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NATIONAL FEASIBILITY STUDY

Poland - Argentina - Paraguay

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Contents

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1. Current state of knowledge

The ongoing industrial revolution 4.0 and the progressing development in the field of energy cause a problem regarding the labor market around the world. In many cases, it is also related to the dynamically developing economy, which additionally intensifies the unfavorable phenomenon of lack of access to well-qualified employees on the labor market. The solution to this problem is to increase the involvement in vocational education training - VET and to improve the efficiency of already existing activities in this area by implementing mechanisms that improve both the education process and the appropriate selection of the required professional skills that arenecessary to learn in the current industrial development.

Compulsory schooling, including vocational education, varies depending on the country (in the European Union, it is usually between the ages of 7 and 16), but the issue of improving the competence of employees in the area of VET, or the process of changing the industry and training in this area takes place in similar way. Employees present on the labor market can take up education either by attending school or by participating incourses.

Currently, there are two paths regarding the model of vocational education. The first of them consists in public, often free vocational education, and the second in strengthening or leaving the role in this area to private institutions. There are analyzes that confirm the validity of both theories, but it seems that depending on many factors, each of them has its rational justification.

The presented Feasibility Study document briefly characterizes the current situation of vocational education in countries of the project partners and European Union: Argentina, Paraguay and Poland, and discusses the possibility of implementing certain mechanisms, the use of which could have a positive impact on the quality and efficiency of vocational education in both Latin American countries in the future.

1.1 Current situation in Paraquay

Vocational training in Paraguay unfolds within the backdrop of a concerning overall educational scenario. This reality is evident, for instance, in the data from the National Educational Process System (SNEPE), which reveals that between 70% and 80% of students do not achieve the expected minimum level of learning, based on grade or course and academic area. Echoing these figures, the results of the 2018 PISA Assessment indicate that 68% of 15-year-old students fall below the basic level of reading competency, with 92% of them not reaching the required academic level in mathematics.

In contrast to this context, the Paraguayan economy experiences consistent growth. The country has gained prominence for its stability, constructing a model primarily based on agricultural product exports and emerging as the region's best- performing economy on a macroeconomic level. However, it's essential to note that these impacts do not widely extend to other sectors of the economy due to the relatively low spill-over effect from the agricultural sector. Moreover, the poverty rate for 2022 standsat 19%, with extreme poverty at 5.2%.

Informality is another hallmark of the Paraguayan economy, averaging around 67% in the industrial sector, encompassing manufacturing, electricity, water, gas, and construction. It's noteworthy that the average years of schooling for the employed population in this sector amount to 9.18 years, out of the mandatory 12 years in Paraguay.

The Paraguayan industrial sector, in terms of development, presents a heterogeneous landscape. Some regions are well-developed, while others grapple with substantial backwardness and informality. The metropolitan region, with robust economic and business development, notable production diversification, and significant participation in industrial and service activities, contrasts with regions characterized by high poverty levels, inequality, and informal employment.

The agro-industry is poised to be a key driver of national economic growth in the coming years. However, agro-industrial production has been volatile, displaying marked disparities in terms of economic unit size, job generation, and income concentration. Apart from agribusiness, other pivotal sectors include land cargo transportation and storage, the electric sector, information and communication technology, textiles, meat and dairy, among others.

Amidst this context, technical education and vocational training in Paraguay have gained increasing importance in recent years, addressing the demands of the labor market and the country's development needs.

Technical and vocational training is coordinated through collaboration among different entities and ministries. The two pivotal institutions responsible for generating and

regulating the supply of technical education and vocational training are the Ministry of Education and Sciences (MEC) and the Ministry of Labor, Employment, and Social Security (MTESS). It can also be stated that the Paraguayan regulatory framework supports and reflects the State's interest in strengthening technical training. However, one of the challenges facing the country is the lack of coordination and alignment among these institutions, impeding the optimal utilization of resources and the efficiency of technical and vocational training provision.

In terms of plans and programs, it's worth noting that the National Development Plan 2023 incorporates strategies related to education and technical-professional training.

1.2. Current situation in Argentina

In Argentina, the field of Vocational Education and Training is made up of programs managed by various public and private entities. Within the public sector, the educational offerings provided by the Ministry of Education include: Initial Vocational Education and Training (IVET) with its three levels of certification (Certification Levels I, II, and III), Continuing Vocational Education and Training (CVET), and Job Training(JT).

