanctioned, which gave the legal framework and the necessary impulse for the creation of the Argentine Science and Technology Information Portal, later regulated by the resolution of the S&T Open Data Program.

Objectives as defined, and expected results

Open accessibility of scientific and technological information, research data and digital publications of scientific papers, and their free availability and accessibility to a broad audience for use in many contexts. It is a website that offers for several users, in an easy

and integrated way, access to a series of resources and services related to the same topic. It includes: web links, search engines, documents, applications, data and analyzed information, made available for its use from data visualizations or access for its download.

- **Body(-ies) who initiated the strategic initiative**

Ministry of Science, Technology and Productive Innovation of Argentina.

- **International references and good practices as drivers**

OECD recommendations; OECD policy papers as *Making Open Science a Reality*; *Open Science, Open Innovation and the Digitalisation of STI*; and *Data-Driven Innovation: Big Data for Growth and Well-Being*; openNASA, OpenAIRE, LA Referencia, and OECD recommendations, openNASA, OpenAIRE, LA Referencia, OCDE Frascati and Oslo Manuals, RICYT Bogotá Manual.

- **The underlying motives for initiating the strategic initiative from a policy perspective**

The underlying motives for the design and implementation of the Information Portal were: the normative context specified above; the existence of important data flows –about scientists and technologists, R&D projects, S&T publications, S&T institutions and equipment and the national systems of scientific data in open access format– and the need to articulate and strengthen the policies of Open Government and Open Data in Science and Technology driven from the MINCYT during the last decade.

- **Please describe how the following issues were covered (or not covered) within the initiative:**

  a) *Data governance for trust –addressing privacy, confidentiality, quality and ethical issues*

The Portal, and all the datasets and information there, were made available taking into account the normative specified above (regarding the Decree number 117 of 2016 that instructs the Data Opening Plan for the National government; the Law number 27,275 on the Right of Access to Public Information promulgated in September 2016) and the Law number 25,326 of Protection of Personal Data (which purpose is the comprehensive protection of personal data registered in the archives, records, data banks, or other technical means of data processing, whether public, or private, destined to give reports, to guarantee the right to honor the people's privacy, as well as access to information about them). No sensitive data information (racial and ethnic, political opinions, religious, philosophical or moral convictions, union affiliation and information regarding health or sexual life) is collected. SICYTAR has developed a cooperation agreement concerning the information it collects, that every organizational user has to sign in accordance. The published information on S&T personnel, R&D projects, S&T institutions, and publications on open access, takes into account all the above.

  b) *Discoverability/findability, machine readability and data standards*

For the harvesting of repositories, the Protocol OAI-PMH is used. The Portal uses primarily the Dublin core (in relation to the data repositories, specifically OpenAIRE Literature Repository Guidelines) and Darwin Core data standards, also ISO 19,115. With regard to genomic data repository, the standards used are GenBank and Fasta. In the coming months, Datacite will be incorporated.

c) *Recognition and reward system for data authors*

There is no reward strategy for data authors but sanctions are established through the Law number 26,899 of Open Access of Institutional Digital Repositories for those who do not comply with it.

d) *Definition of responsibility and ownership*

The Secretariat of Scientific and Technological Articulation is responsible for the management of the Portal and the statistical information produced or collected by the Secretariat itself. However, the academic organizations and the researchers who produce the scientific data and give the open access to their publications and the other MINCYT's departments who contribute with information for the Portal are the ones that are responsible for them.

e) *Business models for open data provision*

With the enactment of the Law of repositories and scientific data, the Law on access to public information and the Decree on open data, a model based on the obligation was implemented. This, however, does not guarantee full compliance at the moment, which is why different strategies of diffusion and persuasion are developed with S&T institutions so that they can be integrated into the open data and open science policy, the same is being done with researchers.

f) *Building human capital and institutional capabilities at public agencies, to manage, create, curate and reuse data*

* Training for those responsible for the S&T institutional digital repositories;
* Funding for the creation and strengthening of institutional digital repositories;
* Advice for the development and implementation of open access institutional policies;
* Recommendations regarding the use of creative commons licenses for the reuse of data.

