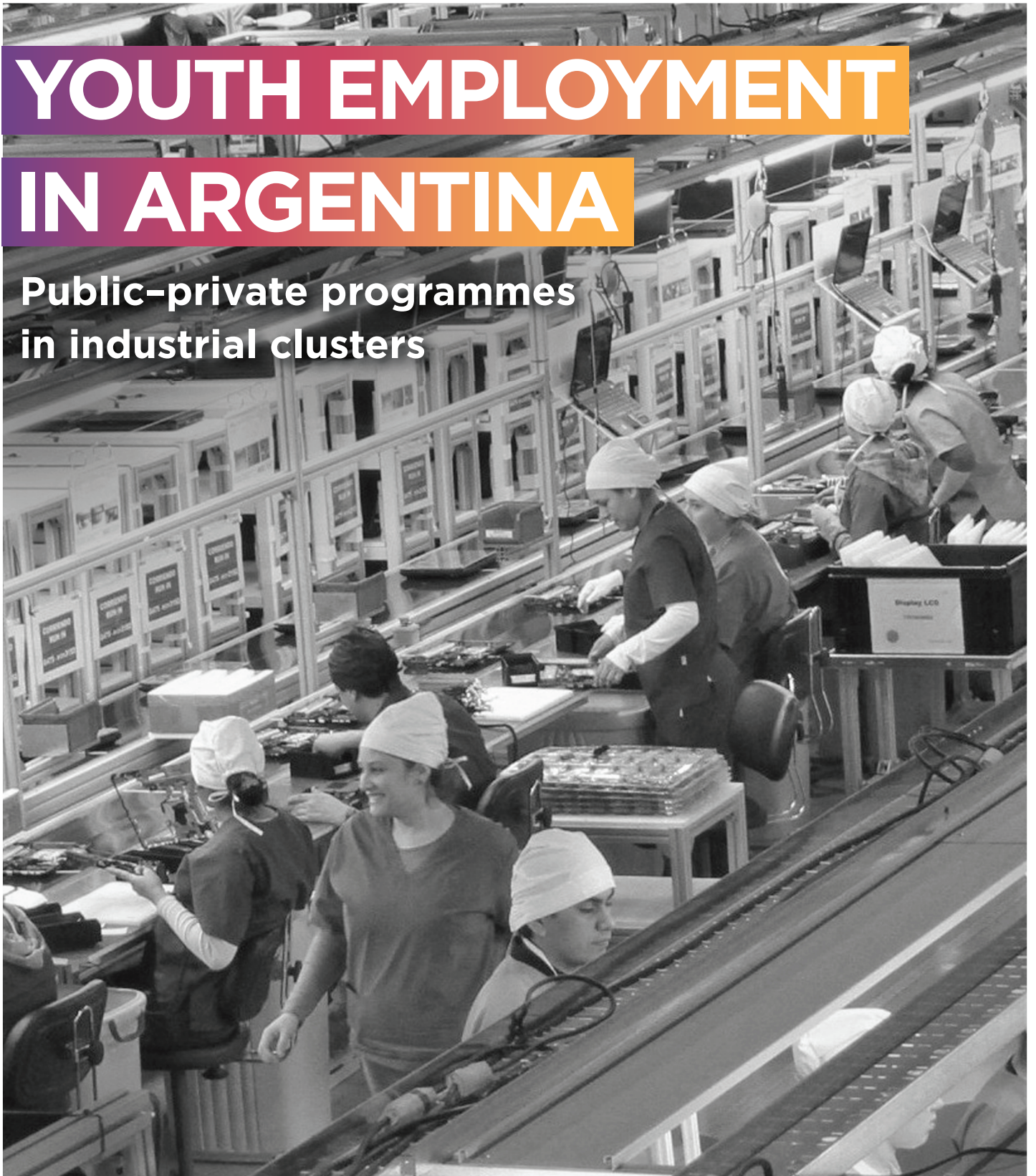


# YOUTH EMPLOYMENT IN ARGENTINA

Public-private programmes  
in industrial clusters



**GAN** ARGENTINA



UNIÓN INDUSTRIAL  
ARGENTINA



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# ACRONYMS

- AFARTE** Association of Argentine Electronic Terminal Factories
- AMAYADAP** Sawmill and Related Wood Association of Alto Paraná
- APEFIC** Association for the Strategic Industrial Forestry Plan of Corrientes
- APICOFOM** Association of Producers, Industrialists and Foresters of Misiones and Northern Corrientes
- CAFIN** Tierra del Fuego Chamber of National Industry
- CECAP** Misiones Wood Technology Centre and the Centre for Productive Training
- CENTEC** Tierra del Fuego Technological Development Centre
- CETRI** Centre for the Transfer of Research Results
- CIAN** Business Incubation and Acceleration Centre
- CLIP** Job Placement and Training in New Technologies Programme
- COMCAL** Residence Centre for Computer Science and Electronics
- CONICET** National Scientific and Technical Research Council
- COVIAR** Argentine Wine-Making Corporation
- CTC** Córdoba Technology Cluster
- EEOC** Obispo Colombes Agroindustrial Experimental Station
- FACET** School of Exact Sciences and Technology at the National University of Tucumán
- FAIMA** Argentine Federation of Wood and Related Industries
- FaMAF** School of Mathematics, Astronomy and Physics of the National University of Córdoba
- FECOVITA** Federation of Argentine Wine Cooperatives
- FONTAR** National Agency for Scientific and Technological Promotion through the Argentine Technology Fund
- FSC** Forest Stewardship Council
- ICT** Information and Communication Technologies
- IICANA** Argentine American Cultural Exchange Institute
- ILO** International Labor Organization
- INDEC** National Institute of Statistics and Census
- INET** National Institute for Technical Education
- INTA** National Institute of Agricultural Technology

**INV** National Institute of Viticulture

**IPAAT** Tucumán Sugar and Alcohol Promotion Institute

**ITC** Cordoba Institute of Technology

**JUCOVI** Youth of Wine Cooperatives

**NEET** Not in Education, Employment or Training

**OEDE** Observatory of Employment and Business Dynamics

**PEA** Airport Business Park

**PEFC** Programme for the Endorsement of Forest Certification

**PEVI** Argentina Vitivinícola Strategic Plan 2020

**PIL** Job Placement Programme

**PPP** First Step Programme

**PTLC** Central Litoral Technological Park

**R&D&I** Research, Development and Innovation

**SME** Small- and Medium-sized Enterprises

**UCC** Catholic University of Córdoba

**UCIJS** Union of Independent Sugarcane Producers of Jujuy and Salta

**UIF** Tierra del Fuego Industrial Union

**UNAM** School of Forestry Sciences of the National University of Misiones

**UNESCO** United Nations Educational, Scientific and Cultural Organisation

**UNL** National Litoral University

**UNNE** National University of the Northeast

**UNTDF** National University of Tierra del Fuego

**UTN** National Technological University



# 1.

## INTRODUCTION

Globally, young people are one of the groups with the largest decent work deficits. There are wide gaps in access to and quality of employment between the adult and youth population. According to the International Labour Organisation (ILO), young people are three times more likely to be unemployed than adults (2020).<sup>1</sup> Moreover, one fifth of them are not in education, employment or training (“NEETs”) or do not receive any remuneration for their work, as is often the case for young women, who are twice as likely as young men to be NEETs.<sup>2</sup> One of the main reasons for this disparity lies in the distribution of household and care tasks, which tend to fall mainly on women.

Even when employed, young people often face precarious working conditions, lack of legal and social protection, and few opportunities for career development. Three out of four young people in Argentina are employed in the informal economy (ILO, 2020) and a large proportion of them live in poverty (17 percent) or extreme poverty (13 percent).

According to the National Institute of Statistics and Census (INDEC), in Argentina there are more than one million young people who are considered to be NEETs, more than 70 percent of whom are responsible for the care of children, younger siblings or older adults. In line with the general situation related to household work, 95 percent of these people are women (De León, 2017).<sup>3</sup> Young people are also at greater risk of losing their jobs. Between 2016 and 2019, there was a 2.5 percent drop in private employment among 18–24 year olds; in the case of the manufacturing industry, the figure reached almost -17 percent for this age group and -33.3 percent for 25–29 year olds, well above the total drop in private employment for that period, which was estimated at -11 percent.<sup>4</sup>

Meanwhile, one of the main problems for business development is the incorporation of qualified human resources. A survey conducted by the Small- and Medium-sized Enterprises (SME) Observatory Foundation (2019) showed that between 2005 and 2019, the medium and high level of difficulty for SMEs to recruit technicians increased from 66 percent to 76 percent, mainly due to lack of experience (66 percent of cases) and to insufficient technical skills (64 percent of cases) among the applicants. The same study found that 82 percent of industrial SMEs expressed the

1 Based on a young population (15–24 years of age) estimated at 1.3 billion in 2019.

2 It refers to people who are neither working nor receiving any remuneration for their work.

3 This study used data from INDEC’s National Youth Survey (2014). The age range surveyed is 15–29 years.

4 Permanent Household Survey for the four quarters of the 2016 – 2019 period.

need for a stronger connection between companies and technical schools.

However, training in the workplace remains low. In 2019, only 11 percent of companies received students from technical schools as trainees, which is slightly higher than the 9 percent recorded in 2018. In Argentina, young people who attend technical middle schools must complete 200 hours of professional practice within the school timetable during their last year of study.<sup>5</sup> These internships provide the students with an opportunity to gain a closer perspective of the industry, as well as an opportunity for future insertion in the company.

Dual apprenticeship or training initiatives – which combine education from a centre or school with practice and training in the workplace – are widespread in European countries such as Germany, Switzerland, Austria, Denmark and the Netherlands. These countries also have the lowest youth unemployment rates. In Latin America, Brazil and Colombia have strong regulatory frameworks that establish fixed wage levels and worker protections for apprenticeship programmes, and have favoured the implementation of dual training at the national level (Smeck, et al., 2020). In the case of Argentina, the inclusion of work-based learning in the curriculum is relatively recent and difficulties still arise in the coordination between schools and companies.

There is a huge gap in Argentina between the skills required by the job market and the training of young people. This discrepancy reflects a series of issues originating in the reconfiguration of the industry itself. Technological change and the advancement of digital technologies, robotics and communications bring improvements to the wellbeing of the population and the productivity of the economy, but if these changes are not accompanied by employment policies which are in line with the new needs of the labour market, they will also contribute to a rise in inequality. While routine positions requiring mid-level skills will tend to disappear, knowledge-based skilled jobs are at a low risk of being automated (Frey and Osborne, 2013; Brynjolfsson and McAfee, 2013). The labour market in Argentina is not an exception to the process of technological change. Apella and Zunino (2017) analysed the evolution of employment levels according to the type of tasks carried out by workers, and concluded that the relative importance of cognitive tasks for employment has increased over the last twenty years, while that of manual tasks has decreased, particularly among the younger population.

Qualification in the knowledge sector involves a combination of skills that go beyond well-defined knowledge and responsibilities. Today's workers must be able to integrate knowledge, think critically, and seek new information for decision making; communicate, learn and teach throughout life; and be autonomous and responsible (Catalano, 2019). Lifelong learning or education is key to the future of work. This term, coined by the United Nations Educational, Scientific and Cultural Organisation

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<sup>5</sup> These internships are free of charge for the companies and are covered by a Civil Responsibility Insurance from the corresponding Provincial Ministry of Education (Law No. 26.058, 2005).

(UNESCO), goes beyond the specific training required for professional and work fields, and includes the development of basic general skills acquired at the primary and secondary levels of formal education.<sup>6</sup>

Globally, this has resulted in a significant number of education policies that adopt vocational training and education as a strategy to promote employability. In Argentina, vocational training involves coordination between the government, companies, and workers who are represented by trade unions. The government centralises the vocational training system mainly through the Ministry of Labour, which manages its own training institutions and supervises private institutions (Weinberg, 2014). Recent initiatives include the creation of sectoral vocational training councils, the certification of work skills, the creation of a network of continuing education institutions, the provision of technical assistance for the implementation of vocational training programmes, and the design of occupational profiles and competence standards, among others.

Although companies collaborate in the tripartite bodies in charge of designing training policies, in practice they prioritise training activities that are close to their immediate interests and tailored to their own technological needs (Catalano, 2019). However, they provide learning opportunities that are difficult to convey through the education system, as innovation is managed within the company itself.

Training tools differ depending on the size of the company; the larger the company, the broader the training offer and the availability of training units (Novick, 2010). Smaller firms stand out for their infrequent allocation of specific budget for training purposes, and for their lower level of identifying training needs. The coordination between these companies, business chambers and educational institutions is therefore key to accessing the training offer.

The aim of this paper is to identify the main public-private initiatives promoting youth employment in Argentina, within the framework of industrial development strategies. Private sector activities - conducted by business chambers and companies - include policies or programmes aimed at helping future workers learn and transition from the world of education to the world of work. They include a wide range of training proposals for employability, led by companies in collaboration with public entities, educational institutions and third-sector organisations. Some of the most widespread programmes are work-based learning (internships and professional practice), vocational training (courses and degrees in vocational training), and training to promote the development of entrepreneurship and the creation of employment.

In many cases, these activities result from a broader discussion about the present

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<sup>6</sup> In its report *Learning to be: the world of education today and tomorrow* (1972), UNESCO proposes lifelong learning as a structuring principle of educational reform.

and future of industry in Argentina and the world. In this light, analysing youth employment in Argentina is not a question of surveying isolated initiatives but of understanding the overall agenda for the promotion of youth employment and employability training, within the framework of the design and implementation of industrial development strategies.





## 2. INDUSTRIAL COMPLEXES

The internationalisation of production processes associated with the offshoring of manufacturing has been one of the main transformations that the world economy has undergone since the 1970s. This reorganisation of industrial processes is generally explained in light of the global value chains approach and territorial competitive advantages. The main characteristic of this model is that each stage of production is carried out at a location where resources and skills are available at competitive prices and qualities (Gereffi and Fernández Stark, 2016).

The organisation of the global value chain and the way it sets the conditions for production and marketing (governance) is key to determining its potential to change the roles of the different participants. In a broad sense, it determines their possibilities for upgrading or for competitive advancement, which translates into higher income (Gereffi, Humphrey and Sturgeon, 2005).

Authors such as Porter (1990), Krugman (1992) and Schmitz and Nadvi (1999) point to the relevance of local networks of companies, scientific-technological institutions and governments in order to gain competitiveness and achieve greater insertion in value chains, especially in regions that are economically less advanced. Geographical proximity and industrial specialisation offer advantages that can be beneficial to all these firms. Based on the Marshallian approach, these agglomerations benefit from the dissemination of technology, knowledge, and the exchange of human resources, services or machinery. When external factors are added to the planned cooperation activities, collective processes become more efficient (Schmitz and Nadvi, 1999). Recent industrial development policies have encouraged this type of collaboration for the development and implementation of competitive growth strategies.

Detailed observation of cooperative industrial development policies shows that: i. the companies involved usually reach a higher level of technological development, which benefits them and the area where the cluster is located; ii. the companies which make up the cluster achieve greater productivity, which allows for better final products or services; iii. as the clusters are made up of both companies and academic institutions that attract young people with new ideas, enthusiasm and willingness, they contribute ongoing research and innovations that later impact the productivity of the companies in the region; iv. the formation of a cluster brings new businesses to the region, along with expanding and strengthening the existing ones; v. clusters facilitate the creation of economies of scale in an associative manner, allowing for the resolution of situations which would not be possible for individual companies,

such as agreements with suppliers or commercial alliances; vi. finally, the teamwork fostered by the presence of a cluster produces better products, which makes it possible to compete abroad with greater strength and foundation (Porter, 1998).

In terms of employment, the location of clusters is a key factor not only for regional development but also for human development. Because the clients and suppliers in the production chain are close to one another, they generate not only direct employment through the cluster's product, but also indirect employment through the supply of the goods and services necessary to sustain it. New companies, suppliers and workers are attracted to the geographical area of the cluster due to the advantages of being close to a rapidly expanding region which offers opportunities for employment, professional and personal development (Krugman, 1993). In turn, the clusters demand manpower, create and train workers. The presence of academic institutions becomes a crucial element to train more specialized and advanced professionals, thus further bringing a competitive advantage to the region.

Finally, the presence of more than one cluster across a country's territory and their integration into international markets can lead to increased foreign exchange earnings for the national economy. The participation of the business sector is essential, as is the role played by public institutions. The latter should be responsible for promoting the products made by the companies, and also for connecting local entrepreneurs with international clients through events such as trade fairs, trips abroad and informative talks, among others (Corrales, 2006).

