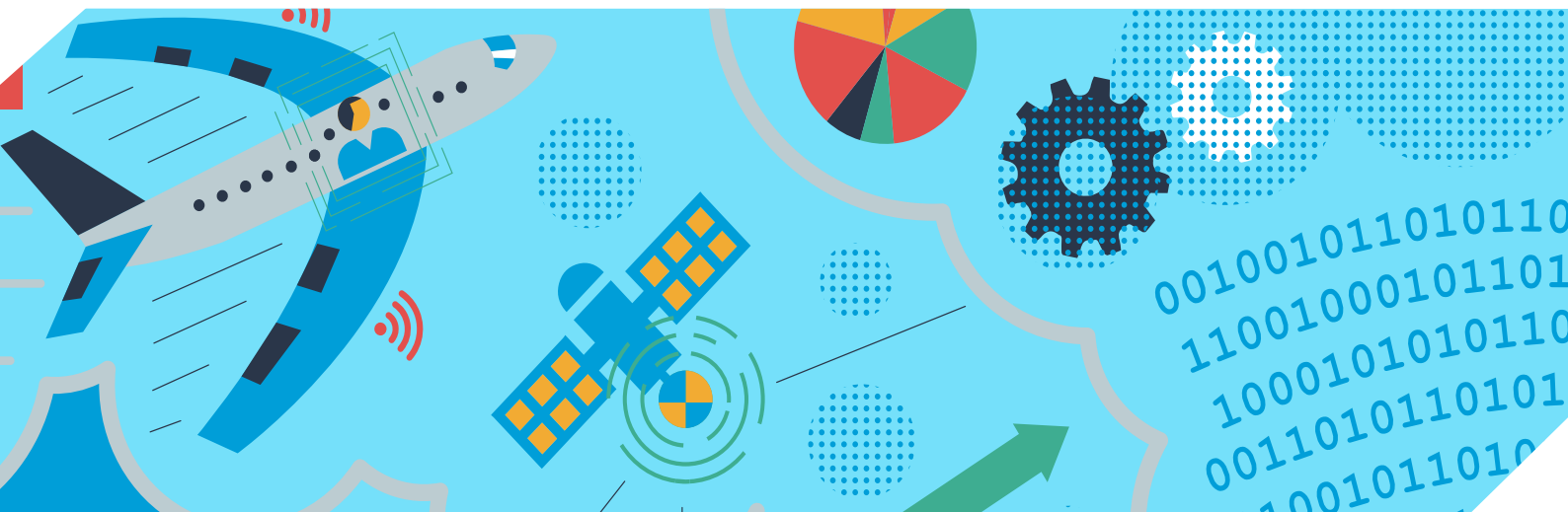




Case study: Uruguay



Industry 4.0: Digital Transformation Plans

This case study is part of research carried out by the ILO's Bureau for Employers' Activities (ACT/EMP) for the production of the 2022 Regional Report "Where do Business Organisations Stand on the Road to Digitalisation? A look at Latin America". The aim of these case studies is to help other employers' and business membership organisations (EBMOs) in their transition towards digitalisation. We would like to thank the ILO's South-South and Triangular Cooperation (SSTC) programme for its support in drafting this document, which will serve as a basis for an exchange of knowledge among EBMOs around the world.

► What is South-South and Triangular Cooperation?

South-South and Triangular Cooperation (SSTC) can be defined as collaboration between two or more developing countries, which frequently have the support of traditional partners, guided by the principles of solidarity and unconditionality, the aim of which is to put into practice inclusive and distributive development models governed by demand. SSTC complements North-South cooperation with joint action to encourage development opportunities. As can be seen from the Sustainable Development Programme 2030, SSTC has become an important means of international cooperation for development and an essential item in the United Nations toolbox.