3. Governance

- ***Governance structure of the strategic initiative***

The lead department for the Argentine Science and Technology Information Portal is the Secretariat of Scientific and Technological Articulation of the Ministry of Science, Technology and Productive Innovation. The initiative was designed, organized and implemented by the above mentioned Secretariat in articulation with several departments inside the MINCYT and with the collaboration of other S&T institutions.

There is a policy governing board of the strategic initiative formed by the Secretary of Scientific and Technological Articulation, the Under Secretary of Institutional Assessment and the Under Secretary of Institutional Coordination that are the institutional departments which have the main responsibility on the open science and open data for science, technology and innovation within the MINCYT. The National Directorate of Programs and Projects of the Secretariat of Scientific and Technological Articulation is the responsible of the coordination of the "Open Data Program in Science and Technology" and plays a hands-on role with the staff support in managing the Portal and its articulation with the different departments within MINCYT and the collaboration of S&T institutions. There is also an informal expert group on this open science and open data initiative

coordinated by the National Director of Programs and Projects that is expected to be created in the near future.

- ***Stakeholder consultation***

Inside the Ministry of Science, Technology and Productive Innovation, several departments that had developed over the past years various initiatives concerning S&T information were consulted with the objective of their articulation and integration in the Portal. Particularly within the Secretariat of Scientific and Technological Articulation, there are several areas with information systems and databases already consolidated: 1) the Argentine Science and Technology Information System (SICYTAR) –which contains databases on the resumes of Argentine scientific and technological personnel; of scientific and technological projects financed by the National Government in the last decade; of the institutions that carry out scientific and technological activities in Argentina–; 2) the National System of Digital Repositories –that contains more than 120,000 open access documents of Argentine scientific and technological production–; and 3) the National System of Large Instruments and Databases –that contains information on scientific and technological equipment and national systems with scientific data in open format (biological, genomic data, etcetera)–. Also, the Portal articulates information with the National Directorate of Scientific Information, the department that provides national statistics on the scientific and technological system. Moreover, the Portal articulates information from several other institutions: the National Agency for the Promotion on Science and Technology (ANPCYT); the National Council of Scientific and Technical Research (CONICET); the National Institute of Agricultural Technology (INTA); and the National Commission of Space Activities (CONAE).

- ***Decision making: who was the main decision maker and how was consensus created? Was there a specific conflict resolution mechanism among participants?***

The main decision maker was the Secretary of Scientific and Technological Articulation, even though every decision was taken under a consensual scheme with the S&T institutions responsible for the information. This consensus was created within the Inter-Institutional Council of Science and Technology (CICYT) that structures the National System of Science, Technology and Innovation -) created by the Law number 25,467 - and which is coordinated by the Secretary of Scientific and Technological Articulation. There was not specific conflict resolution mechanism among participants other than resolution by hierarchical way in those cases of internal conflicts within the MINCYT, and agreements with the respective authorities, in those cases that other external institutions were involved.

- ***The role and interaction of different levels of actors at local, regional, national and supra-national level and political leadership***

Under the Coordination of the National Directorate of Programs and Projects, meetings were held with all the areas that could be part of the Portal's initiative. Individual and group meetings were held, the first seeking an institutional political agreement, the following with the technical professionals of each department or institution to incorporate the available S&T information, and finally political and technical meetings were held to evaluate the Portal in its final version. Even today the technical meetings continue in order

to improve the quality of the S&T information available as well as the better integration of it.

- ***How the governance models chosen ensures that the initiative continuously focuses on its strategic goal, while responsive to the changing context***

The chosen governance model ensures that the initiative is continually focused on its strategic objectives while responding to the changing context. This is because the main areas involved in this governance model have related missions and functions in the organization chart of the Ministry of Science, Technology and Productive Innovation and because there are several regulations, already mentioned, that compel institutions and people that are working on S&T activities to comply with the mandates that these areas manage.

- ***The measures to improve transparency in the management of the initiative***

* Prioritize data that are relevant for both the society and scientific community to encourage them to take part in the initiative;
* Select critical data for the monitoring and evaluation of science and technology public efforts;
* Simplify the presentation of data while maintaining their technical accuracy;
* Train scientific and technological management committees, researchers and selected community groups on how data can be used.