Production is also underpinned by a strong network of public-private support institutions, built largely on public policies that prioritize this type of initiative through programmes for industrial clusters or agglomerates, business networks, and industrial and technology parks. At the national level, since the mid-2000s, the science and technology, agriculture and production sectors have developed programmes to promote clusters, driven by funding from international credit agencies.<sup>7</sup> The characteristic feature of these initiatives was that they designed a strategy to improve the cluster's competitiveness and formalise its representative scope based on legal structures such as civil associations or foundations. Among their main lines of work, these strategies include proposals in the areas of employment and training, which in many cases are linked to technological change.<sup>8</sup>

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7 These initiatives are: Integrated Project of Productive Clusters (PITEC) of the Ministry of Science, Technology and Productive Innovation, Cluster Development Initiatives (IDC) of the Ministry of Agriculture, Livestock and Fisheries, Local Productive Systems, Clusters of the former Ministry of Industry and Tourism and the Competitiveness Programme of the Great North of the former Ministry of Economy and Public Finance. These programmes were partly financed by the Inter-American Development Bank and the World Bank, among others. Currently only the IDC Programme of the Ministry of Agriculture, Livestock and Fisheries is in force. For further details see Ferraro (2010).

8 Information provided by the Competitiveness Area of the General Directorate of Sectoral and Special Programmes and Projects of the Ministry of Agriculture, Livestock and Fisheries.

Another contribution to the strengthening of industrial linkages was the National Industrial Park Programme launched in 2010 by the former Ministry of Industry and Tourism, which is still in force today. The programme funds part of the infrastructure and offers subsidized loans for the establishment of companies, among other benefits.<sup>9</sup> There are currently 210 registered parks out of a total of 405 industrial parks throughout the country, 80 percent of which are public-private and almost 50 percent of which were created in the last eight years (Association of Argentine Industrial Parks, 2020). One of the priorities in the design and management of the parks is their employment and training agenda. The programme promotes the planning of training activities in coordination with technical and educational institutions as a strategy aimed at strengthening local human resources (Di Paolo, et. al., 2019).

One of the common elements observed when analysing the country's business fabric is the low level of product diversification at the regional level. In all regions, except for Pampas, more than 45 percent of employment is concentrated in the two largest complexes.

In the NW region, the Sugar complex and the Fruit and Vegetable sectors represent 46.2 percent of the total employment,<sup>10</sup> and both have a long industrial tradition. The sugar industry in the provinces of Salta, Jujuy and Tucumán dates back to the colonial period. The current potential of this complex lies in the development of business units linked to the green or circular economy, particularly biofuels or paper processing based on a renewable resource like the sugarcane. In the case of the Fruit and Vegetable complex, one of the most competitive products in recent years is the lemon industry in the province of Tucumán, which has achieved a high level of insertion in the international market, even leading exports.<sup>11</sup> Another relevant crop, grown for the domestic market, is the tomato – especially in the subtropical areas of Salta and Jujuy – which is marketed as a first in the whole country.<sup>12</sup> Unlike the others, the development of the Cereal-Oil Complex is more recent, as it is linked to the shift in the Pampean agricultural frontier.<sup>13</sup>

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9 Decree 915/2010.

10 Out of the total number of jobs belonging to complexes in the NOA region (approximately 83,790 employees).

11 In 2018, the lemon complex exported US\$734 million (1.2 percent of total exports). Its exports grew by 24 percent as compared to the previous year (INDEC, 2018).

12 Salta and Jujuy are the first area par excellence, since they produce vegetables to supply the whole country in the middle of winter. The production period peaks between May and September.

13 Since the 1990s, the production of traditional crops in northern Argentina has been displaced by crops like soya and other oilseeds, along with the breeding of high-quality livestock. This process is based on the dissemination and adaptation of technological innovations, the consolidation of large companies and the articulation with external markets (Bisang and Gutman, 2005).

In the case of the NE region, the most relevant complexes in terms of their contribution to employment are the Forestry complex (30.3 percent), the Yerba Mate and Tea complex (25.8 percent) and the Bovine Dairy complex (10 percent). The first two have a high level of geographical specialization and industrial tradition. The Forestry complex is also one of the main exporters in the region and the country, with an industry based on the use of implanted forests. Along with other regions, given their strong local tradition, these industries are institutional references in the field production.

The Cuyo economy revolves mainly around viticulture (32.1 percent) and fruit and vegetable growing (18.5 percent). The Wine complex is included as a case study due to the economic restructuring strategy that was developed at the end of the nineties, which aimed for boutique consumption and designed actions to improve its competitiveness. The sector's activity is strongly promoted by the Argentine Wine-Making Corporation (COVIAR), which represents all the wine producing provinces, with a particularly strong presence in Mendoza and San Juan, as they are the main geographical basins in the country. Cuyo hosts 83 percent of the total employment in the country's wine complex. Other wine producing regions include the NW (mainly Salta) and Patagonia (Neuquén and Río Negro).

In Patagonia, the Fruit and Vegetable and Electronics complexes lead the employment rankings with 32.4 percent and 15 percent of regional employment, respectively. Since the 1970s, the electronics industry has been strongly encouraged in the province of Tierra del Fuego through special tax and customs incentives. These policies have resulted in the development of a complex that includes highly specialised consumer electronics firms and related products<sup>14</sup> (Porcelli and Schorr, 2015), which has hosted a large part of this industry within the country (28 percent of employment in the Electronics complex in the country is concentrated in Patagonia). Despite its earlier origin, the fruit-growing industry – particularly in the High Río Negro, Neuquén Valley and Middle Río Negro Valley – was also favoured by a regulatory framework that encouraged its growth, based on the investment in public infrastructure for irrigation.<sup>15</sup> However, in recent years, hydrocarbon exploration and extraction from non-conventional processes such as fracking has begun to compete for land use.

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14 Cellular phones, laptops, notebooks, tablets, digital photo and video cameras, monitors, GPS, 4G modems, TV sets, decoders, tuners, air conditioning equipment, various household appliances, air conditioning systems for cars, steering boxes, etc.

15 In particular, the Institute of the Lower Río Negro Valley (IDEVI), an autarkic entity that promotes industrial development in the Lower Río Negro Valley area. Its creation, at the beginning of the sixties, is linked to the agricultural and livestock planning of the region, associated mainly with infrastructure projects for irrigation. IDEVI was the main executor of the irrigation and electric power supply projects and economic planning of the Valley. In the seventies, it promoted a land colonization process through the allocation of plots to producers. The plots included levelled ground, irrigation infrastructure and housing.

Due to the high concentration of population in the Pampas region, some of the best performing complexes are Building Materials (17.3 percent) and Textiles and Clothing (9.4 percent), which are labour intensive. The Software complex has seen outstanding growth in the last few years, reaching the first position in terms of its contribution to employment (10.9 percent). Although it is present in several areas of the country, due to the growing demand for these types of goods and services, the Software complex is strongly developed in the Pampas region, where 95 percent of the country's employment in the software industry is concentrated.

The automotive and pharmaceutical industries – as well as the software industry – benefited greatly from industrial promotion policies that facilitated the installation of multinational companies and the development of a local SME network. At the regional level, these complexes account for 95 percent and 93 percent of the total employment in these industries within the country, respectively. Apart from the agricultural activities of the Pampa tradition, such as livestock rearing and grain growing, the Forestry complex stands out, particularly the wood and furniture industry, with 7.2 percent of employment. This segment is supplied by the wood from implanted forests in the NW forest basin.



### 3.

## SELECTING THE CASES

This study seeks to identify the existing employment and training agreements at the national and sectoral levels, the highly institutionalized activities and action plans that are in place, and the shortcomings of industrial activities or sectors in terms of their definitions regarding the promotion of employability. The selection of the cases was based on the concept of industrial linkages<sup>16</sup> and agglomerations of geographically concentrated companies (clusters) as elements which strongly influence the development and competitiveness of a region.

The methodology of this study included a step-by-step analysis. First, the country's industrial complexes were identified using a value chain approach, considering agricultural, extractive and industry-based activities. The complexes were surveyed and organized by region (Pampas region, NW region, NE region, Cuyo region and Patagonia region). A ranking was then created, which included the top five complexes in terms of their contribution to employment for each region, except for the Pampas region where ten cases were considered due to the high concentration of businesses in this area. Finally, one case was selected for the NE, NW, Cuyo and Patagonia regions, and two for the Pampas region.

For each case, an analysis was conducted on the configuration of the complex, the entrepreneurial profile, the public-private support network, and particular attention was given to the strategy for promoting employment and training both at the public policy level and for the activities led by the private sector and companies.

This study has identified 21 industrial complexes or clusters at the national level, on the basis of the activities covered by the Observatory of Employment and Business Dynamics (OEDE) of the Ministry of Labour, Employment and Social Security.<sup>17</sup> Due to limitations in access to the statistical database, in some cases the organization of the complexes includes more than one value chain. This is the case for fruit and vegetables, livestock (swine, cattle, and sheep), cereals and oilseeds, and yerba mate and tea.

<sup>16</sup> They are based on collaboration agreements between economic stakeholders, aimed at generating a competitive advantage. Thus they can develop activities whose outputs would not be achieved if they acted independently or in isolation, or which require great efforts that would not be justified on an individual basis. This interaction makes it easier to combine the processes of collaboration and competition by contributing to the growth of productivity and competitiveness with favourable effects on business and local profits. In turn, they generate processes of innovation, learning, and competitive advantages in individual and collective microeconomic areas, and they produce external economies which improve the efficiency and effectiveness of the participants, which translate into benefits that can be appropriated by companies and regions (Schmitz, 1997).

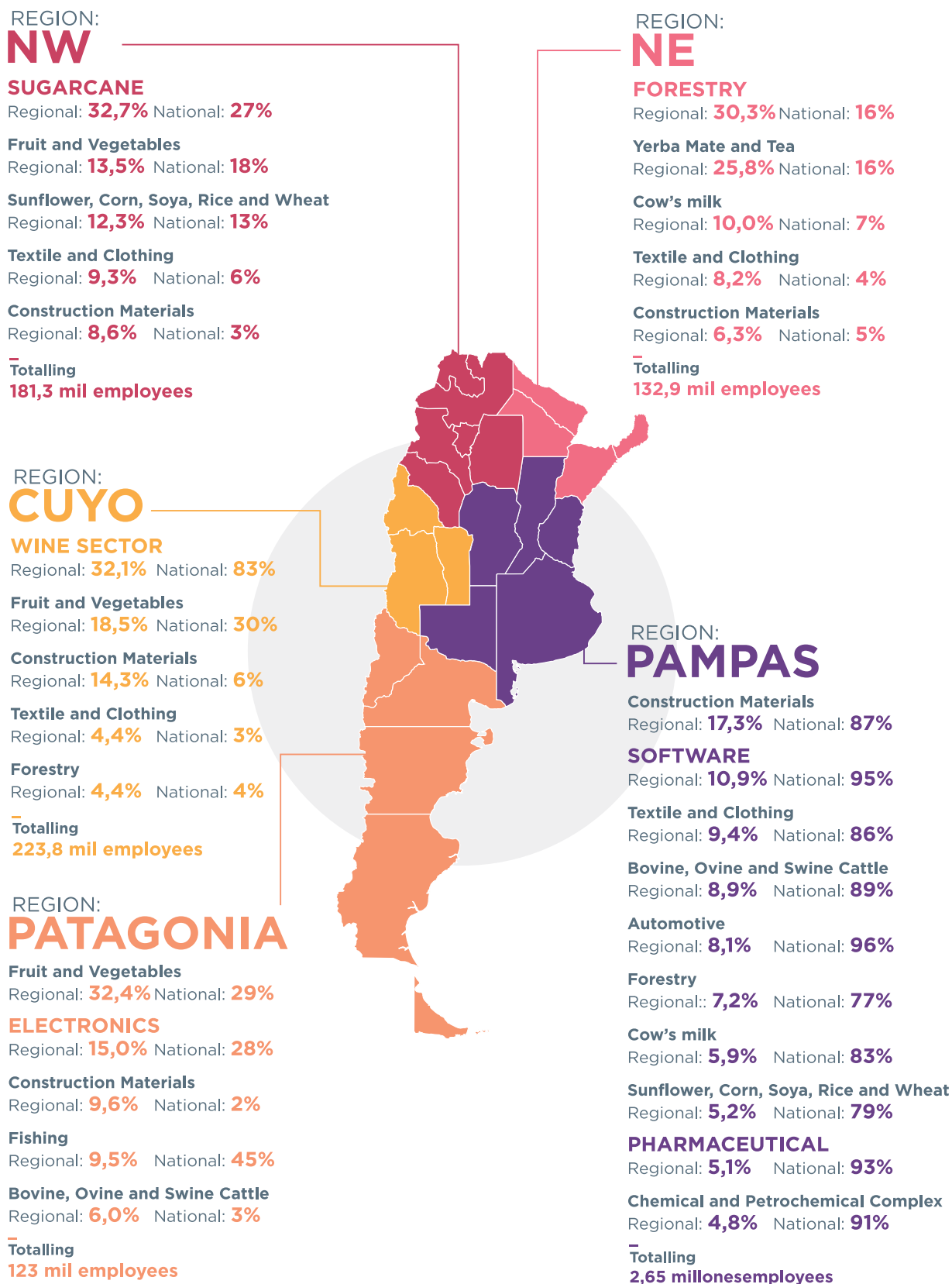
<sup>17</sup> This information refers to 2018, the latest public data available. The construction of the complexes was based on OEDE data using ECLAC as a reference (2015). See Methodological Annex.

Many of these complexes are made up of clusters comprising external economies and public-private cooperation that is typical of business clusters. It is easy to predict which of the regional complexes have the best performance, due to their long history and their degree of international insertion, such as the Wine complex in Cuyo or the Sugar complex in the NW. Others, which are more intensive in technology, such as the Software and the Pharmaceutical Industries (particularly biotechnology), have seen outstanding growth in the last few years, driven by industrial promotion policies, foreign investment, and highly qualified human resources, among other factors. Unlike these cases, which are strongly linked to the territory, complexes such as Construction Materials or Textiles and Clothing are located in different parts of the country, in the vicinity of urban centres.

Below please find the figure showing the top five industrial complexes per region. Those that were chosen for inclusion in this study are in bold font.

**FIGURE 1**

Production complexes per region based on registered private employment (Q1 - 2018)



**Source:** Observatory for Employment and Business Dynamics (OEDE) Ministry of Labour, Employment and Social Security



The cases chosen for the Cuyo Region (Wine complex), the NE Region (Forestry complex) and the NW Region (Sugar complex) are at the lead in terms of their contribution to employment, with equally outstanding performance in terms of foreign trade. They represent, respectively, 95, 100 and 66 percent of the complex's exports at the national level. The Forestry complex also recorded a 38.1 percent growth in its exports between 2016 and 2018, and the wine sector recorded a 7 percent growth in exports for the same period.<sup>18</sup>

The Software and the Pharmaceutical complexes were selected for the Pampas region, and the Electronics complex for Patagonia. Despite the fact that none of these complexes occupy the top position in terms of employment, or has an outstanding performance in terms of exports, they are of strategic importance with regard to their import substitution and technological development. In addition, they have achieved positive employment generation in at least two cases: between 2009 and 2018, employment grew by 103 percent in the Electronics complex and 10 percent in the Software complex.<sup>19</sup>

Another feature of some of these complexes is the strong participation of SMEs in the business network,<sup>20</sup> which in some cases, such as forestry, includes 11.7 percent of all SMEs in the country. Viticulture in Cuyo, for example, comprises 19.4 percent of the total number of SMEs in the region, 1.1 percent of the total number of SMEs in Argentina, and 88.1 percent of the total within Cuyo. The Pharmaceutical complex is another case of strong SME concentration at the regional level; 1.5 percent of all SMEs in the country belong to the Pharmaceutical complex, 99 percent of which are located in the Pampas region. At the Pampas regional level, 1.7 percent of all SMEs are in this complex.

The selection of these regional complexes also considered the existence of public-private coordination policies, whether through cluster development initiatives, local sectoral round tables, or other associations such as industrial parks. This feature reflects the maturity of the local institutional framework for development. The six selected regional complexes managed to institutionalise actions of this type and have had a strong influence on the planning processes. For the Forest complex, initiatives of this type have been concentrated in the provinces of Misiones and Corrientes, especially since the creation of the Productive Forestry Agglomerate of Misiones, Corrientes and the Association for the Strategic Industrial Forestry Plan of Corrientes (APEFIC), both of which have legal identity and focus primarily on the development of the timber segment. Although the Pharmaceutical and Software

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18 Data provided by INDEC for exporting complexes. See Methodological Annex.

19 OEDE. Ministry of Labour, Employment and Social Security

20 Analysis based on the National Innovation and Employment Dynamics Survey (ENDEI) of the Ministry of Labour, Employment and Social Security and the Ministry of Science, Technology and Innovation. See Methodological Annex.

complexes reach all provinces, in the Pampas region the analysis is focused on a biotechnology cluster in Santa Fe, which revolves around the National Litoral University, the National Scientific and Technical Research Council (CONICET), and the Litoral Technological Park. For the latter, the analysis focuses on the agglomeration of companies in Córdoba, which is largely represented by the Córdoba Technology Cluster.