► Summary

Uruguay Chamber of Industry (CIU) has been characterised throughout its extensive history for its countrywide vision and a search for new business frontiers for its members. It was in this spirit of optimism that in 2019 it began its **Industria 4.0** service to assist manufacturing companies to implement new technologies. Participating companies were given a diagnosis of their existing digital situation, a digital transformation plan (PTD) tailored to their specific needs and assistance from two experts for 3 months. Industria 4.0 is now in its 8th edition and 60 companies have completed their PTDs.

► About the EBMO

Uruguay Chamber of Industry (CIU) is an EBMO whose main goal is the industrial development of Uruguay through direct contact with businesses and with its 49 industry member associations. CIU has been in existence for more than 120 years.

From its beginning to the present day, one of the main goals of CIU has been to encourage industrial entrepreneurship and innovation throughout the country, and thus to develop new markets and opportunities. **Industria 4.0** is only one of its more than **36 support services for business development**, offered by CIU to the whole of the Uruguayan industrial base.

► The digitalisation project

Industria 4.0 was launched in July 2019 to support the development of innovations and to assist the manufacturing sector to incorporate these new technologies.

In its current version, Industria 4.0 helps companies to make an assessment of their current state of digital readiness and helps them prepare a **digital transformation plan (DTP)**, and assist them through digital transformation journey

Industria 4.0 vision is that in the future enterprises will combine different technologies (innovative and disruptive) in their production processes and operations. These technologies commonly include the Internet of Things, artificial intelligence, robotics, additive manufacturing (3D printing) and real-time business intelligence.

“At CIU we try to generate new business opportunities. This leads to the development of products and services that respond to our members' future abilities and needs”.

To develop these products and support them, interested companies should complete the following process:

1. On-line application:

Applications are welcome through the Impulsa Industria project. Interested companies complete an on-line form that provides Industria 4.0 with information on the level of digital technology and infrastructure used in their processes.

To date it has not been necessary to reject any applicants as CIU has designed a methodology that is appropriate to the reality of manufacturing industry in Uruguay.

2. Initial contact / assignation of a pair of experts:

For a total of eight hours over the course of two days, the company receives training in the concepts used by Industria 4.0 and works together with the expert advisors to analyse its environment, information flows, business models, value proposals and production processes. It should be pointed out that the initial training is given to groups, with participation by the teams assigned by each company. The format is virtual or in person, depending on where the company is located.



3. Training in the methodology of the PTD and Industria 4.0

For a total of eight hours over the course of two days, the company receives training in the concepts used by Industria 4.0 and works together with the expert advisors to analyse its environment, information flows, business models, value proposals and production processes. It should be pointed out that the initial training is given to groups, with participation by the teams assigned by each company. The format is virtual or in person, depending on where the company is located.

4. Facility visit:

The expert advisors visit the company's facilities to learn more about its processes and potential for digitalisation and to confirm the information already provided.