4. Process

- ***Please describe the major milestones of the initiative, including preparatory work, such as needs assessment studies and analyses commissioned externally or produced internally, main meetings with various stakeholders, adoption of intermediary and final documents, adoption of relevant legislation and regulations***

The aforementioned legal and political framework is the context in which the Information Portal of Science and Technology was set up. This includes advancement in publishing relevant data; work with processed and complex information; and be visibly attractive, easy to understand, friendly and simple to use. Initially, once the objective of the Portal was established, open sites such as OpenNASA, the open data page of the Massachusetts Institute of Technology (MIT) and OpenAIRE were taken into account as models by the large amounts of information handled, the form of integration and interoperability, the power of their search engines and its ability to recover information and communicate it. These references allowed to glimpse some ideas that should be incorporated: i) think about types of users on public S&T data and present the information according to their profiles and supposed interests, ii) organize the content through questions that can be answered with the S&T information in the Portal, and iii) add images as part of the information available, etcetera. In some way, the work process was inductive, characterized by a back and forth between the search for references, reflections on what was aspired, exchanges within the technical team, informal consultations and programming of the Portal itself.

To promote the initiative, the political directive was fundamental because it set the horizon, mobilized wills and promoted several agreements with different agents and institutions of the S&T data ecosystem. Through it, the role of each was defined and new opportunities were opened up; generating an incremental effect. The project has been strategically promoted to become a broader information system that offers an enhanced access to public S&T open data of the national research system.

The development of the Portal took place in a legal framework where there was no longer any reason to deny the publication and opening of the data. Although this, it was not exempt from persuasive strategies, given that many of the involved actors participated who first explaining their reluctance to the publication and opening of their information.

Regarding the content, the design of the Portal –at first- was based on the Argentine Science and Technology Information System (SICYTAR) - a system that contains the curricular information of scientific and technological personnel, R&D projects, and S&T institutions of the country-, which already had several sets of data to incorporate the notion of data download and reuse. In a gradual manner and in accordance with the dynamics of the inter-institutional and intra-institutional articulation, other issues and data sets were added, with different levels of development and digital infrastructure - scientific publications in open access, scientific data resulting from research, S&T equipment, satellite images, and national statistics on the S&T system-.

The Portal was developed with the contribution of the technical team of the existing National Directorate of Programs and Projects and without specialized personnel in communication or graphic design. The motivating nature of the project for the team and the opportunity to learn new skills in several of its members were important inputs of a process that led to the diversification and enrichment of the staff.

- *Please describe the evidence base used in the process (studies, surveys)*

Besides the OECD policy papers as *Making Open Science a Reality*; *Open Science, Open Innovation and the Digitalisation of STI*; and *Data-Driven Innovation: Big Data for Growth and Well-Being*; the aforementioned research on open sites such as OpenNASA, the Massachusetts Institute of Technology (MIT) open data webpage, or OpenAIRE, there were no further studies included in the process.

- *Was regulatory impact analysis applied in the process, and if so, to what degree? If yes, what was the outcome of it? If not, is ex-post assessment foreseen?*

There was no impact analysis applied in the process. Nevertheless, it is expected that in the near future certain strategies for monitoring and evaluating the impact of the initiative may be applied for its continuous improvement.

Some actions have been considered to promote dissemination and increase the interest of society in the information available at the Portal. Among these can be enumerated: i) the elaboration of infographics or stories with data according to seasonal themes, specific dates, remembrances, etcetera; ii) dissemination in social networks to reach curious citizens and dissemination in the middle school; iii) the incorporation of more specialized information according to the characteristics of the different types of users; iv) the

implementation of a consultative process to identify strengths, opportunities or weaknesses of the Portal; v) the development of thematic hackatons; vi) the preparation of recommendations for the cleaning of data oriented to the actors involved; among others. In the short term, a site usability study is also planned to evaluate aspects related to its friendliness, navigation, and others. The sustainability of the project still raises certain questions because although the commitment to maintain the general structure of the site is assumed by the National Directorate of Programs and Projects, the other actors and organizations already involved must continue to do so.