In the cases of Wine and Sugar, although the institutions of reference are national, such as COVIAR and the Argentine Sugar Centre, both are strongly driven by the provinces that lead the production: Mendoza and San Juan in Cuyo, and Tucumán, Salta and Jujuy in the NW.

In Patagonia, the particular case of the Electronic Cluster of Tierra del Fuego is considered due to the regulatory framework for industrial promotion and the strong institutionality linked to the local delegation of the Association of Argentine Electronic Terminal Factories (AFARTE), the Tierra del Fuego Chamber of National Industry (CAFIN) and the Tierra del Fuego Industrial Union (UIF).



## 4. THE CASES

# THE FORESTRY CLUSTER IN MISIONES AND CORRIENTES

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Argentina has 3.7 million hectares of land available to expand forest plantations.





### LOCATION

Almost 70 per cent of forested areas in the country are located in Misiones and Corrientes.



### SECTOR STRATEGY

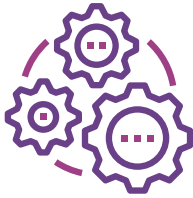
Integral use of timber to gain competitiveness and access to new markets.



### EMPLOYMENT

**14,756**  
registered  
private jobs.

## RELEVANT PUBLIC-PRIVATE ARTICULATION STRATEGY



Employment and training agenda with a focus on vocational training and skills certification.

Expanding the forested area will allow for an increased demand for the training of new workers. Chambers, companies, S&T institutions and public bodies are coordinating actions to define new profiles and certify skills.



### NEW SKILLS

Productive reconversion and mechanization. New skills to operate machinery or tools (for harvesting for example). Highly qualified profiles: forestry engineering, forestry expert, electronics, and electromechanics. Validated skills certification system.



### TRAINING PRACTICES

Exchanges and internships with technical schools. Training offered by the relevant business chambers.



### ENTREPRENEURSHIP

Training courses and promotion of self-employment for the wood construction segment.



### CORPORATE SOCIAL RESPONSIBILITY

Actions taken by large companies for the training of vulnerable youth and local communities.

## THE CLUSTER

The wood industry is mainly concentrated in Misiones and Corrientes, in the vicinity of the forest plantations. These provinces account for almost 70 percent of the forested area in the country.<sup>21</sup> There are two main activity hubs: the northern area of Misiones,<sup>22</sup> which hosts the more capitalised sawmills offering high value-added products and present in international markets, and the northern area of Corrientes,<sup>23</sup> where there are medium to large companies dedicated to the first stage of transformation of timber. Together, 14,756 registered private jobs are located in these provinces.<sup>24</sup>

## THE COMPANIES

The first stage in this activity is the sawing of logs, most of which come from implanted forests. Sawn timber is industrialised by the sector that makes wooden goods, transforming it into boards, floors, openings, boxes and other manufactured products.

The woodworking establishments in Misiones and Corrientes differ in size, depending on the business segment in which they operate. The companies which only produce sawn wood (first transformation) are usually SMEs, while the companies producing boards and remanufactures (second transformation) are large, and generally integrated into the forestry sector to reach economies of scale.

A large number of the existing sawmills are micro or small, usually informal establishments that lack adequate building infrastructure and automated technologies; therefore, their productivity is often low and they do not meet basic health and safety standards.

Unlike the micro and small establishments, the more capitalised sawmills have high levels of vertical integration with their own plantations, as well as the production of logs, sawing and remanufacturing, and in some cases agricultural and livestock production and timber construction.

## PUBLIC-PRIVATE PARTNERSHIPS

The policies aimed at the promotion of conglomerates or clusters in Misiones and Corrientes have helped achieve a high level of synergy between the public, private and scientific-technological sectors for the development of the sector and the

<sup>21</sup> Based on a total area of approximately 1,317,793 hectares in the whole country. Data for 2017. National Directorate of Industrial Forestry Development.

<sup>22</sup> Montecarlo, Guaraní, Eldorado, San Pedro, Gral. Manuel Belgrano, Iguazú.

<sup>23</sup> Capital, San Cosme, Itatí, San Luis del Palmar, Empedrado, Berón de Astrada, San Miguel, General Paz, Concepción, Saladas and Mburucuyá, Santo Tomé, Ituzaingó and General Alvear.

<sup>24</sup> According to OEDE estimates.

greater integration of enterprises. Some of the most outstanding activities include the Forestry Productive Cluster Foundation (APF) of Misiones – an initiative launched in 2007 within the framework of the Integrated Project of Productive Clusters (PITEC) of the National Agency for Scientific and Technological Promotion – and the Association for the Strategic Industrial Forestry Plan of Corrientes (APEFIC) created in 2012, which resulted from a provincial policy aimed at promoting the competitiveness of the local economy.

Business chambers play a central role as a vehicle for the demands and concerns of the private sector in this coordination. At the national level, the complex is represented by the Argentine Federation of Wood and Related Industries (FAIMA), while the provinces have two main chambers: the Sawmill and Related Wood Association of Alto Paraná (AMAYADAP) in Misiones, and the Association of Producers, Industrialists and Foresters of Misiones and Northern Corrientes (APICOFOM).

These chambers foster training and capacity building activities based on sectoral agreements, specific needs or requests from partners, and funding opportunities. Budgetary restrictions are often a constraint when it comes to paying for courses or internships, and in many cases public programmes are the way to advance the work agenda. A large proportion of the resources currently come from the Sustainability and Competitiveness Programme, which is partially financed by the Inter-American Development Bank<sup>25</sup> and reaches the local chambers through FAIMA, the federal chamber.

## STRATEGY AND ACTIONS TO PROMOTE EMPLOYMENT AND TRAINING

In 2019, the Strategic Forestry and Industrial Forestry Plan 2030 was introduced at the national level, setting the main guidelines for the sector, based on the participation of public and private institutional stakeholders. In Misiones and Corrientes there have also been different planning activities aimed at improving the competitiveness of the cluster,<sup>26</sup> where decisions have been made regarding human resources, the necessary skills for the development of the activity, training and education needs.

The great challenge posed by this activity is gaining profitability from the integral use of timber. Advancing in the industrialisation of timber would allow Argentina to enter new markets with a more diverse array of products. The cluster also has huge potential in the field of bioenergy. The generation of energy from forest biomass and the development of by-products based on wood waste such as pellets or briquettes

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<sup>25</sup> The Programme is under the sphere of the Ministry of Agriculture, Livestock and Fisheries.

<sup>26</sup> Some of the most outstanding are the Plan for Improving Competitiveness of the Forestry Productive Agglomerate Foundation (2007) and its update (2010), the Strategic Industrial Forestry Plan for Corrientes (2013).

are a green alternative for industries interested in making their production more efficient.

In Corrientes in particular, a large number of establishments are concentrated in the first transformation stage and even the smallest firms lack the basic technology to improve productivity, as is the case with wood yards. Larger establishments also require the incorporation of technology, especially mechanisation, to improve their productivity. This in turn means that people's skills need to be updated so they can operate the equipment, mainly at production plant level. Yet the skills required are transversal, related to the ability to solve new problems. Job rotation is very frequent within firms and it requires a willingness and commitment to learning.

The local chambers of commerce conduct a large portion of the training activities. The programmes offered are usually agreed upon by the partner firms at the beginning of each year. However, employers say that the most effective training is that which takes place in the workplace, especially at the plant level. This is because the machinery used is often imported and few firms are able to access the equipment.

It is the suppliers that train the employees to use their technology, whether on-site at the plant or at their headquarters. Brazilian equipment is often purchased because of its proximity and the greater possibilities it offers in terms of after-sales services. Training is maximised by means of internal transfer through responsible-assistant programmes. In general, the machinists rotate between the different positions, and they can each operate all the different posts of the plant.

Other sources of training include the Misiones Wood Technology Centre and the Centre for Productive Training (CECAP) in Corrientes, which is mainly aimed at training machinists for the different occupational profiles. One of the most innovative activities is the provision of training in mechanized forest harvesting via virtual simulators. Regarding higher education, the most recognized institutions are the School of Forestry Sciences of the National University of Misiones (UNAM) and the National University of the Northeast (UNNE) in Corrientes. The most senior staff are generally trained in the area, at UNAM or UNNE if they specialise in forestry. The most in-demand training for the industry is in the area of forestry engineering, electronics and electromechanics. The business chambers offer professional training courses as well as general courses in forestry administration. There is also a significant offer for training in timber construction as a way of promoting entrepreneurship.

A great effort has been made in recent years to design and update job skills, certifying the portfolio of work<sup>27</sup> with the support of technical institutions, trade unions and business associations. Effort has been made since 2004 towards the development of

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<sup>27</sup> At the national level, the Ministry of Labour, Employment and Social Security is responsible for the implementation of regulations and protocols.

protocols for the standardization of work roles and the establishment of parameters for the evaluation and certification of skills. In general, companies have been very open to this initiative and in many cases they promote the evaluation of their employees and applicants (Peirano, 2012).

Another element that favours decent employment within the forestry industry is the system of green production certifications. There are two international certifications in Argentina: the Programme for the Endorsement of Forest Certification (PEFC) and the Forest Stewardship Council (FSC), which have been adopted by some of the largest companies in the sector as a result of the growing demand for product traceability in foreign markets such as the USA, the EU, Australia and Japan. More than 40 percent of the land surface of Argentina is covered with plantations certified by both seals (Industrial Forestry Competitiveness Board, 2019). These certifications include aspects related to gender equality, decent work, integration of native communities and local development.





## SOME EXPERIENCES



### Arauco Group

The ARAUCO group is a Chilean global company with business in all aspects of the industrial forestry chain (forestry, cellulose, timber, panels and energy). In Argentina, it has 1,800 direct employees, and a total of 4,000 workers including outsourced services, contractors and service providers. It has plants in Misiones (Puerto Esperanza and Puerto Piray), Buenos Aires (Zárate) and Santa Fe (Rosario).

It offers several global proposals for the promotion of youth employment, such as a Young Professionals Programme, with specific training and skills activities, and others directed at training in transversal skills.

Part of their work also involves the development of the communities living in the areas where their plants are located. In Puerto Esperanza, for example, one of the most widespread initiatives is part of the Sustainability and Youth Programme which trains young job seekers. They hold specific workshops based on the demands of the industry, and at the end of the training, they evaluate and certify the participants' skills, hiring those who have had the best performance at the end of the process. ARAUCO manages these activities in coordination with the Ministry of Ecology of the Province and the local employment office.

Furthermore, it has been providing support to the scholarship programme for secondary, tertiary and university students for some years now. The programme involves a financial contribution and the pairing with tutors who follow up on the students and provide academic support. The programme also includes beneficiaries from the Guarani communities.



## Pindó S.A.

Pindó is a family business specialising in agriculture and forestry with more than 40 years of experience, and it has 300 direct employees. It is based in the town of Puerto Esperanza, north of Misiones. The company supplements the timber business with the production of yerba mate and the generation of energy from forest biomass.

It implements several initiatives for the promotion of youth employment together with business chambers, educational and science and technology institutions.

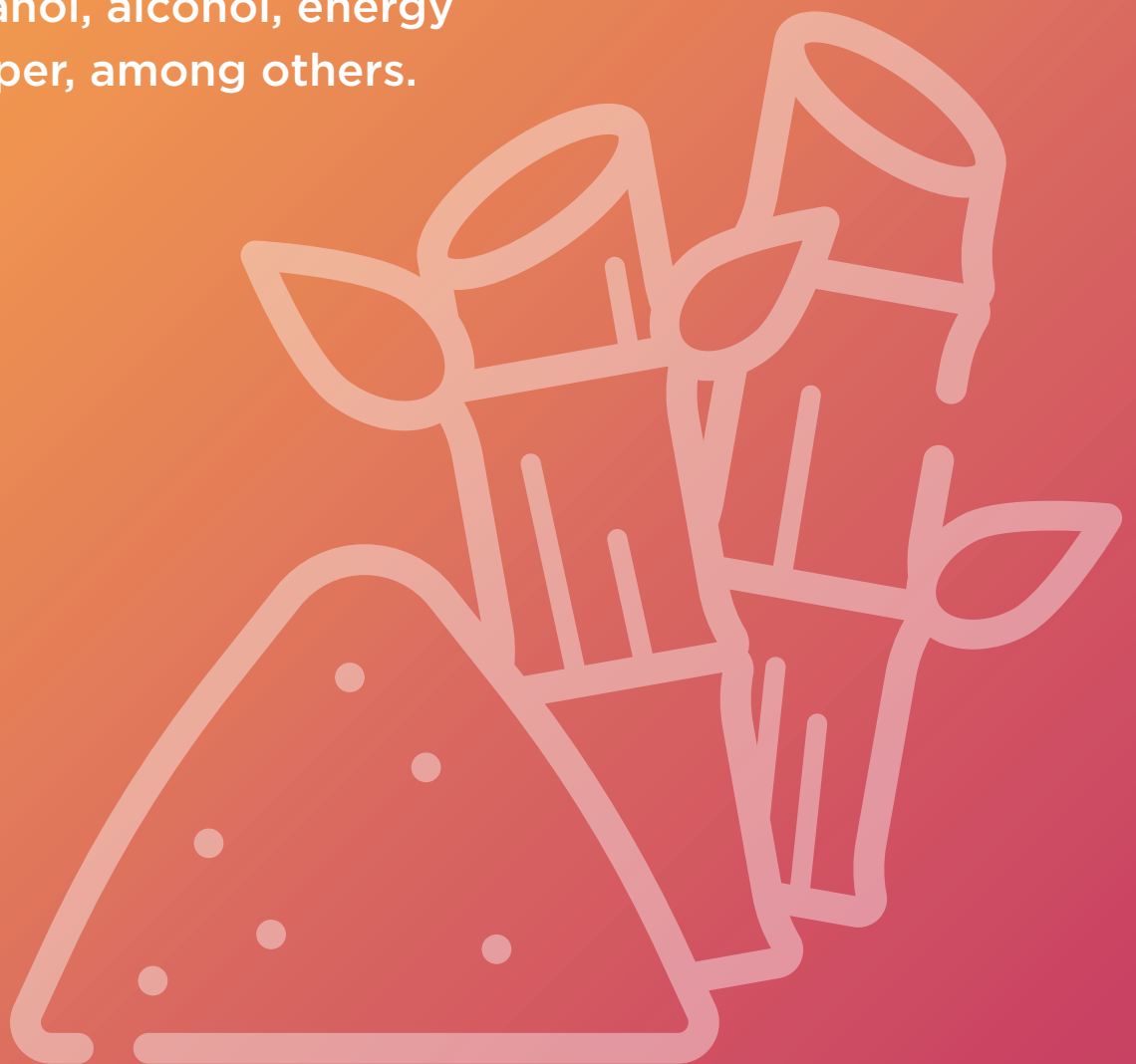
It runs an internship programme in coordination with the Línea Cuchilla Institute, an agricultural-technical school for secondary and tertiary education. The internship scheme allows the company to recruit the best professional profiles once the students have completed the course. In addition, it promotes the continuous training of employees, participates in the design of the training offer of AMAYADAP, and it facilitates attendance to courses and training programmes. At the university level, together with the UNAM it has created a job pool for forestry and electronic and electromechanical engineering students. Pindó's employees are usually local to the area; priority is given to local personnel due to the type of specialisation required. There are also exchanges with Brazil for highly qualified positions.

As far as research, development and innovation (R&D&I) is concerned, it seeks partnership agreements with technical institutions to train researchers inside the company. At present, it has fellows from the National Institute of Agricultural Technology (INTA) working in the nursery area.

# NORTHWEST ARGENTINA SUGAR CLUSTER

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The sugarcane industry yields products such as sugar, bioethanol, alcohol, energy and paper, among others.





### LOCATION

99.5 per cent of the sugar cane is produced and processed in the provinces of Tucumán, Jujuy and Salta.



### SECTOR STRATEGY

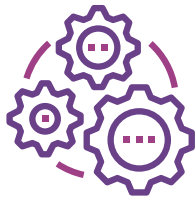
A productive reconversion supplemented by policies aimed at promoting the use of biofuels and energy efficiency.



### EMPLOYMENT

**90,524**  
registered  
private jobs.

### RELEVANT PUBLIC-PRIVATE ARTICULATION STRATEGY



**Agenda led by the private sector.**

The employment and training actions aimed at young people are planned by the companies, acknowledging the need for tighter coordination with the public and education sectors, and S&T institutions.



### NEW SKILLS

Technological updates require new profiles such as health and safety, environmental, chemical and mechanical engineering.



### TRAINING PRACTICES

Career plans for young professionals. System of university internships and training for factory workers.