5. Iterative development:

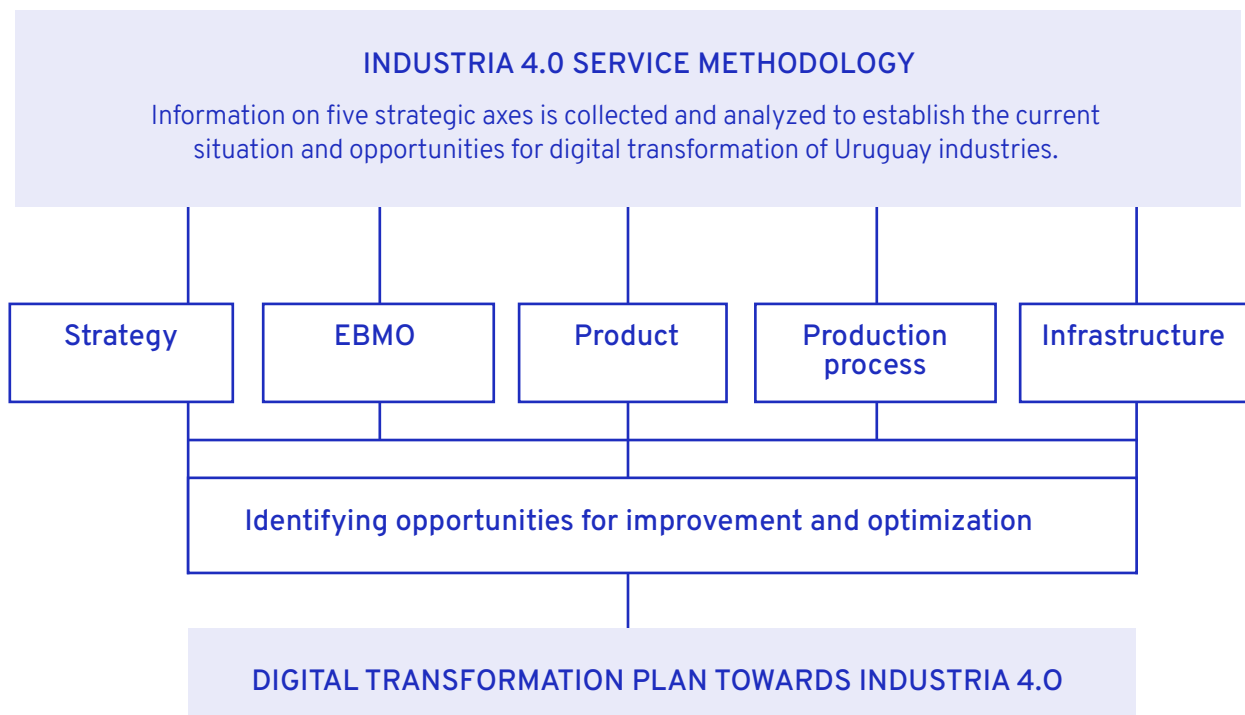
Dialogue and joint work continue to develop the PTD (virtual/telephone/in-person meetings).

6. Reports and closing meeting:

the company is given a **Diagnosis Report 4.0** on its level of digitalisation, and its **Digital Transformation Plan** that will be used as a route map with specific recommendations for the transformation process. These products are accompanied by a live presentation by the expert advisors, who emphasise the main findings and recommendations.

This service aims to help enterprises get closer to the technological frontiers of their industry branch and not only to digitalise their processes. This is why the terms "digital transformation" and **Industria 4.0** are used.

Figure 1



“It is not a question of merely designing a website or digitising information, it is a more complex service that seeks to support companies in applying technology to their industrial processes, with everything that this entails”.

The service also includes **Themed Workshops** on Industria 4.0. Industria 4.0 service also provides connections between manufacturing companies and suppliers of technological services, in a virtual space, which is open-access and free of charge, called [Plataforma Industrial](#), the first virtual market for industry in the country.

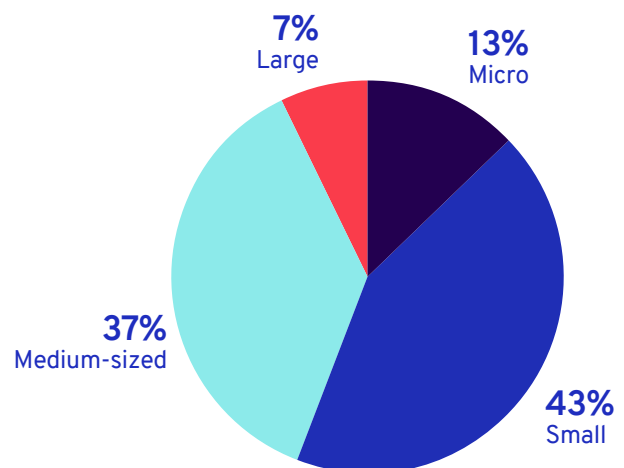
The process lasts 12 weeks. On completion of the service, companies can choose to continue working at their own expense with the expert advisors or with technology suppliers. Furthermore, through its other support services Impulsa Industria guides companies towards public financing options, links with other actors in the industrial ecosystem (several of which are already on the Plataforma Industrial) or other services provided by CIU. As far as technology suppliers are concerned, CIU encourages companies to connect with them using the Plataforma Industrial.