- *Idea generation and priority setting: how were the main ideas generated? How were priorities set among the ideas?*

The original idea was elaborated and outlined by the SACT authorities. However, the search for international experiences, the draft proposals for the implementation of the project and the adaptations for the adoption of the strategy was responsibility of the professional staff of the National Directorate of Programs and Projects. The priority established by the SACT authorities was the elaboration of an "open window on open science" that would allow any citizen quickly and easily access all the information available in the MINCYT and the main S&T institutions in Argentina. There was two guiding ideas on the whole project, which were the priority on an easy navigability and communication, and the priority on the opening of information.

- *Please describe potential delays or setbacks in the process, as well as the underlying reasons for these setbacks (e.g. opposition of key advocacy groups or political forces, lack of communication among stakeholders, etc.)*

Several of this setbacks where already described. In the one hand, the Portal was developed without specific financial resources: this was a major setback in regards to the ability to hire staff with the necessary knowledge for the proper development of the project. Besides, the cultural problem regarding open government, open science and open data, that reflects in the reluctance to the publication and opening of information from many of the involved actors. Finally the absence of specialized personnel within the technical team, professionals in communication or graphic design, in computer design and programming, was a major setback in terms of the time required for the training of the available personnel, so that it could perform the necessary tasks for the development of the Portal.

- *Stakeholder consultation process: at what points in time were key stakeholder groups consulted, and how was their feedback incorporated into the design of the initiative?*

As was stated before, the coordination of the project was responsibility of the National Directorate of Programs and Projects. Under this coordination, meetings were held with all the areas that could be part of the Portal's initiative within the MINCYT and with other institutions within the national research system.

The first meetings were between the SACT authorities and the technical team from the National Directorate. Once the idea and priorities were defined, individual meetings were held with the persons responsible of other areas within the Ministry that could provide information for the Portal, first seeking an institutional political agreement, then seeking

for technical support in order to integrate the information the best way possible. On a third stage, once all the information available within the Ministry was incorporated, other meetings were held with the authorities of other institutions within the S&T national system, again first seeking for political agreement, then for technical work. Finally meetings were held to evaluate the Portal in its final version. Each area involved made their suggestions that were, as far as possible, incorporated in the Portal.

5. Adoption and implementation of the initiative

- ***What was contained in the final design of the initiative: main policies, regulations?***

Once the Portal's webpage was launched, the National Directorate developed a normative to institutionalize the Portal. This ministerial resolution defined the "Open Data Program in Science and Technology", its objectives, actions, the area responsible for the management of the Portal and the Program, and several basic definitions on data and data standards. All the aforementioned regulations related to this Program and the Portal, are its predecessors.

- ***Scope of the initiative: does it concern purely data resulting from research, or does it concern broader public sector information[1] or private sector data?***

The Portal, as stated before, contains data such us:

* data generated by departments inside the MINCYT;
* data from other public S&T institutions;
* data resulting from research;
* data on private sector that develop R&D projects financed or co-financed with public funds.

- ***What were the expected results of the initiative?***

On the one hand, to improve the amplitude and public accessibility to the S&T information, consolidating existing information systems and creating those necessary to reduce the information deficit for producers and users of scientific and technological information.

In addition, to transform the S&T information and research data into public goods, generating easily accessible S&T information, available for free and in a single site, to enhance a social dynamic of co-participation, co-creation and co-responsibility.

Finally, it was sought, and continues today, that the available S&T information allows: to promote transparency; to increase the effectiveness of government and public services; to design more and better public policies; to generate innovation and economic development

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[1] "Public sector information" is broadly defined by the OECD Recommendation of the council for enhanced access and more effective use of public sector information as "*information, including information products and services, generated, created, collected, processed, preserved, maintained, disseminated, or funded by or for the Government or public institution*", taking into account the legal requirements and restrictions, including intellectual property rights and trade secrets, effective and secure management of personal information, confidentiality and national security concerns, and fundamental principles including democracy, human rights and freedom of information.

focused on the creation of new instruments, products and services; and to strengthen companies that bet on innovation and new technologies.

- *What were the key performance indicators foreseen in the initiative, and who was responsible for reaching the targets set?*

Specific evaluation and monitoring strategies were not developed in advance beyond the use of the google analytics tool and the queries that the mail box receives weekly from portal users.