### ENTREPRENEURSHIP

Promoting the involvement of young people in sugar cane cooperatives. The generational relay sheds a new light on the activity and favours the creation of a sense of belonging.



### CORPORATE SOCIAL RESPONSIBILITY

Capacity building programs for the world of work. Bridging the digital divide. Training in trades in coordination with middle schools.

## THE CLUSTER

Sugar-related activities have a significant impact on the agro-industrial production of the Northwest, both in terms of employment and income generation. 99.5 percent of the country's total sugar production is concentrated in the provinces of Tucumán, Jujuy and Salta and it generates around 90,500 registered private jobs.<sup>28</sup> The production is geared towards satisfying the demand of the domestic market, with exportable balances that vary from one year to the next, depending on weather conditions and international prices.

## THE COMPANIES

The sugar value chain includes primary and harvesting production, industrial processing, refining, and derivatives. In addition to the production of sugar and bioethanol, the production processes yield by-products such as alcohol, energy and paper.

Regarding the distribution, Tucumán represents 64.3 percent of the activity with a large relative number of agents in each of the stages of production: 6,357 sugarcane growers and 15 mills. There is a large number of small producers with less than 50 hectares coexisting with large producers who cover 25 percent of the land and mills with 50 percent of the land.<sup>29</sup> In turn, in Salta and Jujuy there are two and three mills, respectively, owned by large, integrated production companies that own 95 percent of the sugarcane they process. The transformations in the production process, essentially the complete mechanisation of the harvest, have reduced the demand for manpower in the sugar chain over the last three decades. The process of technological reconversion in the industry has shown positive effects in aspects such as the quality and diversification of the production, a greater regularisation of labour relations in the sector, and the minimisation of its environmental impact.

The rising global trend in agricultural production in general, and of sugarcane production in particular, is closely linked to the continuing advances in biotechnology (Anino and Pizzo, 2017). Economic transformations and vertical integration lead to an increase in industrialization where machinery suppliers, transgenic seed producers and suppliers of chemical products become increasingly relevant. The sector's greatest area of growth is in renewable energies, biofuels and the efficient use of waste, which is why the sugar sector is beginning to have stronger links with energy and paper companies.

<sup>28</sup> Based on data from ODE (2018) for direct registered private employment.

<sup>29</sup> According to the Report on value chains: Sugar, Pablo Anino and Florencia Pizzo, Publication of the Ministry of Public Finance of the Nation, 2017

## PUBLIC-PRIVATE PARTNERSHIPS

The business sector is represented by the Argentine Sugar Centre, one of the oldest trade unions in the country.<sup>30</sup> It deals with matters related to the production and marketing of cane sugar, and highlights the sector's importance for the region's for the economic development.

The large agro-industrial complexes located in Salta and Jujuy have developed from a highly competitive business profile in renewable energies, value-added sugar and paper, using international standards to report their economic, social and environmental performance. Ledesma and Seaboard's sustainability reports are drawn up under Global Reporting Initiative standards.<sup>31</sup> These companies hold several international quality and sustainability certifications, some of which are focused on their contribution to quality employment and community development, the principles that underpin their human resource strategies.

Given the diversity of the stakeholders in Tucumán, there is greater involvement by the public sector. In 2013, the government of the province established the Tucumán Sugar and Alcohol Promotion Institute (IPAAT) to regulate the supply to the domestic market and control the province's sugar surplus.

Over the last eight years, the National Ministry of Agriculture, Livestock and Fisheries implemented a programme aimed at improving the competitiveness of the sugar sector in the NW (PROICSA).<sup>32</sup> It was a comprehensive activity based on the creation of incentives for the production of bioethanol within a framework of environmental and social sustainability, including support for small-scale sugarcane producers and their organizations.

The management of this programme included the design of a network of supporting institutions involving the Ministries of Production of the provinces of Tucumán and Jujuy, the National Institute of Agricultural Technology, the Union of Independent Sugarcane Producers of Jujuy and Salta (UCIJS) and the Obispo Colombres Agroindustrial Experimental Station (EEAOC).

## STRATEGY AND ACTIONS TO PROMOTE EMPLOYMENT AND TRAINING

The main challenge facing the sugar sector lies in the technology used within the links in the chain, whether for primary production or in the industrialization process;

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30 It was founded in 1894.

31 These reports also constitute the annual Communication on Progress, which is part of the commitment to the 10 Principles of the UN Global Compact.

32 The PROICSA programme was implemented by the National Ministry of Agriculture, Livestock and Fisheries for a total amount of US\$140 million in external funding.

in this sense, there have been some initial efforts to incorporate innovations, which come together with the generational turnover. Gender issues have also begun to be considered, as there is still a wide gap in employment opportunities.

One of the most significant transformations that the sector has undergone in the last decade is the mechanization of the harvest, which has had a strong impact on employment.<sup>33</sup> In order to mitigate this impact, the sugarcane cooperatives of Tucumán have worked to strengthen their social and organizational structures, developing services and adding value from an integrated perspective involving the inclusion of women and young people. In close cooperation with science and technology programmes and institutes,<sup>34</sup> young people have received training for the improvement of sugarcane fields through soil management, seed genetics and a better use of the Technology Park.

On an industrial scale, the transformation is focused on innovation through processes aimed at increasing production capacity and adding value within a framework of sustainable development, which is increasingly oriented towards waste management and the generation of clean energy. For this reason, companies are interested in including and training professionals and experts for the different stages of the sugarcane industrialization process, especially chemical, environmental, mechanical and electronic engineers. For this purpose, companies usually enter into framework agreements for internships at universities. In turn, they also acknowledge the need for better qualified factory workers and in this sense, companies point out the importance of having a more dynamic coordination with the technical schools located close to the sugar mills.

Together with the incorporation of state-of-the-art equipment and machinery, the supplier companies have provided training for the technical professionals and operators in the use of new technologies.



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<sup>33</sup> It is estimated that each harvester replaces 150 seasonal workers, according to data from the Ministry of Economy and Public Finance (2011).

<sup>34</sup> Training courses for rural youth offered by EEAOC and the Experimental Agricultural Station INTA Famaillá within the framework of PROICSA.

## SOME EXPERIENCES

### Ledesma

Ledesma is the largest agro-industrial company in the sector, with 110 years of experience. It leads the production of sugar and paper and has a significant share in the alcohol and bioethanol markets. The Ledesma Agro-industrial complex is located in Jujuy and employs more than 5,000 people, of which almost 60 percent are employed directly by the company, while the rest are temporary positions depending on the seasonality of the production.

The company has several lines of action to promote youth employment, ranging from activities to stimulate employment and employability in the local community, to a training programme for young professionals aimed at filling management positions within the company.

As part of the company's social responsibility policy, it implements some capacity and skill-building programmes for the world of work, with a focus on employing young people and bridging the digital divide. Since 2012, it has been implementing an innovation and technology programme, which offers free technological training tools in three of its own centres located in towns near the Ledesma Agro-industrial Complex. Every year, it offers 1,900 openings for more than 160 courses in a variety of fields, ranging from basic computer skills to collaborative work, applications for 3D design and printing, augmented and virtual reality, robotics, programming and mathematical games, among others. Along these lines, it runs another programme in partnership with a technical school aimed at expanding the access to job opportunities for young people through training in trades (home electricity, sanitary installation, blacksmithing and carpentry). This initiative was launched in 2015 and it is estimated that nearly 900 young people have already participated in it.

Ledesma offers professional learning opportunities in the company, under an internship programme in coordination with five technical and agro-technical schools. The participants do their internships at the different facilities: factories, laboratories and on the field. The programme seeks to encourage young people to develop sustainable economic projects. More than 2,800 young people have participated in the programme since it began in 2014.

Likewise, as part of the company's human resource strategy, it has a programme aimed at young professionals who, after gaining an overall perspective of the company, can be trained for managerial and executive positions.



## Leales Sugar Mill

Leales Sugar Mill is one of the companies that belong to the Budeguer Group. The Ingenio Leales Agro-industrial Complex is located 50 kilometres from San Miguel de Tucumán, and it produces nearly 90 thousand tons of refined sugar and 20 million litres of alcohol per year for the food and beverage industry. The factory employs approximately 400 people between permanent and temporary staff.

Over the last ten years it has been investing in technological modernisation, and this has allowed it to double its industrial capacity. This transformation has required more technically specialised human resources.

The company has a framework agreement for internships with the National University of Tucumán aimed at training young professionals, especially with the School of Exact Sciences and Technology (FACET), which allows for the recruitment of advanced students in chemical, mechanical and electronic engineering; and with the School of Economics for administrative positions. The aim of the company is to hire the interns after they have been trained.

Many of the young people who join the company as factory workers are graduates from the Technical School of Villa Leales. Although there are no formal collaboration agreements, the company is making progress in managing an internship system.

# SANTA FE BIOTECHNOLOGY CLUSTER

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The first university  
spin-offs with a focus  
on biotechnology in  
the country.





### LOCATION

Santa Fe concentrates about 16 per cent of the biopharmaceutical companies in the country.



### SECTOR STRATEGY

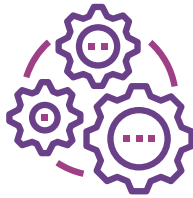
To advance in the value chain by supporting R&D&I activities, articulating with public and private investment bodies, and through cooperation between companies.



### EMPLOYMENT

**2,125**  
registered  
private jobs.

#### RELEVANT PUBLIC-PRIVATE ARTICULATION STRATEGY



**Alliance for the generation of self-employment and entrepreneurship.**

The National Litoral University, the Technology Park and CONICET are part of an entrepreneurial ecosystem that promotes scientific knowledge and technology transfer.



### NEW SKILLS

Strong boost to degrees in the field of biotechnology. Need for training in business and management to improve the management of enterprises and the marketing of science-based products and services.



### TRAINING PRACTICES

Internship systems. Coordination of job searches and training practices between universities and companies. Demand for public instruments to support employment and training.



### ENTREPRENEURSHIP

University, Technology Park and CONICET manage actions for the incubation and development of biotechnology companies.



### CORPORATE SOCIAL RESPONSIBILITY

Coordination with public programs for the employment of young people who have not completed secondary education. Support for the completion of studies.

## THE CLUSTER

The city of Santa Fe is home to a cluster of technology-based firms associated with the National Litoral University (UNL), CONICET and the Central Litoral Technological Park (PTLC), a business incubator specializing in biotechnology, particularly medical and veterinary supplies. There are also other bio- and nanotechnology companies in the area, which are not located in the Park but maintain close links with the University and the PTLC. Overall, this biotechnological cluster groups around ten biopharmaceutical companies (16 percent of the total number of biopharmaceutical companies in the country) (Gutman and Lavarello, 2014).<sup>35</sup>

## THE COMPANIES

The origin of the cluster dates back to the establishment of the Zelltek company at the beginning of the 1990s, the first spin-off from a state university in the country. It began in the Cell Culture Laboratory of the School of Biochemistry and Biological Sciences, which had recently started operating and which provided the facilities and equipment necessary for the initial developments.<sup>36</sup> It received funding from the European Union, the Argentine biotechnology company PC-GEN,<sup>37</sup> and the province provided loans at a subsidized rate.<sup>38</sup> The success of this company is largely due to the identification of a gap in the Argentine pharmaceutical industry, namely the culture of animal cells for medicines in a more lax regulatory context than the current one regarding intellectual property, which facilitated the production and marketing of these developments<sup>39</sup> (Gorenstein and Gutman, 2017). It then started working on a platform of recombinant human proteins (erythropoietin or EPO) aimed at designing biosimilar products.

Another key element for the development of the cluster was the establishment of the Technology Park in 2002. The University and CONICET promoted this initiative together with the government and the business chambers, with the aim of replicating Zelltek's experience.<sup>40</sup> Zelltek moved to the Park on the year it was founded, and it is still operating as part of Amega Biotech, one of the main economic groups in the country's pharmaceutical industry.

<sup>35</sup> According to OEDE estimates, the Santa Fe pharmaceutical industry generates 2,125 registered private jobs.

<sup>36</sup> The company's first project was the development of a platform for the production of recombinant human proteins (erythropoietin or EPO) for the pharmaceutical market.

<sup>37</sup> It is a firm incubated by the Institute of Biomedical Research of the Pablo Cassará Foundation.

<sup>38</sup> In 1993, it was granted a provincial credit for the purchase of equipment under the Santa Fe Technological Innovation Act.

<sup>39</sup> In Argentina it was possible to patent processes until 1995, when the legislation changed. For this reason it was legal to produce biosimilars of patented products with a different process.

<sup>40</sup> The PTLC is a state-controlled company. It comprises the scientific-technological sector (CONICET and UNL), the provincial government of Santa Fe and the Municipality of Paraná, and the private sector through the General Economic Confederacy (CGE) and the General Industrial Confederacy (CGI).

The Park offers infrastructure and services that vary according to each business venture's stage of development. It currently has about 20 companies in operation, mostly SMEs, more than half of which specialise in biotechnology and human health. The companies have the profile of university start-ups, with small structures, highly trained human resources – with undergraduate and postgraduate degrees – as well as a strong connection with the scientific-technological sector and facilities for coordination.

Access to public funding for start-ups is a common feature. In many cases, these developments require a substantial initial investment. The Park's business model is based on innovation and adaptability, with products that adjust to the specific needs of national and international markets. The entrepreneurs concentrate their activities on the scientific-technological aspects and they therefore lack knowledge in the field of business management.

## **PUBLIC-PRIVATE PARTNERSHIPS**

The cluster is developed within the framework of an entrepreneurial ecosystem where the University and CONICET provide the scientific training and the skills required by the industrial sector, as well as the laboratories for research and development. The UNL also trains future entrepreneurs through employment and entrepreneurship promotion programmes, while the LTP facilitates the incubation and development of companies established on the basis of training from the University and CONICET. This system in turn feeds back into employment among the workers educated at the University and in the province. The success of this coordination is largely due to the close work and trust developed not only on the basis of common interests but also as a result of using a shared space. The Park is located in a plot that belongs to CONICET, adjacent to the university city.

The University has a long history of links with the private sector as a provider of technological services to third parties, although it was only in the 1990s, after the creation of the Centre for the Transfer of Research Results (CETRI), that it was able to centralise the demand and organise its management. In the early 2000s, within the context of a significant economic crisis, it launched the Entrepreneurship Programme and shortly after that the First Job Programme for students and graduates of the different schools.

The work done at the University supplements that of the Park, which, in addition to providing the physical space and services for the incubation or establishment of companies, functions as a Technology Link Unit through which it is possible to manage projects using public subsidies. This provincial and national funding results

from a regulatory framework aimed at promoting biotechnology dating back to the<sup>41</sup> mid-twentieth century, which allowed, among other benefits, the creation of a Fund to Encourage New Enterprises in Modern Biotechnology, with resources from the national treasury and other contributions from international organizations.

The government of Santa Fe, in particular, has a history of early support to the sector, starting with the design of credit instruments that facilitated the incubation of companies such as Zellteck. In recent years, it included this technological hub in its Provincial Strategic Plan and it funds a large part of the Park's activities and companies. However, this public funding is not sufficient to cover the costs of validating the drugs and launching them into the market, where the private sector is usually the main investor. In many cases this means that there are asymmetrical relationships along the chain, based on alliances coordinated by transnational companies (Gutman and Robert, 2016).

## **STRATEGY AND ACTIONS TO PROMOTE EMPLOYMENT AND TRAINING**

One of the main challenges facing this cluster is bringing together companies which have the capacity to market the developments. This requires support for training and research, coordination with public and private investment bodies, and cooperation between companies to advance in the value chain. The latest strategic plan drawn up by the Park emphasises precisely the need for greater business development based on the synergies between the group of entrepreneurs and the scientific-technological system, as well as the identification and retention of talent in technology-based companies. Thus, it promotes not only entrepreneurial activities at the initial stage but also coordination with strategic private partners (parks, established companies), investment funds, public support programmes, etc.

There are several actions aimed at promoting employment and entrepreneurship, which vary in nature depending on whether they are related to the UNL, the Park or the CONICET. There are three such major initiatives at the University: the Entrepreneurs Programme, the First Job Programme and the CETRI, which offers services to companies with some degree of development.