The service is continually evolving. At present CIU is in the process of implementing a digital platform for optimising the production of PTDs, adapting the service to micro-manufacturers and incorporating components of a circular economy.

► **Industria 4.0's achievements**

Industria 4.0 is now in its 8th edition and achieved the following milestones between July 2019 and December 2022.

- **60** manufacturing companies have developed their own PTDs (13% Micro, 43% Small, 37% Medium-sized and 7% Large).
- **56** expert advisors trained in the Industria 4.0 methodology.
- **88** companies trained in Industria 4.0.
- **11** themed workshops held, with 158 participating companies.



Industria 4.0. has compiled information on its impact* on participating companies:

- On average **43%** of the recommendations contained in the PTDs have been implemented.
- An average of **53%** have seen changes / impacts affecting production process optimisation, cost reductions, strengthening of the company's identity, more customers and better security for sensitive information, among others, after taking part in the programme.

► **Project development**

Industria 4.0 is part of the range of services and solutions provided by the [Impulsa Industria](#) project. It is an initiative by CIU with support from Uruguay's National Institute for Employment and Professional Training (INEFOP). The purpose of Impulsa Indus-

* Source: Based on a sample of 18 participating companies in 2020 and 2021.



tria is to encourage industrial development projects by offering novel services that stimulate new skills and links between the different actors (manufacturing companies, entrepreneurs, the academic world and students). Impulsa Industria's portfolio of services currently includes the following: [Aceleradora de Empresas Industriales](#), [Células de Innovación Abierta](#) (which works with university students or a team of researchers), [ImpulsaLab](#) (an innovation laboratory) and [Alimentos](#) (a service focused on the food industry that includes technological innovation components, product and packaging redesign and the circular economy) and, of course, [Industria 4.0](#).

It was as part of the Impulsa Industria scheme that in October 2018 CIU began to map this digital transformation advisory service for manufacturing companies. **It should be noted that Industria 4.0 is the first supplier of support to manufacturing companies in their digital transformation in Uruguay.**

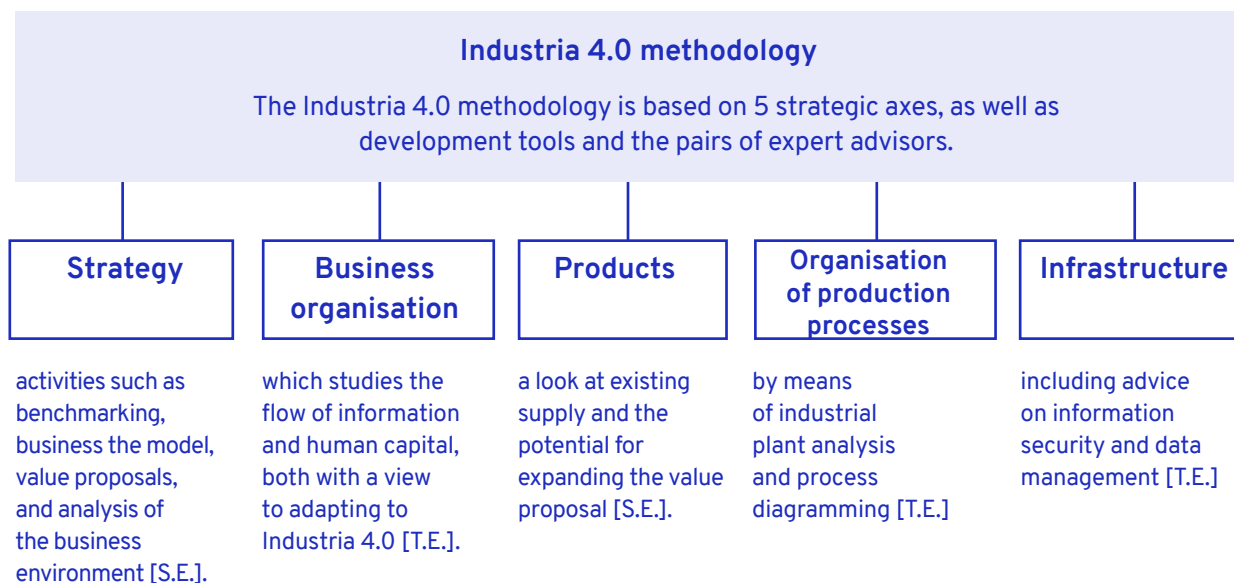
“When we started this project in 2018, we were pioneers, no one in the public sector was doing it and it was still just a small niche among large companies”.