- *Who was (were) the main implementing body(-ies) for the initiative?*

Within the Secretariat of Scientific and Technological Articulation, there are several areas whose participation was very important:

1) The National Directorate of Programs and Projects, responsible for the design and implementation of the Portal (it also is responsible for the Argentine Science and Technology Information System (SICYTAR) –which contains databases on the resumes of Argentine scientific and technological personnel; of scientific and technological projects financed by the National Government in the last decade; of the institutions that carry out scientific and technological activities in Argentina–).

2) The National Directorate of Physical Resources in Science and Technology (with its National System of Digital Repositories –that contains more than 120,000 open access documents of Argentine scientific and technological production–; and its National System of Large Instruments and Databases –that contains information on scientific and technological equipment and national systems with scientific data in open format–).

Also, the Portal articulates information with the National Directorate of Scientific Information, from the Secretariat of Planning and Policies in Science, Technology and Productive Innovation. Moreover, the Portal articulates information from several other S&T institutions: the National Agency for the Promotion on Science and Technology (ANPCYT); the National Council of Scientific and Technical Research (CONICET); the National Institute of Agricultural Technology (INTA); and the National Commission of Space Activities (CONAE).

- *Problems or challenges to managing the implementation of the initiative (e.g. delays, missed targets, or results that did not meet expectations). What corrective actions were implemented to put the initiative back on track?*

Several of this problems where already described in the previous chapter. In the one hand, the Portal was developed without specific financial resources: this was a major setback in regards to the ability to hire staff with the necessary knowledge for the proper development of the project. Besides, the cultural problem regarding open government, open science and open data, that reflects in the reluctance to the publication and opening of information from many of the involved actors. Finally the absence of specialized personnel within the technical team, professionals in communication or graphic design, in computer design and programming, was a major setback in terms of the time required for the training of the available personnel, so that it could perform the necessary tasks for the development of the Portal.

6. International aspects

- ***The international dimension of the initiative, i.e., reference to international recommendations and standards (such as OECD recommendations), engaging foreign partners, addressing international data flows***

The references used to design and implement the Portal were already mentioned: OECD recommendations; OECD policy papers; openNASA, OpenAIRE, LA Referencia, OCDE Frascati and Oslo Manuals, RICYT Bogotá Manual.

- ***Degree to which the international dimension influences the design and implementation of the initiative***

Mostly, in relation to the design of the webpage, sites such as OpenNASA, the open data page of the Massachusetts Institute of Technology (MIT) or OpenAIRE were taken into account as models by the large amounts of information handled, the form of integration and interoperability, the power of their search engines and its ability to recover information and communicate it. These references allowed to glimpse some ideas that should be incorporated: i) think about types of users on public S&T data and present the information according to their profiles and supposed interests, ii) organize the content through questions that can be answered with the S&T information in the Portal, and iii) add images as part of the information available, etcetera.

- ***International comparability of data and cross-country data***

By following the OpenAIRE Guidelines for Literature Repositories[2] it is ensured that specific requirements on bibliographic information about Open Access publications are met. What's more, several controlled vocabularies are used:

- *Resource type to identify the genre of a research resource – version 1.1 released in October 2016;*
- Access mode ***to declare the degree of 'openness' of a resource*** *– draft v1.1 released in May 2017;*
- Version ***to express a specific version of a resource*** *– in review and analysis;*
- Date type ***to tag an event in the life cycle of a resource*** *– in progress;*
- Classification scheme *– in progress.*

https://www.coar-repositories.org/activities/repository-interoperability/coar-vocabularies/

Both for the design and implementation of the CV Database, CVar, and the design of S&T indicators, MINCYT applied several OCDE Manuals as Frascati Manual and Oslo Manual, and the Bogotá Manual from the Network for Science and Technology Indicators –Ibero-

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[2] Guidelines for content providers of the National System of Digital Repositories http://repositorios.mincyt.gob.ar/pdfs/Directrices_SNRD_2015.pdf; Metadata and Harvest Policies of LA Referencia, http://www.lareferencia.info/joomla/es/recursos/documentos/acuerdos-tecnicos/16-metadatos-y-politicas-de-cosecha-de-la-referencia; OpenAIRE Guidelines for Literature Repositories https://guidelines.openaire.eu/en/latest/literature/index.html.

American and Inter-American- (RICYT). Again, in reference to genomic data repository, the standards used are GenBank and Fasta.