The Entrepreneurship Programme has been in place at the University since the beginning of the 2000s. However, the actions to connect and advise on projects in the embryonic phase had already started in the 1990s. Its main areas of work are education and training, technical assistance and dissemination within the community. In terms of education and training, the programme works with the entrepreneurial divisions at the different schools, conducts training based on specific demands,

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41 Mainly Law No. 26.270 passed in 2007.

establishes links with companies and chambers, and offers summer courses for entrepreneurs which are open to the whole community. Other more recent initiatives include opening liaison offices in municipalities in the province, launching a specific training programme aimed at women entrepreneurs and a postgraduate course for UNL faculty to train trainers in entrepreneurial skills. In addition, the programme organises lectures and training for secondary schools. In the field of technical assistance, the most widespread tool is the entrepreneurial office, which offers a space at the university and guidance to start up a project idea. It also liaises with the government, business chambers and other academic institutions in different incubation spaces such as the Technology Park and offers mentoring services with experts and more advanced entrepreneurs. Part of the dissemination tasks are carried out by the UNL entrepreneurial community initiative, which organises international conferences for young entrepreneurs, called the Innovation Capital Forum, to bring together investors, lectures in schools and presentations to companies.

The UNL also manages a set of job placement activities through its First Job Programme, which coordinates internships, organises job fairs and postgraduate courses to link students and graduates to companies, provides advice on preparing CVs and presenting them at job interviews, and channels job searches through a virtual employment portal. Although this programme is not formally linked to the Park, biotechnology companies tend to use the University's employment portal to hire staff.

These programmes are complemented by the activities of the CETRI, which provides technological services for third parties. It also acts as a Technology Link Unit to enable companies to gain access to credit and public funding and offers intellectual property registration services. The Park itself functions as a Technology Link Unit for incubated companies, along with offering infrastructure and installation services.

The companies that move their operation to the Park also support the entrepreneurial promotion activities between UNL researchers and CONICET. In many cases they offer financial aid for education or projects which are in their initial stage, either independently or through the University's Sponsorship Programme, which consists of a monthly contribution to improve the quality of educational services. They also often recruit their employees from the University's employment portal.

Business owners generally agree on the importance of the University for human resource training and support to entrepreneurship. Many of the companies incubated in the Park have been developed by UNL students and graduates under the Entrepreneurship Programme. In many cases the PTLC is considered to be a continuation of the work initiated by the University.

## SOME EXPERIENCES



### Zelltek

Zelltek was the first company to be developed in the UNL's Cell Culture Laboratory at the beginning of the 1990s, and then to be based in the Park. It specialises in the development of biosimilar products for human health. Over the years it fostered alliances to maximize investment with other start-ups; in 2006 the regional company Amega Biotech entered the scene and it finally acquired Zelltek's entire share package in 2008.

Its work team was a key aspect for the company's success. Zelltek's R&D&I area is integrated by researchers, students and fellows from the UNL and CONICET. In 2016, around 70 percent of the employees in this unit had a university degree (mostly awarded by the UNL) and more than 40 percent had completed postgraduate studies, with a doctorate degree or one in progress. Zelltek's work cannot be separated from that of the University, in fact the company continues to work within the University's LCC, apart from having two plants in the Park.

The UNL and Zelltek have signed several collaboration agreements in recent years to strengthen the work aimed at creating new bonds with the private sector and improving the education offered by the University.

Since 2009 the company has been part of the UNL Sponsorship Programme and it makes monthly contributions to fund R&D&I, teaching and university extension activities.





## Lipomize

Lipomize is a company that entered the Park's incubator in 2012 and is now at the preliminary stage. It develops technology and liposomal products for the pharmaceutical, cosmetic and food industries. It has 14 direct employees, most of them UNL graduates. Lipomize sells products and services within the country and it also exports to Uruguay, Ecuador, Spain, Germany, India and China.

The UNL played a key role in the development of the company. The founding partners met during a conference for Young Entrepreneurs at the University in 2010 and from that moment on they gained access to a work office and then moved to the Park's incubator.

The company is still closely linked to the University, is part of the Sponsorship Programme, has fellows, and hires staff in coordination with the First Job Programme.

It also coordinates job searches with the Municipal Employment Office and national employment promotion initiatives. The current administrative staff was hired by the company within the framework of the Ministry of Labour's Job Placement Programme, which offers economic support to the company by covering part of the salary during the first months of the contract. In this case, the employees are young, recent secondary school graduates.

Lipomize is also part of Linkyou, a network co-financed by the EU's Erasmus Programme, which brings together the industry, academics and students from Latin America to promote employability among young people.

# CÓRDOBA SOFTWARE CLUSTER

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The Córdoba ICT hub is one of the most prominent ones in Argentina.





### LOCATION

There are more than 300 companies in the capital city and in the main urban centres.



### SECTOR STRATEGY

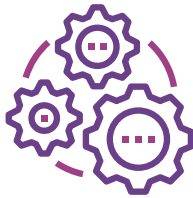
Development of new markets to meet the increasing demand for software and IT services.



### EMPLOYMENT

**7,184**  
registered  
private jobs.

### RELEVANT PUBLIC-PRIVATE ARTICULATION STRATEGY



Promotion of IT talent to encompass the growth of the industry.

Universities, clusters and public policy programs coordinate training and job placement actions. There is an unsatisfied demand for 4,000 jobs in software.



### NEW SKILLS

New digital skills. Training of programmers starting at the secondary education level. Updating the educational curricula for software development as a new field of study. Emphasis on soft skills training.



### TRAINING PRACTICES

Close coordination with public employment policies to implement training practices in the workplace. Extensive internship system. In-company training and coordination with universities.



### ENTREPRENEURSHIP

Universities and clusters take actions to promote entrepreneurship. Presence of university spin-offs.



### CORPORATE SOCIAL RESPONSIBILITY

Programs with an emphasis on the insertion of women in the workforce. Training in programming starting in secondary school.

## THE CLUSTER

The Software and IT Services cluster has a long history in Córdoba related to the dissemination of technology within the province's economic system. It is made up of SMEs and transnational companies developed in line with the industry promotion policies and specialised knowledge of the universities. Its main hub is located in the city of Córdoba, and there are also development companies in other large urban centres such as the city of Villa María. In 2018 the cluster created 7,184 registered private jobs.<sup>42</sup>

## THE COMPANIES

Although the origins of the industry date back to the 1970s, its most dynamic cycle began in 2001, during the post-convertibility period, with the dissemination of a regulatory framework that facilitated the installation of the first TEs, encouraged by a competitive exchange rate. Motorola, Intel, EDS (currently Hewlett-Packard Enterprise Services), Gameloft and Indra were the five Software and IT Services Transnational Enterprises (SSI TEs) that set up branches in Córdoba, and received benefits such as salary subsidies, tax relief, scholarships for worker training, and real estate granted in commodatum, among others.

This boost to the establishment of global companies was later supplemented by the extension of tax benefits for SMEs, especially after the establishment of the Córdoba Technology Cluster (CTC), the main network of firms and universities linked to the industry in the province. The Cluster became a point of reference for the sector. Its institutional structure later became a wide network of clusters and hubs scattered around the country, replicating its first steps. It currently acts as a technological linkage unit and offers advisory, training, networking and entrepreneurial promotion services (INCUBA Cluster).

In this industry, large companies coexist with small enterprises that developed due to the low initial investment required in terms of infrastructure and equipment. Along with other areas of the country, Córdoba has seen a considerable growth of its business fabric. While in 2001 there were 30 registered companies, there are currently more than 300 firms associated with this cluster alone. These companies have a markedly innovative profile based on highly qualified human resources educated in the universities of the province. Many of these companies are incubated in the universities themselves, which provide support for their initial development.

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42 According to OEDE estimates.

## PUBLIC-PRIVATE PARTNERSHIPS

The growth of this industry in Córdoba has been closely linked to the development of the Córdoba Technology Cluster, to the local scientific and technological capacity – especially since the creation of the Córdoba Institute of Technology (ITC), dedicated to software-related education – and to the provincial and then national public policy that provided the regulatory framework and economic support for the development of the activity.

The CTC is the main driving force behind the industry's business development policy. It is the result of the initiative of a small group of companies in the province which created this network in 2001 to strengthen the SME sector in response to the installation of multinational companies, in a context where clustering theories were beginning to take on some relevance in the country. The CTC was also the main promoter of the Córdoba Institute of Technology, together with six public and private universities; this resulted in the creation of a technology laboratory, of undergraduate and postgraduate courses, and the first agreements for the development of R&D&I projects. These initiatives had strong public support in 2003 when software development activities were declared industrial activities.<sup>43</sup> Córdoba was the first province to do so, and it greatly influenced the passing of the 2004 National Act for the Promotion of the Software Industry.<sup>44</sup> This measure gave better access to industrial benefits for companies in the sector.

In 2007, the Córdoba Electronics and Information Technology Sector Board was also created, as a public-private space promoted by the provincial government to discuss a strategy for the sector. A year later, the Airport Business Park (PEA) was launched, where some of the firms in the industry are located, and new university courses were added to improve the education of human resources. One of these was the Postgraduate Course in Distributed Systems and Services, a specialisation organised jointly by the government, Intel and the School of Mathematics, Astronomy and Physics (FaMAF) of the National University of Córdoba. It also offers short courses for initial training levels. In 2009, the Ministry of Production established the Residence Centre for Computer Science and Electronics (COMCAL) aimed at developing specialised information and communications technologies (ICT) programmes in collaboration with the CTC. This initiative was also accompanied by a training programme (PROFOCO) for the use of applications and programming.

In recent years, programmes aimed at strengthening the management and administration of technology companies have also been added to supplement computer and electronic skills. Some of the most relevant ones are carried out at CTC.

43 Decree 1408/03.

44 Law 25.922/2004.

One of the critical points of the industry is its intensive need for highly qualified human resources. Although there is a wide range of specialised education on offer, employers stress that it is not sufficient to cover the demand for the required positions.

## STRATEGY AND ACTIONS TO PROMOTE EMPLOYMENT AND TRAINING

In 2018, the Federal SSI Network Strategic Plan for the Software Industry was presented, which included all the chambers and clusters in the country, and which serves as a framework for the implementation of public and private initiatives. According to the Plan, one of the main challenges facing the industry is to respond to the growing demand for software and IT services in a country that is still performing poorly in terms of its digital transformation, ranking well below other countries in the region, such as Chile, Uruguay and Brazil.<sup>45</sup> This happens in a context of the global proliferation of technologies associated with the knowledge economy and of the mechanisation of production that requires the development of qualified human resources to supply the country's potential demand and attain a better insertion in international markets. In the case of Córdoba, although the educational offer linked to the industry has grown in recent years, by the end of 2019 the province had an unsatisfied demand for 4,000 jobs (CTC, 2019).

Regarding employment and training, some of the Plan's guidelines focus on adapting IT degrees to the development of software as a new discipline, encouraging this kind of training from secondary school (especially in the case of women who are under-represented in the industry), lifelong learning through study exchanges abroad, and the coordination with the employment and training programmes offered by the national and provincial governments.

Several universities in the province offer technological university degrees. Some of the longest established are the National University of Córdoba, the Catholic University of Córdoba (UCC) and the Provincial Technological University. At the tertiary level, the Higher Institute of Technology of Córdoba and the IES Siglo 21 University College are also reference points.

As far as the management of technology companies is concerned, CTC offers a Business Management Training Programme based on a network of experts who provide support to the companies incubated in the Park. The Cluster also has a mentorship programme in which company CEOs, professionals and academic referees participate to provide guidance.

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<sup>45</sup> The Plan takes as a reference a ranking developed by ECLAC that covers 139 countries. In this ranking, Argentina is in the 89th position, below Chile (No. 38), Uruguay (No. 43), Colombia (No. 68) and Brazil (No. 72).

In addition, the CTC adheres to the Programming Girls Club programme, a nationwide initiative of the Software Chamber, to promote the inclusion of women in the industry starting in secondary school. The Club operates at the Argentine American Cultural Exchange Institute (IICANA). It is free of charge and is aimed at girls aged 13 to 17 years.

In the case of these companies, their actions differ depending on the size of the firm. Large to medium sized companies have their own training programmes, especially at the initial level, to familiarise applicants or new employees with the most commonly used technologies. They also promote training through the partial funding of degrees and courses and the adaptation of working hours to the class load. A common feature is the high demand for training and labour insertion programmes in the province. Some of the most widely used by companies are the First Step Programme (PPP) and the Job Placement and Training in New Technologies Programme (CLIP). Both seek to transition young people into the labour market through training programmes in private companies.<sup>46</sup> CLIP is a programme especially designed for the industry. According to the CTC Cluster's register, at the beginning of 2020, there were 400 approved enrolments within the industry for the First Step Programme. It is worth noting that the coordination with the public programme is done via the CTC. This formalises its position as a Technology Link Unit to promote employment.

As in other cases with technology clusters, there is generally a fluent relationship between government bodies, companies and the universities themselves, resulting in the development and growth of this type of enterprise.



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<sup>46</sup> The First Step Programme is aimed at 16 to 25 year olds, while the CLIP is directed to 18 to 35 year old participants.

## SOME EXPERIENCES

### Dicsys

Dicsys is a company that develops and offers software services with offices in Argentina, Brazil and Panama. It employs 200 people. Its head office is in the city of Córdoba and it also has offices in the city of Buenos Aires.

Its human resources area generates agreements with universities to recruit personnel for its software units as well as general staff. It also offers its own training programme, called Dicsys Academy, to prepare and select applicants.

The aim of this programme is to train participants in the use of the company's own technologies and to attract talent.

The selected students are generally advanced computer science students looking to specialize in the field. At the end of the course, a working relationship is established with the highest-achieving students. The Programme also seeks to generate early links for a better insertion of the employees and greater continuity of the labour relationship in a context of high turnover due to the high demand for this type of profile. The course is also available for internal collaborators of the company interested in updating contents.

In the case of less qualified profiles, it usually resorts to the provincial job placement programmes, mainly the First Step Programme.





## Vates

Vates is one of the longest established companies in the industry, with over 30 years in Córdoba. It employs close to 500 people and has offices in Córdoba, Buenos Aires and Santiago de Chile. It has its own continuous training and professional development programme, and it also coordinates efforts with provincial policies for the incorporation of personnel and training practices, particularly the First Step Programme.

The company also partners with training centres and universities depending on its own needs. They generally use the National University of Cordoba's FaMAF to train the people with the most qualified profiles. It also obtains discounts from private education institutions for the completion of undergraduate and graduate degrees.

In addition to the technical skills required by this industry, the company emphasizes the need for autonomous employees with good communication, critical thinking and leadership skills for some positions. Part of the initial training within the company is precisely aimed at the development of soft skills. Flexibility and adaptability are encouraged as part of the professional growth strategy. The employees are generally young recent graduates looking to gain experience. The possibility of rotating jobs within the offices in Argentina and abroad is particularly valued.



# THE CUYO WINE CLUSTER

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Argentina is ranked among the top ten exporters of wine and must in the world.





### LOCATION

93 per cent of the wine production activity in the country is concentrated in Mendoza and San Juan.



### SECTOR STRATEGY

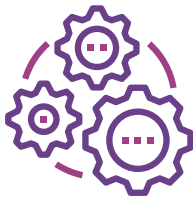
Development of new markets based on the addition of value and differentiation.



### EMPLOYMENT

**112,017**  
registered  
private jobs.

### RELEVANT PUBLIC-PRIVATE ARTICULATION STRATEGY



Shared agenda on employment with a focus on social sustainability.

The issues of employment in general and of the training and inclusion of young people in particular, are part of the sector's strategic agenda. Chambers, trade unions, technical institutes and different government areas are working to improve employment in this sector, as is the case of the skills certification and training practices.



### NEW SKILLS

Greater professionalisation: studies in wine tourism and sommelierie. R&D in oenology. Continuing education in estate and winery work. More qualified temporary workers.



### TRAINING PRACTICES

Career plans for young professionals. University internship system and exchanges with technical schools.



### ENTREPRENEURSHIP

Encouraging the establishment of new companies for service outsourcing. Generational relay and feeling of belonging.



### CORPORATE SOCIAL RESPONSIBILITY

Focus on environmental and social sustainability. Involvement with local communities together with Fairtrade certifications.

## THE CLUSTER

Argentina is among the top ten wine producing countries, with a 2.6 percent share of world trade, and it is the second largest exporter of must, with a 17 percent share of the total world trade. The provinces of Mendoza (75 percent) and San Juan (18 percent) account for 93 percent of the country's wine production. The sector is one of the main drivers of the regional economy of Cuyo, generating 112,017 registered private jobs.<sup>47</sup>

## THE COMPANIES

The wine production chain includes primary production and harvesting, and processing and bottling in the industrial phase. It mainly markets wine, concentrated grape juice (must), raisins and fresh grapes. Wine tourism stands out as an associated business unit, as it represents a significant percentage of the local employment generated by the industry.

The primary cluster comprises more than 17,000 producers, 90 percent of which own farms smaller than 30 hectares, and three quarters of which own farms smaller than 10 hectares. It is a heterogeneous cluster in terms of scale, age of the plantations, technology and the relationship between the stakeholders in the chain.