Training and methodology

For the CIU team, the principal components in the success of Industria 4.0 are training for experts and participants, a rigorously constructed methodology adapted to the context of the country and the creation of alliances and forms of cooperation with the relevant institutional ecosystem.

The help of experts was essential for CIU to enable it to offer specialist advice to the participants. Based on previous experiences, CIU decided to use pairs of expert advisors who could contribute a viewpoint that was not solely technological to the companies. A **strategic expert** (S.E.) and a **technology expert** (T.E.) were therefore assigned to participating companies. With these two experts companies benefit from the different skills and knowledge provided by Industria 4.0.

The expert advisors are trained in the **Industria 4.0 methodology**, which was developed by the Instituto Nacional de Tecnología Industrial (INTI - the national industrial technology institute) of Argentina. INTI has been a key ally for Industria 4.0 and frequent collaborator of CIU.



The Industria 4.0 methodology is based on 5 strategic axes, as well as development tools and the pairs of expert advisors.

1. **Strategy**, activities such as benchmarking, business the model, value proposals, and analysis of the business environment [S.E.].
2. **Business organisation**, which studies the flow of information and human capital, both with a view to adapting to Industria 4.0 [T.E.].
3. **Products**, a look at existing supply and the potential for expanding the value proposal [S.E.].
4. **Organisation of production processes**, by means of industrial plant analysis and process diagramming [T.E.].
5. **Infrastructure**, including advice on information security and data management [T.E.].

These axes feed into an **integrating tool** to enable participating companies to visualise a business model proposed by the Industria 4.0 process.

The rigorous application of methodology has enabled CIU to:

- systematise information and standardise quality criteria.
- establish timetables for the work and define a route for implementation.

- identify repeated problems in each axis and to solve them.
- define a training scheme for potential expert advisors and allied institutions that contributes to project sustainability.

Timeline

2018

An agreement was signed with INTI to **draft an Industria 4.0 methodology** adapted to the Uruguayan context.

2019

An **initial mapping of institutional abilities** (actual and potential) was carried out of the Industria 4.0 ecosystem in Uruguay to serve as the baseline of the programme. INTI offers the **first training programme for national expert advisors** in the methodology and the service started with the **1st edition of Industria 4.0**, in which large companies also took part. The mapping of industrial capabilities was later reviewed and a second group launched, this time involving MSME companies in Salto, Uruguay with a view to improving **access to services outside the capital city** Montevideo.

2020

A **review of the methodology** was carried out **based on lessons learned**, which analysed the relevance of the tools used for each strategic axis and modified the intervention to accommodate virtual activities, due to the COVID-19 pandemic. The 3rd

and 4th iterations were introduced using this revised methodology.

2021

A second review of the methodology was carried out to bring the service into line with the needs of SMEs (micro-enterprises are for the moment excluded). **The second training session for national expert advisors** in the Industria 4.0 methodology took place in April. The “training of trainers” scheme was implemented for the first time. The training session was carried out by INTI and graduates from the first edition were then responsible for conducting the second training. The 5th and 6th editions of the service were also conducted during this year. A third review of the methodology was carried out with the participation of the new expert advisors and the programme's impact was also evaluated.