7. Monitoring and evaluation

- ***The monitoring and evaluation framework for the initiative, including responsible organization, methodology, transparency and fund allocation***

There were not designed in advance any specific evaluation and monitoring strategies beyond the use of the Google Analytics tool, the follow up on the queries that the mail box receives weekly from Portal users, and the interaction with several institutional users (through the calls for proposals for R&D project funding or the use of the apps on the Portal, as well). Nevertheless, MINCYT considers that monitoring and evaluation are very important issues, and they are a commitment for the SACT itself to be designed and implemented.

Also, SICYTAR develops a daily analysis of the increment of data in the database and runs consistency analysis and cleaning processes.

8. Lessons and Challenges ahead

- ***The degree of attainment of the objectives***

Considering that the original objective was to guarantee open accessibility of S&T information, research data and digital publications of scientific papers, and their free availability and accessibility to a broad audience for use in many contexts, the degree of achievement of the objectives is certainly high, at least for the S&T information available within the MINCYT so far. However, information about the S&T System still needs to be incorporated, mainly by strengthening the current information sources (SICYTAR, digital repositories, and scientific data).

- ***Main achievements of the initiative in terms of process and end results***

Between the main achievements, there are some that can be pointed out:

- The inductive design and implementation processes: characterized by a back and forth between the search for references, reflections on what was aspired, and exchanges within the technical team, informal consultations and programming of the Portal itself.
- To political coordination needed for the agreements with several internal actors and other institutions within the National S&T System: with the collaboration of various internal and external actors the Portal became a broader information system -with open data- that involves and recognizes other actors of the national scientific-technological complex.
- The traction power of the project's political coordination allowed laying the foundations for the cultural change regarding the opening of information within the S&T sector.

- *Lessons learnt from setbacks in the process*

The absence of specialized personnel within the technical team was a major setback. Nevertheless, it all came around thanks to the goodwill and drive of the National Directorate's technical team; they trained themselves with virtual courses and tried and tested new processing, visualization of information tools, etcetera.

The cultural problem regarding open government, open science and open data, that reflects in the reluctance to the publication and opening of information from many of the involved actors. Thanks to the political coordination and the perseverance that the SACT's authorities had regarding the Portal, they mobilized wills and promoted agreements with actors and institutions with the aim of taking the initiative forward.

- *Challenges for the future*

The main challenges for the short term future is promote the use and reuse of the information available in the portal and the amplification of the information about the S&T System. This last one involves at least to different aspects:

1. On the one hand, the strengthening of the current information sources (SICYTAR, digital repositories, and scientific data).

   SICYTAR has yet to improve the amount of information in what regards to S&T projects (so far it has been supported by 18 thousand projects from the main funding sources in Argentina - CONICET, ANPCYT and INTA - however, it remains to include projects from other scientific organizations and from the Universities that make up the entire National S&T System); the database on S&T institutions (it has been a titanic work to design, integrate and improve the quality of the information about institutions that develop R&D activities, and this is information in continuous actualization); the database on S&T personnel (so far it has over 100 thousand curriculum vitae, although it is a wide coverage at national level, it is not yet of census character).

   Digital Repositories also has to improve the amount of information it contains, so far it has over 120 thousand documents from various institutional digital repositories. Also the number of institutional digital repositories has to must grow in order to increase in turn the volume of information in the national repository.

   The different National Systems of Scientific Data, as well, have to improve the amount of information they contain.

2. On the other hand, the development of new information sources: SICYTAR is working on a database of unique publications from the information contained in the researchers' curriculum vitae; referring to National Systems of Scientific Data, the diversity of disciplines that collect the scientific data from their work has to increase in variety.

- *Transferability: how relevant is this case study for implementation in other OECD member and partner countries?*

This implementation model is replicable under very specific circumstances. Firs of all, it should be considered that Argentina has a centralized management of science and technology. At the same time, it already had several instruments that collected information and which were designed for administrative purposes but that had great potential in terms of information on S&T activities and those who carry them out. However, there were also different initiatives in terms of scattered and disjointed information. Argentina also has a particular legal framework, whose creation was due more to the interests and the impulse of a sector of the scientific community itself, than to an inductive process of the daily practices of scientific work with respect to open access.

Taking all this into account, a strategy of visibility can serve to integrate and strengthen the open science policies that are carried out in a country.