On the one hand, the wine and must production stage is somewhat dispersed, with almost 1,300 wineries, most of which are small and medium enterprises. On the other hand, there is a greater concentration of companies in the fractioning stage. Annual production is estimated at 17.7 million hectolitres, of which 75 percent are used for wine and the rest for must. In turn, a third of the wine produced is used to make wine with varietal certification while the rest is used for generic wine (COVIAR, 2016).

Although 80 percent of the total wine production goes to the domestic market, international trade shows a favourable balance<sup>48</sup> thanks to the competitive strategy launched by the sector towards the end of the nineties. In the last five years, world wine production has grown slightly due to the demand. At the same time, there is a longer-term local and international trend which shows a reduction in the consumption of wine (especially generic wines) in favour of beverages with lower alcohol content such as beer, while new consumers are demanding high-consistency, high-quality

<sup>47</sup> Based on data from OEDE (2018) for direct registered private employment. COVIAR also estimates another 273,000 indirect jobs according to the report titled Impact of Wine Growing on the Argentine Economy published by COVIAR, Argentine Wine Growing Observatory, June 2018 (pages 83 and 84).

<sup>48</sup> Ninety-three percent of Argentina's exports are varietal wines, mainly directed to the United States, the United Kingdom, Canada and Brazil. Eighty-seven percent of must production is exported to foreign markets, mainly to the United States, South Africa, Japan and Canada (Bevilacqua, Canitrot and Girodano, 2016).

wines (Bevilacqua, Canitrot and Giordano, 2016).

As is the case with other traditional activities, the reconversion of the productive model is geared towards a technological modernisation of the processes, such as the mechanisation of the harvest, efficiency in the irrigation systems, improvements in logistics, and particularly, the promotion of agricultural service companies and the outsourcing of temporary labour at the different stages of production.

## **PUBLIC-PRIVATE PARTNERSHIPS**

One of the main strengths of the sector is its institutionalisation. Towards the end of the year 2000, the main stakeholders in the Argentine wine sector chain designed a strategic plan that set forth medium and long-term collective goals. This process of inter-institutional coordination resulted in the Argentina Vitivinícola Strategic Plan 2020 (PEVI) and the creation of COVIAR, a public-private organization responsible for its management.

COVIAR promotes the organization and integration of all the stakeholders in the chain: more than ten chambers and associations from the private sector,<sup>49</sup> the National Institute of Viticulture (INV) and the National Institute of Agricultural Technology; as well as a strong representation of the provincial governments. For the purposes of the periodic evaluation and adjustment of the PEVI, COVIAR has organized yearly analysis and review of its activities and is currently discussing the development of a strategic vision for 2030 with a focus on innovation, social and environmental sustainability.

One of the main priorities on the agenda of labour issues is to update its collective bargaining agreements. As part of this regulatory updating<sup>50</sup> effort, the Argentine Wine Union, together with the INV and the Federation of Wine and Related Workers and Employees, have drawn up standards to certify the skills required for the main tasks at the vineyard, including harvesting, laboratory, winery and bottling phases. These standards were the main input to design the curriculum of the National Continuous Training System. Although the impact of the programmes and training was not as significant as expected, the hard work necessary to write the standards of competence, curriculum design and content of the subjects was very useful in the process of renewing the collective bargaining agreements and promoting continuous

49 For the private sector: Association of Argentine Wine Cooperatives; Association of Winemakers of Mendoza; Wineries of Argentina; Argentine Chamber of Manufacturers and Exporters of Grape Juice Concentrates; Chamber of Winemakers of San Juan; Chamber of Wine Producers of San Juan; Chamber of Agricultural Producers of La Rioja; San Juan Wine Chamber; Centre of Vinegrowers and Winemakers of the East; Federation of Argentine Chambers of Grape Growers; Producers of Raisins and Table Grapes; Argentine Wine-making Union and the Representative of the private sector of the other wine provinces.

50 Within the framework of programmes of the Ministry of Labour, Employment and Social Security that ran between 2006 and 2014.

training in new production technologies. The certification of skills has been in high demand by employers to organize the roles and salary scales of employees.

The national programme “Youth with more and better work” and provincial programmes such as “Promotion of Youth Employment” in Mendoza, have not had a significant impact on the primary sector due to the high migration rates of young people to urban areas and their low interest in rural work. This is why both employers and the government acknowledge the need to promote policies that encourage their sense of belonging, such as the construction of housing, health centres and schools in the areas close to farms and wineries.

## **STRATEGY AND ACTIONS TO PROMOTE EMPLOYMENT AND TRAINING**

The strategic pillars of the wine sector are based on the innovation of products and processes that increase the added value, with the purpose of gaining, maintaining and consolidating external markets, reinforcing the Argentinean domestic market and attaining the sustained development of the wine industry. The strategic plan for 2030 that is currently under discussion reinforces the standards for sustainability, inclusion of producers, and wine tourism as specific actions to improve competitiveness.

Wine companies implement sustainability policies as part of their corporate social responsibility programmes, such as the requirements to meet certification standards for the quality of production processes, sustainable and social practices such as ISO 9001, ISO 22,000, Global GAP and Fairtrade. The latter, for instance, pays special attention to the creation of quality local employment with an emphasis on the inclusion of young people.

As far as training is concerned, there is a significant number of public and private educational offers related to viticulture, such as technical degrees, bachelor’s and master’s degrees in oenology, viticulture, and degrees linked to wine tourism and professional sommellerie. The curricula include supervised training programmes in estates, wineries or indirect services associated with wine tourism. Some of the main skills assessed by the companies that participate in these programmes include: complying with working hours; the employee’s attitude towards instructions; theoretical and practical foundations; skills for the execution of tasks; their disposition for teamwork; personal initiative and learning capacity.

Although this is a critical moment for employment, there is demand for the inclusion of youth and, in addition, a high turnover in the sector once young people have gained experience. In their final years, university students apply for exchange grants to gain experience in wine production in other countries. This is a very frequent and demanded practice that guarantees that they will get specific professional

opportunities once they have completed their studies.

Regarding seasonal work in the harvesting season, it is young people who approach the wineries to ask for work; the type of wines produced require a level of experience that can only be acquired through practice. It is therefore key that permanent workers guide the process.

From the point of view of the inclusion of young people in the sector's job market, it is worth noting that in wine cooperatives, as well as in other sectors, the new generations are claiming back their space with a more professional imprint and a stronger feeling of belonging. Such is the case of the Youth of Wine Cooperatives (JUCOVI)<sup>51</sup>, an entity that brings together young agricultural cooperativists from Mendoza's wine industry. This platform has been used by UNCuyo to research the rural exodus of the new generations.<sup>52</sup> They are also aiming at technological and organizational innovation through the creation of agricultural service companies. As part of a training programme for new cooperative leaders, they launched a Diploma in Social Economy together with the Catholic University of Argentina.



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51 JUCOVI is a member of A.CO.VI, the Association of Wine-making Cooperatives. They identify as a group of children and grandchildren of members of the cooperatives belonging to the Federation of Argentine Wine Cooperatives (FECOVITA).

52 The research revealed that in order to have better chances in life, young people choose the cities and they are not willing to carry on with the family production or rural development. In some cases, they are encouraged by their parents to make this choice. Close to 35 percent of them do not even consider the possibility of staying on their parents' rural property. Furthermore, one of the main reasons for the rural exodus is the lack of services and connectivity (Hidalgo, Abraham and Giménez, UNCuyo).

## SOME EXPERIENCES

### Alta Vista Winery

It is one of the large wine companies that covers all the activities in the chain. The winery is located in Chacras de Coria, 15 kilometres away from the city of Mendoza. It is one of the oldest wineries in Mendoza (founded in 1899), and it was completely restored in 2003, respecting its architecture but incorporating state of the art wine-making technologies. One of the company's business units organises visits to the winery for wine tourists.

It has estates in Valle de Uco and Luján de Cuyo, located 1,000 metres above sea level that allow it to produce very high quality wines for export. Its business offices in the city of Buenos Aires address the internal demand.

The company's corporate social responsibility programme addresses the principles of sustainable production, complying with certified standards for the quality of production processes, sustainable and social practices. Alta Vista holds ISO 9001, ISO 22.000, Global GAP and Fairtrade int. certifications.

In 2011, it became the first Argentine winery to obtain international Fairtrade certification. It currently has one product for export and another one for the local market with these characteristics, under the brand name Finca Monteflores. The company gives a portion of the price agreed with the buyer (Fairtrade premium) to the Flores del Monte Civil Association, which groups some of its vineyard and winery workers. These resources are managed by the workers who invest in benefits for their communities, such as repairs and equipment for healthcare centres, schools and canteens. The company's workers are between 20 and 30 years of age, and the administration of the resources generated by Fairtrade gives them experience in the field of management and participation, thus building their capacity for social work in the community. Furthermore, this in turn is audited by the certifier as a contribution to the local employment, equality and inclusion of young people.

On the other hand, during the harvesting season, which requires the largest number of workers, the company hires advanced students of oenology and agronomical engineering from the UNCuyo. The school's dissemination efforts are aimed at recruiting students. However, in most cases it is the young people themselves who apply for the job, since the accredited professional practice is a requirement for the completion of studies.

Among the skills most valued by the company when recruiting young people in all its areas is a commitment to the work culture, the ability to work as part of a team, and the ability to adapt to a changing environment.



## Zuccardi Family

Zuccardi is a family business founded in 1963, which has been perfecting itself in the wine business for three generations. Alberto Zuccardi, an engineer, planted the first vineyards and experimented with irrigation; his son José Alberto developed and put the brand on the international market, and now his three sons are heavily involved in the family business. The eldest son, Sebastián, is in charge of the agricultural and oenological area, and together with his father they are known references in the Argentine wine industry worldwide. Miguel runs an olive oil project, and Julia leads the wine tourism unit.

Zuccardi Valle de Uco has been recognized for two consecutive years (2019–2020) as the best winery in the world by The World's Best Vineyard.

**Its R&D division is a breeding ground where young professionals are trained and specialise in different areas to develop high quality products using sustainable practices.**

Present in more than 45 countries, Bodega Santa Julia has the largest organic wine project in the country. Its business approach is ecological and social, and its CSR policy of commitment to the community is called “No nos da igual” (We DO care). On the one hand, they promote the completion of studies among employees within the company and during working hours, and run projects for local development, such as sewing workshops for work clothes and garments in Maipú and Santa Rosa. The “Fair For life” certification guarantees that all the workers in the production chain enjoy good working conditions.

The company has over 850 permanent workers in its two main wineries: Zuccardi Valle de Uco and Bodega Santa Julia. In the last three years, the company has implemented an initiative to hire young people between 18 and 24 years of age from the Maipú area. During the harvesting season, the company must increase the number of staff for the wine-making process by 15 percent. Thus, the company joined forces with the Ministry of Employment, Labour and Social Security and the Municipality of Maipú to plan ahead and recruit young people interested in learning the trade. The initiative involves one month of six-hour training, three times a week with content taught by company professionals (oenologists, agronomists, and laboratory technicians) and teachers from the local agrotechnical secondary school. They are then hired for the harvest. Throughout the whole process, the participants earn an income paid by the Job Placement Programme (PIL) and the winery. In turn, the municipality provides them with transportation services so they can keep to the timetable.

The winery has also ceded land to build a public secondary agro-technical school.

# TIERRA DEL FUEGO ELECTRONIC CLUSTER

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More than 90% of  
the electronic goods  
consumed in the country  
are manufactured in  
Tierra del Fuego.





### LOCATION

More than 30 companies based on Isla Grande in Tierra del Fuego.



### SECTOR STRATEGY

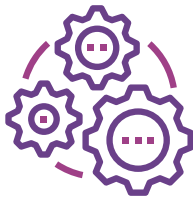
Addressing the rapid technological change of the products, with greater efficiency, local development and innovation, using consumables produced in Argentina.



### EMPLOYMENT

**6,377** registered private jobs.

### RELEVANT PUBLIC-PRIVATE ARTICULATION STRATEGY



Production strategy in connection with the industrial policy of the Special Customs Area.

The employment agenda is connected to the training of the specific profiles required by the industry, from operational trades to professionals in the areas of systems, electronics, engineering and robotics. A need to strengthen the link with the university system (UTN and UNTdF) and reinforce the strategy to achieve the skills certification (CENTEC).



### NEW SKILLS

Promotion of software, electronic and robotics engineering. Skills training aimed at skills certification along the production line. Career education courses and programs aimed at secondary school students.



### TRAINING PRACTICES

Young professional programs, university internship systems and professional practice programs for students in related areas of study.



### ENTREPRENEURSHIP

Initiatives to generate self-employment opportunities in the field of after-sales service (repair of electronic equipment) and an inclusive purchasing strategy for entrepreneurs from marginalised or vulnerable sectors. Program in coordination with the province for the reconversion of local suppliers of parts that are currently imported.



### CORPORATE SOCIAL RESPONSIBILITY

Local training initiatives offered by the municipalities of Ushuaia and Río Grande. Private Social Investment strategy to promote self-employment, service outsourcing or import substitution. Support of state education through works and donations.

## THE CLUSTER

More than 90 percent of the electronic goods consumed in the country come from Tierra del Fuego. Manufacturing companies located in the cities of Ushuaia and Río Grande make up one of the largest industrial conglomerates in the region. Over the last fifteen years, it consolidated as a technological productive investment and a value-added hub, hosting more than 30 national and international companies that generate 6,377 jobs.<sup>53</sup>

## THE COMPANIES

The cluster was established in the early seventies with the creation of the Special Customs Area.<sup>54</sup> Its aim was to develop the economy of the southern territory and its geopolitical positioning in a strategic area. What is currently known as the industrial sub-regime was formed under different modalities and incentives.<sup>55</sup> It is currently led by the electronics branch, both due to the number of establishments and employment that it encompasses, and to its investment and participation in the gross product of the province.<sup>56</sup> From 2003 onwards, this scheme benefited from the promotion of domestic consumption of national products, high import tariffs for electronics, new tax privileges for the Special Customs Area, and public policies that directly benefited the Tierra del Fuego complex, such as the production of netbooks for the Conectar Igualdad Plan (2010). Over the last two decades, the increased demand for mobile phones, LCD and LED television sets and air conditioning equipment was almost entirely covered by the production of the factories located in the south of the country.

The consumer electronics value chain has three phases: supply of inputs and services, manufacturing, and marketing (Altube, 2015). The Tierra del Fuego conglomerate mainly focuses on the manufacturing stage, with four types of companies:<sup>57</sup>

- i. those with temporary contracts with foreign firms to manufacture products under international brands;
- ii. those which, in addition to producing for foreign firms, manufacture products under their own brand;
- iii. retail companies of household appliances or supermarkets, with or without their own brands or their own factories;

<sup>53</sup> Based on data from OEDE (2018) for direct employment. AFARTE (2019) estimates that the complex will generate an additional 2,800 indirect jobs.

<sup>54</sup> With the creation of the Special Customs Area (AAE, for its Spanish Acronym) on the Isla Grande in 1972. Law No. 19.640 “New tax and customs regime”

<sup>55</sup> The main incentives are tax exemptions including VAT, income tax, import duties on inputs and a reduced rate of domestic tax on locally manufactured electronics (Porcelli and Schorr, 2014)

<sup>56</sup> According to AFARTE data, in the last five years investments reached US\$500 million and they estimate that the electronics industry today represents 20 percent of Tierra del Fuego’s GNP and 26 percent of private employment in the province.

<sup>57</sup> Examples of companies in the complex: i. Newsan, Radio Victoria Fueguina, Ambassador Fueguina; ii. BGH; iii. with or without their own brands: Coto, Carrefour, Rodó, Megatone or with their own factories: Frávega-Electrofueguina and Garbarino-Digital Fueguina. iv. firms belonging to brands such as FAPESA-Philips and FAMAR-Delphi.

and iv. firms controlled by their own international brands.

The factories in the cluster are mainly dedicated to the finishing of electronic products with parts supplied by national and foreign companies. The most relevant ones are the global firms that export their technology through manufacturing licenses and key supply kits, which involves working under certified international quality standards.

The focus on the manufacturing stage of electronic goods with imported parts is also highly dependent on demand and on the changing consumption trends, thus giving the conglomerate relative power within the chain. Although the sector is protected, political decisions such as the waiver of tariffs in 2017 impact negatively on the sector's competitiveness and affect employment directly.<sup>58</sup> On the other hand, the mass marketing of products is in the hands of a small group of companies (household goods chains, mobile phone companies and large supermarkets) that set the final price of the product for the consumer after purchasing it from the factories, chartering it to the sales locations and insuring it.

This is why the electronics industry must quickly address the effects of technological change and of the design component incorporated in its products that shortens their life cycle due to the constant replacement of products by consumers. The trend towards specialisation and vertical integration of the chain at a global level reinforces the leading role of the companies that make up the Tierra del Fuego cluster, which invest their capital at considerable risk and with long recovery periods. The main challenges lie in the promotion of local technological innovation and in a greater integration with the national consumable market that will enhance the multiplier effect that this industry has on the economy.