2022

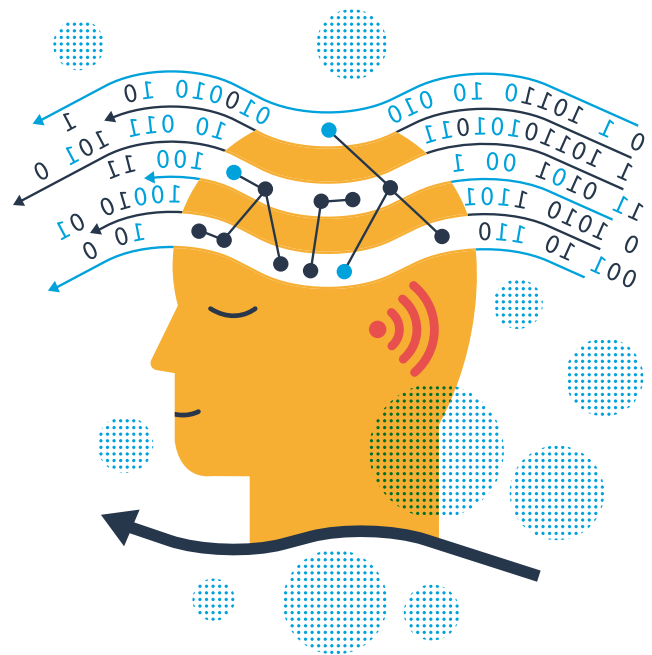
The 7th and 8th editions of Industria 4.0 were introduced and a third group of expert advisors trained. CIU began to adapt the **methodology to include micro-enterprises in the manufacturing sector**.

2023+

CIU expects to implement the Industria 4.0 pilot project for micro-enterprises, and also to add a circular economy component to the service to bring it into line with a project called [AL-Invest Verde](#) jointly financed by the European Union.

► Resources, financing and allies

The service exists thanks to the time and dedication contributed by CIU personnel and its different allies, who have helped to develop and implement it. The project is mainly carried forward with the support of two individuals from CIU's staff. CIU estimates that the fees of the expert advisors assigned to participating companies amount to USD 40,000 per year, an average cost of USD 2,000 per company/PTD. Development of the methodology jointly with INTI and training for the expert advisors required an investment of 30,000 dollars.



The cooperation with others institutions has been vital in providing the service and implementation of PTDs by the companies. A total of 28 institutions were involved with the Industria 4.0 activities, especially the Centro de Automatización Industrial y Mecatrónica (CAIME), who provided experts for the PTDs, and Universidad Tecnológica (UTEC) for training in the different technologies for Industria 4.0. When the time came to implement their PTDs, several companies received financial support from the Ministry of Industry, Energy and Mining (MIEM) and the National Development Agency (ANDE).

Furthermore, the Industria 4.0 service received financial support from INEFOP. At present **the service is completely free of charge for participants**. CIU has also obtained funds from AL-Invest Verde, some of which are being used to adapt components of the Industria 4.0 service to the circular economy.

CIU believes it is very important for the service to seek changes and new frontiers for the country's manufacturing industry; the aim is not to make the service profitable, rather it is to support national development by building new institutional and business capabilities and to provide added value to its members.

► **Lessons to share**

1. **Seeking new frontiers** – Industria 4.0 was created to bring new technologies and ways of working to the manufacturing sector in which niche companies are not receiving training. For CIU one of the added values that may be offered by an EBMO is recognising new potential markets and preparing its members to take advantage of them.
2. **In-house first** – es decir, desarrollar las capacidades internas de la OE para diseñar y poner en marcha servicios de desarrollo empresarial novedosos en el país, lo cual incluye formación de la temática a abordar y elaboración de procedimientos y manuales de trabajo para la coordinación con instituciones y expertos de diferentes áreas de conocimiento.
3. **Network connections** – with the academic world, the public sector, other countries.
4. **Methodology and rigour**– adapted to the context of the country and the service, with emphasis on evaluation and monitoring of the results.
5. **Publication of successful cases** – seeking to maximise the demonstration effect with testimonials from companies that have benefited from the service.