## **PUBLIC-PRIVATE PARTNERSHIPS**

One of the main challenges to improving the competitiveness of the sector is to promote the integration of this industry with the rest of the country, in particular through the national production of parts and equipment (electrical, metal mechanical, plastic and graphic) by companies capable of producing goods that follow the required standards. This reduces the logistics costs associated with imports<sup>59</sup> while at the same time it stimulates employment in the national industry.

In this regard, plans that stand out include the "Strategic Plan aimed at detecting import substitution opportunities in the electronics industry" and the "Programme

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58 The impact on employment is direct, as most of the employees of the plants are on temporary contracts. Added to the worsening of the demand shock in the sector since 2016, they explain the progressive fall in employment from a maximum of 12,875 jobs in 2013 (Porcelli and Schorr, 2014) to the current 6,377.

59 Logistics costs of goods imported to the port of Buenos Aires and then chartered to Tierra del Fuego.

for the search, selection and monitoring of potential suppliers of parts for the electronics industry in Tierra del Fuego”, which the provincial government has been implementing together with the EMPRETEC Foundation<sup>60</sup> since 2011 through the Secretariat of Industry of the Ministry of Industry and Productive Innovation of the province. The partial results of these plans show that imports have been successfully substituted, but for a small number of key inputs, thus keeping them highly<sup>61</sup> dependent on the external sector.

Institutionality is a prominent aspect of the sector; the main manufacturing companies – national, foreign, or mixed capital – are grouped under AFARTE. The sector is also represented by the Tierra del Fuego Chamber of National Industries (CAFIN) and the Tierra del Fuego Industrial Union (UIF).

Given the cluster’s specialised profile and the marked market trend towards digital electronic devices, there is a clear link with the scientific-technological sector. In 2018, the Tierra del Fuego Technological Development Centre (CENTEC) was inaugurated in Río Grande, with over 80 percent of its funding coming from the National Agency for Scientific and Technological Promotion through the Argentine Technology Fund (FONTAR). It has three laboratories – measurement and calibration, electrical safety, and software – which aim at replacing certifications of electronic products that are not made in the province, as well as preparing the sector for future technological restructuring. In addition to validating the equipment and instruments used in industrial production, it builds specific capabilities to meet the required standards through training courses aimed at the various companies involved. The members of CENTEC are: AFARTE, the National University of Tierra del Fuego (UNTDF), the National Technological University (UTN) and the Provincial Government.

## STRATEGY AND ACTIONS TO PROMOTE EMPLOYMENT AND TRAINING

Industrial development drives the increase in employment related to the migration to the island from the mainland. Since 1970, the population has grown quickly,<sup>62</sup> displaying the fastest growth rate in the country<sup>63</sup> during the boom of the Tierra del Fuego complex. The low temperatures and inclement weather make it difficult for new inhabitants to settle there, but it is a good opportunity for young people

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60 The EMPRETEC Foundation was created 1988 by the UN and a group of Argentine public banks, with the aim of promoting entrepreneurial culture through programmes that seek to systematize knowledge about entrepreneurs, in order to lay the theoretical foundations necessary to design a training system for successful entrepreneurs. [www.empretec.org.ar](http://www.empretec.org.ar).

61 As of November 2015, imports had been substituted for a total of US\$27.5 million since 2012, indicating an incipient but not very significant substitution of these imports compared to the amounts for imports expressed above, which exceeded US\$4 billion.

62 From 13,527 inhabitants in 1970 to 127,205 inhabitants in 2010, according to the national census.

63 The highest in the country was 26 percent between the 2001 and 2010 census.

in search of a home and well-paid work<sup>64</sup> to take root and relocate. The benefits offered outweigh the geographical and economic disadvantages and generate high expectations among young job seekers.

On the other hand, the companies and institutions of the Tierra del Fuego cluster implement joint and individual strategies to improve the employability, training and insertion of new workers, focusing on skills that favour decision-making in a versatile and constantly changing industry, consistent with the high technological level at which it operates. The sophistication of the industrial processes involved demands qualified manpower, and companies aim to incorporate experts and professionals that allow them to meet international certification standards, and identify areas to increase the efficiency of the value chain.

Two initiatives aimed at easing the transition between the educational and employment stages for young people stand out. On the one hand, in 2013, Samsung, one of the leading global companies and a licensee of products manufactured by the electronics complex, together with the companies Digital Fueguina, Electro Fueguina, Mirgor, Brighstar and Fundación Pescar, created the Samsung Tech Institute, which offers technical-professional training to promote employability in the technology industry and its value chain. On the other hand, the 2019 provincial programme “Jóvenes Fueguinos en Marcha” (Tierra del Fuego Youth in motion) created training programmes for job placement and included the possibility of doing internships in companies through job training programmes.

The Labour and Technological Development Space, which depends on the Municipality of Río Grande, opened in 2017 as a local initiative for job training and as a way to bring entrepreneurs and companies together. Some of the most prominent activities connected to the electronics industry are training in electricity, electronics, programming, and robotics, with an offer that prioritizes the development of skills from an early age.

Finally, regarding education, in 2018 the National Institute for Technical Education (INET) and the government of the province launched the programme “Continuing Technical Vocational Education Training” for teachers, with the aim of developing and updating their skills in new technologies, industries, renewable energies, etc.



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64 The average salary in the province has reached twice the average salary in urban agglomerations.

## SOME EXPERIENCES

### Newsan Group

The Newsan Group is one of the leaders of the Cluster, and the current vice-chair of AFARTE. It manufactures several of its own brands such as Noblex, Atma, Philco and Sanyo, as well as licensed brands: JVC, Pioneer, Bosch, Braun. It is also a strategic partner of leading global companies such as LG and Motorola. It has eight industrial plants, six located in Ushuaia and two in the province of Buenos Aires, employing a total of 2,300 people.

Within this context of technological production and the sophistication of processes, the Newsan Group fosters the continuous training of its personnel through training and development programmes directed at middle management, and it funds undergraduate and graduate degrees for skill building.

Its young professionals programme includes two rotations in different areas of the company over a nine month period, leading innovative projects in each one. The company is also connected to the educational world through its First Professional Practice Programme for students from AMBA technical schools. In Ushuaia, it partnered with UNTDF in 2016 to implement an internship programme, and it contributes to the educational development of the local community through its Private Social Investment strategy by means of scholarships, equipment donations and the building and refurbishment of public schools.

The group developed NewsanIN, an after-sales service with social impact, from which it promotes self-employment in the large urban centres where its products are consumed. This is implemented through electronic product repair workshops aimed at people who are excluded from the job market, with a focus on young people under 25 years of age from vulnerable communities and with a low level of education. In order to favour the integration of the value chain, it developed an inclusive procurement programme through which it supports social economy projects and projects led by young entrepreneurs. Within this framework, it procures clothing for factory employees from a Mendoza (Xinca) based SME which employs rural women, former prisoners and unemployed people; and data cleaning services from Arbusta, a firm mainly made up of young people dedicated to the development of technological solutions.





## Mirgor Group

Mirgor began its activity as a supplier for the automotive industry and later expanded into the electronics industry as part of the Tierra del Fuego complex. Today it also occupies other links in the value chain through its retail unit and DiggIt, its online shop. It has four manufacturing plants in Río Grande – where it now employs more than 2,000 people – which produce mobile phones, computers and household appliances for Samsung, one of the most popular brands among consumers. This activity has connected Mirgor to leading car brands (Chevrolet, Mercedes Benz, Renault, Volkswagen, Ford) and to household appliances and air conditioning brands (Whirlpool, LG, Carrier and Surrey).

It has developed an innovation business unit aimed at promoting electrical engineering, software engineering and mechanical engineering projects that are attractive to advanced students in these areas. Through its Young Professionals Programme, the company also recruits recent graduates from other fields, such as human resources, foreign trade, marketing and economics.

The group provides support for the training of young people in the municipality of Río Grande, aiming at local development and to help them transition from the world of education to the job market. More than 3,000 children and young people have attended “Mirgor School” which promotes the skills and competencies required by the current job market.

This public-private partnership led to the creation of the company’s own training centre where staff receive continuous training and in turn train young people from the city, with the possibility of gaining work experience at the factories. Mirgor is also a partner at the municipality’s Business Incubation and Acceleration Centre (CIAN), a space dedicated to strengthening the business environment and developing innovative projects. In the latest edition of the Samsung Tech Institute, Mirgor participated in the “Educating for Work” initiative, where more than twenty young people took part in training sessions with electronics companies over a period of four months, to develop their creative and productive skills linked to technology and aimed at professional qualification.



## 5. CONCLUSIONS

Young people face new challenges entering the labour market and responding to the digital and social-emotional skills requirements, the evolution of technologies, and the dynamic organisation of work and productivity. While not always coordinated, different industries in Argentina address the future of work, the demands for skills and new occupational profiles, training needs and the potential to promote employability.

Through analysing the various cases described above it was possible to identify some general elements that have a favourable impact on the management of initiatives to promote youth employment, which can be summarised as follows:

- I. the existence of a shared agenda or strategy;
- II. the interest in providing training in new skills;
- III. the development of on-the-job training;
- IV. the management of entrepreneurship;
- V. corporate social responsibility and local development actions, and
- VI. the existence of a public-private support network.

A particular feature of these cases is the existence of some kind of productive planning that translates into sectoral plans or projects. Various public policy tools have supported the design of plans to improve business performance, especially those focused on the development of company networks and clusters. In many cases, this has to do with combining technological change processes with new skills training in order to improve job placement. In agro-industrial sectors such as forestry, sugar and wine, training in new skills is required to address the mechanization of production, especially in harvesting, or innovation in products based on the revaluation of waste. However, these needs do not always translate into specific actions that respond to a diagnosis, with objectives, responsibilities and a budget, as is the case with initiatives designed to improve competitiveness or R&D&I.

There is an interest in **training for new skills** which goes beyond the development of knowledge or skills specific to the industry, where a particular emphasis is placed on training in soft or transversal skills related to teamwork, communication, negotiation, conflict resolution and critical thinking. This is a constant demand from companies, which translates into different training proposals for public programmes, and even programmes from the firms themselves, which offer this type of training for applicants and staff in general. In this regard, it is necessary to differentiate the type of activity based on the size and profile of the companies. The largest companies usually have their own programmes and budget for education and training. Medium

to small-sized enterprises depend on state-funded course offers, and in most cases on the work of business chambers, industrial parks, clusters or even universities, which act as technology linkage units. These supporting institutions are the ones which usually identify the needs of the firms.

As far as vocational training is concerned, skills certification is still at a very early stage, and only limited to some cases. Argentina has a public-private skills certification system to establish occupational roles for the different economic sectors. Business chambers, educational institutions, trade unions and the government set the assessment standards based on the skills or knowledge required to perform a job. The certification of skills is a useful tool to guarantee the worker's knowledge. Of all the clusters analysed in this paper, only the industrial forestry case actively promotes the certification of skills. Larger companies manage the certification of their employees and applicants within the framework of continuous training and first job programmes. Although the wine industry cluster has job skills standards and an assessment curriculum, it has not advanced in their implementation.

Another common factor is the dissemination of **training programmes within the work environment**. The firms train their employees according to their needs and the technology they have available. Due to budgetary restrictions, training centres are often slow to incorporate innovations and have a limited educational offer. However, as some of the employers pointed out when interviewed, the most effective training is that which takes place in the workplace. For this reason, in recent years public policy has sought the help of the private sector to extend these training modalities. In addition to their own training programmes, some of these companies are working with technical institutions or public programmes to implement professional training opportunities, which in some cases end in the hiring of the high achievers. Internships and workplace training programs facilitate the development of both technical and social and job skills; they are also a way of acquiring credentials that allow young people to access other jobs in the future.

However, these initiatives are not widespread in all cases, and they are not part of an overall strategy. One exception is the Software cluster in Córdoba, where companies coordinate institutionally with the cluster organisation to connect with public programmes for the insertion of young people into the job market.

One of the most widespread initiatives at the national level is the Job Placement Programme (PIL) of the Ministry of Labour, Employment and Social Security. It offers financial support to the companies for the recruitment and training of unemployed people, covering part of their salary for nine months to one year, depending on the age and gender of the beneficiary. The companies also use initiatives at the province level, as in the case of the Software cluster in Córdoba, which has significant demand for the First Step Programme (PPP) which is geared towards young people looking

for a year-long training in private companies.

In the case of technology companies, there is a strong linkage with knowledge institutions. Although the classical university spin-off model is not always recognised, under which research initiated in the laboratory progresses towards the development of marketable products or services, firms maintain strong bonds with the academic community, whether for advice, technical assistance or the management of scholarships and job searches. These are innovative companies with highly qualified human resources, mostly made up of young people who seek to gain work experience and who value the growth opportunities offered by the firms. In these cases, particularly in the Software industry, the demand for personnel is high and the required profiles are usually scarce, so companies offer additional benefits such as training, scholarships to complete university degrees, facilities for teleworking, gym memberships or opportunities for career development overseas. They also place significant emphasis on the sense of belonging as an organizational strategy, through the creation of spaces for participation, the exchange of ideas and teamwork. Another characteristic of the Technology clusters is their marked support of **entrepreneurial promotion** activities. Many companies are the result of these initial stimuli, with funding and advice for their initial development based on the knowledge acquired at local universities. There are several records of entrepreneurship programmes led by universities, chambers, cluster organisations and industrial parks, municipal and provincial governments. In the case of the Biotechnology complex of Santa Fe, the UNL in particular has a long-standing tradition in the field and is well known by companies in the area, both regarding the support it provides to seed projects and the opportunities it offers for networking and the search for investors at more advanced stages.

It is worth noting the impact of corporate social responsibility policies on the inclusion of young people and women in the labour market. In most cases it is the environmental and social sustainability programmes that generate training, inclusion and development initiatives in local communities. The companies' corporate social responsibility and sustainability policies are the necessary condition to access international certifications, such as Fairtrade in the case of wine, or PEFC and FSC in the case of forestry.

The migration of young people to urban centres has been identified mainly in the agro-industrial sectors as one of the major constraints to retaining talent and promoting youth employment. It is at this point that companies identify the need for closer coordination with the public sector to generate better conditions for local development through housing, health and connectivity that will allow them to develop a sense of belonging. There is also a new rural generation that finds high potential in the development of agricultural service companies – whether through private or cooperative ventures – which are betting heavily on the professionalisation

and inclusion of young people, and are presented as an interesting alternative for the outsourcing of services required by large companies in these agro-industrial sectors such as forestry, wine and sugar.

Part of the success of these initiatives is based on the environment that supports the development of the companies, with an offer of specialized services, availability of human resources, and opportunities for cooperation and exchange for the generation of new businesses. These public-private networks encourage an interaction between the education system and the business community. The certification by competences, training programmes in the workplace, and the promotion of self-employment or entrepreneurship are some of the most outstanding activities to support employability and which originate in the interaction between the government, companies and educational institutions.



## 6.

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# 7.

## ANNEX

### METHODOLOGY FOR THE CONSTRUCTION AND ANALYSIS OF PRODUCTIVE COMPLEXES

#### SOURCES OF INFORMATION

##### SMEs in exporting complexes

**Base:** National Innovation and Employment Dynamics Survey (ENDEI)

**Source:** Ministry of Labour – Ministry of Science, Technology and Innovation

##### Employment

**Base:** Permanent Household Survey

**Source:** INDEC

**Link:** <https://www.indec.gob.ar/indec/web/Institucional-Indec-BasesDeDatos>

**Base:** Four digit annual registered private paid employment as per CIIU Rev. 3

**Source:** OEDE / Ministry of Labour

**Link:** [https://datos.gob.ar/ar/dataset/siep-indicadores-empleo-trabajadores-registrados-oede/archivo/siep\\_16.23](https://datos.gob.ar/ar/dataset/siep-indicadores-empleo-trabajadores-registrados-oede/archivo/siep_16.23)

##### Exports

##### Sugar, Wine, Forestry and Pharmaceutical Complex

**Base:** Exports of exporting complexes, by region

**Source:** INDEC, National Directorate of Foreign Sector Statistics

**Link:** <https://www.indec.gob.ar/indec/web/Nivel4-Tema-3-2-39>

##### Electronics complex

**Base:** Provincial origin of Argentine exports (OPEX) Georeferenced consultation system

**Source:** INDEC, National Directorate of Foreign Sector Statistics

**Link:** [https://opex.indec.gob.ar/index.php?pagina=mapa\\_dinamico](https://opex.indec.gob.ar/index.php?pagina=mapa_dinamico)

##### Software complex

**Base:** Production reports by province – Córdoba

**Source:** Ministry of Finance / Economic Policy Secretariat Undersecretariat for Microeconomic Programmement (SSPMicro)

**Link:** <https://www.argentina.gob.ar/economia/politicaeconomica/microeconomica/informesproductivos#regionales>

**Report** The Argentine Software Industry achieved a historical record of exports in 2017

**Source:** OPSI / Cámara de la Industria Argentina del Software

**Link:** <https://www.argentina.gob.ar/economia/politicaeconomica/microeconomica/informesproductivos#regionales>

### Characteristics of the samples used

The analysis of employment in the industrial complexes by region used data from the database of registered private, wage-earning, provincial and annual four-digit employment according to CIIU Rev. 3 for the first quarter of 2018. In turn, the analysis of the employment dynamics for each year is based on data from the first quarter.

The analysis of youth employment was based on data from the Permanent Household Survey database for the four quarters of the 2016–2019 period. Through the application of filters, it has been possible to analyse the employment of workers over 18 years old in private companies. Youth employment can be divided into two segments: 18–24 and 25–29.

The database of the National Survey on Innovation and Employment Dynamics (2018) was used to analyse the presence of SMEs in industrial complexes. After the organisation of economic activities following ECLAC’s proposal (2015) for the development of industrial complexes, it was possible to identify the proportion of participating SMEs.

### Construction of the industrial complexes

The article used as a reference for the construction of the industrial complexes (ECLAC, 2015) proposes a classification of 29 industrial complexes for the whole country that involves networks of suppliers and primary and secondary producers, both in the industrial and service sectors. Said complexes are presented in the following table:

1. Rice	2. Automotive and spare parts	3. Poultry	4. Sugar
5. Biofuels	6. Beef	7. Leather and shoes	8. Electronics
9. Industrial forestry	10. Fruit growing	11. Sunflower growing	12. Vegetable growing
13. Cow’s milk	14. Corn growing	15. Farm machinery	16. Construction materials
17. Medicines for human use	18. Mining	19. Ovine	20. Fishing sector
21. Swine	22. Chemical and petrochemical	23. Steel industry	24. Software
25. Soya	26. Textile and clothing	27. Wheat	28. Wine sector
29. Tourism			

Based on the source of information used to write this document, it was possible to build a total of 22 industrial complexes (although only 21 were considered for the analysis, as the Tourism complex was not included because it belonged to the service sector). Some complexes were unified since the employment registry uses the same code for the different activities. For example, the Cattle/Sheep/Swine Complex.

### Complexes built

1. Construction materials complex
2. Software complex
3. Textile and clothing complex
4. Bovine/ovine/swine cattle complex
5. Forestry complex
6. Automotive complex
7. Sugarcane complex / Yerba mate complex
8. Mining complex
9. Cow's milk complex
10. Sunflower/Corn/Soya/Rice/Wheat complex
11. Pharmaceutical complex
12. Fruit and vegetable complex
13. Chemical and petrochemical complex
14. Agricultural machinery complex
15. Wine sector complex
16. Steelmaking complex
17. Leather and shoes complex
18. Electronics complex
19. Fishing complex
20. Poultry complex
21. Biofuels

Below are the codes used for the construction of each complex.

## Equivalence table for the integration of the selected productive complexes

Complex	CIU 4d	Description
<b>1</b> <b>Construction materials complex</b>	2520	Manufacture of plastic products
	2610	Manufacture of glass and glass products
	2691	Manufacture of non-refractory ceramic products for non-structural use
	2692	Manufacture of refractory ceramic products
	2693	Manufacture of non-refractory clay and ceramic products for structural use
	2694	Production of cement, lime and plaster
	2695	Manufacture of concrete, cement and plaster articles
	2720	Manufacture of primary products of precious and non-ferrous metals
	2731	Cast iron and steel
	2732	Casting of non-ferrous metals
	2811	Manufacture of metal goods for structural use and mounting
	2899	Manufacture of heavy metal products
<b>2</b> <b>Software complex</b>	7210	Consultant services in IT equipment
	7220	IT consultant services and provision of software
	7230	Data processing
	7240	Database-related services
	7290	Information technology activities (not categorised previously)
<b>3</b> <b>Textile and clothing complex</b>	1711	Preparation and spinning of textile fibres; weaving of textile goods
	1712	Finishing of textile goods
	1721	Manufacture of goods made from textile materials, except for clothing items
	1722	Manufacture of tapestries and rugs
	1723	Manufacture of ropes, string, twine, and nets
	1729	Manufacture of textile goods (not categorised previously)
	1730	Manufacture of knitted fabric, knitwear and crochet
	1810	Manufacture of clothing items, including leather
<b>4</b> <b>Bovine/ovine/swine cattle complex</b>	1511	Production and processing of meat and meat products
	1911	Leather tanning and finishing
	1533	Production of animal feed

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5	Forestry complex	201	Forestry
		202	Extraction of forestry products
		203	Forestry services
		2010	Sawmill and wood brushing
		2021	Manufacture of sheet wood for plating; Manufacture of laminated panels, plywood panels, particle panels, and panels (not categorised previously)
		2022	Manufacture of carpentry parts for buildings and constructions
		2023	Manufacture of wooden containers
		2029	Manufacture of (not categorised previously) wooden goods; Manufacture of cork, straw and braidable materials
		2101	Manufacture of wood pulp, paper and cardboard
		2102	Manufacture of paper and undulated cardboard and paper and cardboard containers
		2109	Manufacture of paper and cardboard goods
		3610	Manufacture of furniture and mattresses
		6	Automotive complex
3420	Manufacture of bodies for automotive vehicles; Manufacture of trailers and semitrailers		
3430	Manufacture of parts; spare parts and accessories for automotive vehicles and their engines		
7	Sugarcane complex / Yerba mate complex <sup>65</sup>	1542	Production of sugar
		1543	Production of cacao and chocolate and confectionery products
		1549	Production of foodstuffs (not categorised previously)
		1551	Distillation, rectification and blending of alcoholic beverages; production of ethyl alcohol
		114	Spice, aromatic and medicinal plants and industrial crops
8	Mining complex	1110	Extraction of oil and natural gas
		1310	Extraction of iron ore
		1320	Extraction of non-ferrous metal ores, except for uranium and thorium minerals
		1411	Extraction of ornamental rocks
		1412	Extraction of limestone and plaster
		1413	Extraction of sand, rolling stones and crushed stone
		1414	Extraction of clay and kaolin
		1421	Extraction of minerals to manufacture fertilisers and chemicals, except for peat
		1422	Extraction of salt from salt flats and rocks
		1429	Exploitation of mines and quarries (not categorised previously)
9	Cow's milk complex	121	Cattle breeding and production of milk, wool and furs
		1520	Production of dairy products

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10	Sunflower/Corn/ Soya/Rice/ Wheat complex	111	Cereal, oilseed and forage crops
		1514	Production of vegetable oils and fats
		1531	Production of grain mill products
		1532	Production of starch and derivatives
11	Pharmaceutical complex	2411	Manufacture of basic chemicals, except for fertilisers and nitrogen compounds
		2423	Manufacture of pharmaceutical products, chemicals for medicinal use and botanical products
12	Fruit and vegetable complex	112	Vegetable, legume, flower and ornamental plant growing
		113	Fruit growing - except for wine grapes - and nuts
		1513	Preparation of fruit, vegetables and legumes
13	Chemical and petrochemical complex	2412	Manufacture of fertilisers and nitrogen compounds
		2421	Manufacture of pesticides and chemical products for agricultural use
		2424	Manufacture of soaps and detergents, cleaning and polishing products, perfumes and toiletry preparations
		2429	Manufacture of chemical products (not categorised previously)
14	Agricultural machinery complex	2911	Manufacture of motors and turbines, except for aircraft, automotive and motorcycle engines
		2912	Manufacture of pumps; compressors; taps and valves
		2913	Manufacture of bearings; gears; gear trains and transmission parts
		2914	Manufacture of ovens, stoves and burners
		2921	Manufacture of agricultural machinery
		2925	Manufacture of machinery for food, beverage and tobacco production
		2929	Manufacture of special use machinery (not categorised previously)
15	Wine sector complex <sup>65</sup>	1552	Production of wines and other fermented fruit beverages
		114	Spice, aromatic and medicinal plants and industrial crops
16	Steelmaking complex	2310	Manufacture of coke oven products
		2710	Basic steel and iron industries
17	Leather and shoes complex	1912	Manufacture of suitcases, handbags, etc., saddlery and leather goods (not categorised previously)
		1920	Manufacture of shoes and parts

65 Note: to identify the employment, the CIIU associated to the production of sugar and yerba mate were integrated, albeit considering the region in order to define the complex type in each of them. Thus, the complex integrated in the NW identifies the employment in the sugarcane complex, while the one in the NE does so for the yerba mate complex.

<b>18</b>	<b>Electronics complex</b>	3000	Manufacture of office, accounting and IT appliances
		3220	Manufacture of radio and television transmitters, telephony and wired telegraphy devices
		3230	Manufacture of radio television receivers, sound and video recording devices, and related products
		3310	Manufacture of medical devices and instruments and measuring, testing, checking, surfing and other connected devices, with the exception of optics instruments
		3311	Manufacture of medical and surgical equipment and orthopaedic devices
		3320	Manufacture of optical instruments and photo equipment
		3330	Manufacture of watches
<b>19</b>	<b>Fishing complex</b>	501	Fishing and gathering of seafood
		502	Exploitation of fish hatcheries and farms and other forms of aquaculture
		503	Fishery services
		1512	Production of fish and fish-based products
<b>20</b>	<b>Poultry complex</b>	122	Farm production and animal husbandry, except for cattle
<b>21</b>	<b>Biofuels</b>	2320	Manufacture of refined petroleum products

### Equivalence of industrial complexes and export complexes

The data used for each industrial complex, both at the national and regional level were provided by INDEC. This was possible for 14 of the 21 complexes developed. Source: <https://www.indec.gob.ar/indec/web/Nivel4-Tema-3-2-39>. Periodo disponible 2016-2018.

Industrial complex		INDEC Category (exporting complexes)
<b>3</b>	Textile and clothing complex	Textile complex
<b>5</b>	Forestry complex	Forestry complex
<b>6</b>	Automotive complex	Automotive complex
<b>7</b>	Sugarcane complex / Yerba mate complex	Yerba mate complex
		Sugarcane complex
<b>8</b>	Mining complex	Metal and lithium mining sector (not including steelmaking)

66 In Cuyo, the activity CIU 114 «Spice, aromatic and medicinal plants and industrial crops» is used to identify their use in the wine-making complex while, as explained above, in the NE it is used to identify the Yerba Mate and Tea complex, and in the NW the Sugar complex.



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<b>9</b>	Cow's milk complex	Dairy complex
<b>10</b>	Sunflower/Corn/Soya/Rice/Wheat complex	Oilseed sector Cereal sector
<b>11</b>	Pharmaceutical complex	Pharmaceutical complex
<b>12</b>	Fruit and vegetable complex	Fruit growing sector (excluding grapes) Vegetable growing sector
<b>13</b>	Chemical and petrochemical complex	Oil and petrochemical complex
<b>15</b>	Wine sector complex	Grape complex
<b>16</b>	Steelmaking complex	Steelmaking complex
<b>19</b>	Fishing complex	Fishing complex
<b>20</b>	Poultry complex	Poultry complex

For five of the referenced complexes, the export data were prepared based on the selection of products within the framework of INDEC's georeferenced OPEX consultation system. (<https://www.indec.gov.ar/indec/web/Nivel4-Tema-3-2-79>) Para los años 2017 y 2018 los datos disponibles son parciales.

### INDEC OPEX consultation systems according to the product codes

(Note: partial data for 2017 and 2018)

	Industrial complex	Product codes
<b>4</b>	Bovine/ovine/swine cattle complex	201AA Beef / 201 AB Mutton and goat meat / 201 AC Pork
<b>14</b>	Agricultural machinery complex	313BA Tractors /313BC Spare parts of vehicles and tractors / 313BZ / Rest of automotive vehicles, tractors, cycles and other land vehicles and their spare parts
<b>17</b>	Leather and shoes complex	305 Leather goods / 308 Shoes and their different parts
<b>18</b>	Electronics complex	312AI Calculators, cash registers, franking and accounting machines, etc. / 312AJ Automated data processing machines / 312AK Parts and accessories for typing machines, calculators, statistics machines, and other office appliances / 312B Electrical devices and appliances and objects for electronic use and their parts
<b>21</b>	Biofuels	302 AJ Biodiesel

The data corresponding to the Software complex was taken from CESSI and the only data available are from Argentina (<https://www.cessi.org.ar/opssi>)

Industrial complex	CESSI - national data
Software complex	Software and IT services industry

No sources of information were identified for the Construction materials complex.

Industrial complex	-
Construction materials complex	No export data

### Classification of regions

Regions	Provinces
<b>Cuyo</b>	Mendoza, San Juan, San Luis
<b>Argentine Northeast</b>	Chaco, Corrientes, Formosa, Misiones
<b>Argentine Northwest</b>	Catamarca, Jujuy, La Rioja, Salta, Santiago del Estero, Tucumán
<b>Pampas</b>	CABA, Córdoba, Entre Ríos, GBA, La Pampa, Santa Fe, rest of Buenos Aires
<b>Patagonia</b>	Chubut, Neuquén, Río Negro, Santa Cruz, Tierra del Fuego



## INTERVIEWS

Area or programme	Name of interviewee	Position	Institution or company
<b>Cluster Development Initiatives</b>	Pablo Sívori	Former Coordinator of the Competitivity Area	Ministry of Agriculture, Livestock and Fisheries
<b>Entrepreneurship Subsecretariat</b>	Gonzalo de Villalobos	Former Chief of Cabinet	Ministry of Production
<b>Software cluster</b>	Lorena LLanes	Project Manager	Córdoba Cluster
	Liliana Gómez	HR Manager	Vates company
	Mara Riboldi	HR Manager	Dicsys company
	José Rodríguez Ponce	Executive Director	“Innovar Emprender” Agency
	María Laura Palacios	Person in charge of the Talent Committee Talentos	CESSI
<b>Biotechnological Cluster</b>	Eduardo Matozo	Chairman	PTLC
	Rubén Malizia	Director of the Company Incubator	PTLC
	Javier Gómez	University Extension Secretary	UNL
	Carolina Donnet	First Job Programme Coordinator	UNL
	Luciana Tottereau	Entrepreneurship Programme Coordinator	UNL
	Martín Díaz	Founding Partner	Lipomize company
<b>Forestry</b>	Camila Rosciano	HR Manager	Don Guillermo company
	Walter Rojas	Public Affairs Manager	ARAUCO Group
	Pablo Riat	Production Manager	ARAUCO Group Puerto Piray Plant
	Valeria Bettini	Training Executive	FAIMA
	Carolina Llavallol	Coordinator of the Forest Sustainability and Competitiveness Programme	Ministry of Agriculture, Livestock and Fisheries
	Francisco Torres Cayman	Manager	APEFIC

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<b>Sugar</b>	Carlos Feijoo	Chairman	Argentine Sugar Centre
	Yesica Charaviglio	HR Management Supervisor	Budeguer Group - Leales Sugar Mill
	Vicente Amadeo	Community Relations Manager (RSE)	Ledesma
	Mercedes Cabanas	Production strengthening coordinator	PROICSA
	Mariano Lechardoy	Official	National Ministry of Agriculture, Livestock and Fisheries
<b>Wine sector</b>	Carlos Fiochetta	Gerente general	COVIAR
	Eduardo Senra	General coordinator	Argentine Wine-making Union
	Ariel Dubner	HR Manager	Zuccardi Family
	Mariela Gamallo	HR Manager	Casa del Rey - (Alta Vista Winery)
	Mario Gonzalez	Fairtrade Team Leader	La Riojana Wine-making Cooperative
	Alejandro Fonteriz	Export Manager for the American market	La Riojana Wine-making Cooperative
<b>Electronics</b>	Federico Rayes	Coordinator	UNTDF Technology Transfer Office
	Rodolfo Germán Pérez Suárez	Head of Sustainability	Newsan Group
	Rubén Bertossi	HR Manager	Mirgor Group
	Sabrina Oniszczyk	Institutional Relations and Press Manager	AFARTE
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There is a huge gap between the demand for skills required by the labour market and the training of young people. This discrepancy reflects a series of issues originating in the reconfiguration of the productive system itself. Technological change, the advance of digital technologies, robotics and communications bring improvements to the wellbeing of the population and the productivity of the economy, but if these changes are not accompanied by employment policies which are aligned with the new needs of the labour market, they will only increase inequality.

This paper identifies the main public-private initiatives aimed at promoting youth employment in Argentina within the framework of productive development strategies. This paper identifies the main public-private initiatives aimed at promoting youth employment in Argentina within the framework of production clusters. It proposes a reflection based on experiences in the field of learning and transitioning from education to the world of work implemented by the business sector in collaboration with public entities, educational institutions and third sector organisations.



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