Initial Vocational Education and Training at Certification Level I endorses the learning of basic operational technical knowledge and skills. Certification Level II attests the mastery of operational technical knowledge and skills, and to a limited extent, some managerial operational knowledge. Certification Level III involves the acquisition of theoretical scientific and technological knowledge specific to their professional field, as well as mastery of technical and managerial operational skills.

Continuous Vocational Training extends the path of professionalization that adapts to the development needs of the socio-productive sector. It is conceived as a strategy for lifelong learning and is closely related to the initial training trajectory of each individual, whether it continues due to the need for updates in processes, techniques, regulatory frameworks, etc., or for specialization in some aspect of professional functions or a subsector within the professional field. The central and distinctive characteristic of Continuous Vocational Training, regardless of the initial VET context with which it is articulated, and the educational purpose, with which it is defined, is that it is designed and developed based on the subjects' prior professional qualification. This articulation presupposes, from the perspective of VET planning, a coherent link in the training trajectory between initial VET and continuous VT proposals, implying a progressive increase in the professionalization of the individuals. Within Continuous Vocational Training, we can distinguish two variants of training oriented according to the degree of intensification and depth of the training proposal: Update and Specialization.

Job training refers to the educational actions aimed at developing individuals' capabilities so that they can adapt to the demands of a specific job or occupational role. It does not necessarily require a specific prerequisite of a prior professional qualification. The training actions in workplace training are not based on professional profiles, nor are they necessarily based on educational trajectories approved by the Federal Council of Education. Due to this, certifications in workplace training, while being part of the professional training domain, do not require the identification of the certification level of the training proposal. The Ministry of Education of Argentina, in collaboration with trade unions, plays a significant role in shaping vocational education policies.

From the Ministry of Labor, Employment, and Social Security, there are also training and certification initiatives. An example of this is the Labor Competency Certification Program. This program enables workers to obtain a public and sector- specific recognition that guarantees their expertise in the occupation they are engaged in. Competency certification is achieved through assessments in work environments or in Professional Training Centers authorized as certification institutions, recognized by the Ministry of Labor. The Ministry, Training Centers, business chambers, and trade unions define the job-related competencies for each activity or job position, aiming for uniform competency standards that describe the respective professions across the entire country.

Within the scope of what could be termed the "Private Offering," various alternatives coexist. One of these is driven by the Ministry of Labor, Employment, and Social Security, known as the Tax Credit Program. This is a public policy that encourages companies and cooperatives to enhance their productivity and competitiveness by implementing training measures for their workers or unemployed individuals, and/or by certifying the quality of their processes.

On the other hand, there is a large number of private institutes that offer Professional Training courses on a wide range of topics and of varying time length. It's important to note that the majority of these institutions lack official certification recognized by the Ministries. Additionally, it's worth mentioning that these courses are fee-based, unlike the various public offerings described earlier, which are all free for participants.

Regarding the changes in the world of work, Vocational Education and Training (VET) faces significant challenges, as there's a trend towards requalifying skills and transforming traditional job profiles. Simultaneously, new profiles and occupational roles are emerging.

In general terms, it can be pointed out that the demanded qualifications are showing a tendency to require greater autonomy and responsibility in production processes. Consistent with this, there's a growing demand for skills in handling new technological packages. These new profiles entail an increasing and ongoing need for training due to the

specific characteristics of the 4.0 technologies sector.

Within the structure of the training offerings in the sector, for the City of Buenos Aires, the Vocational Training Centers of Fundación UOCRA propose courses based on the requirements of the Ministry of Education of the City Government. In the case of the centers in the province of Buenos Aires – which coordinate with the provincial Ministry of Education through COPRET (Provincial Council of Education and Work), the connection with the productive and work environment is crucial. This significantly impacts both the physical possibilities of the centers (workshop space, practical areas, etc.), for example, and decisions about the training paths that comply with local and other regulations. This involves links with municipal and territorial actors.

Connections with socio-productive environments are present, but it's necessary to consolidate certain institutional mechanisms to make them more frequent and

seamless. Regarding the potential connection between companies and centers, it can be inferred that in many cases, the search for workers happens in work environments rather than educational ones (possibly to ensure that workers already have certain experience and knowledge gained through their own professional practice), especially for roles or occupations requiring lower qualifications.

Another form of territorial connection is through national universities, which can offer training within their institutional spaces through indirect enrolment, under the pedagogical supervision of the centre. In other words, there's a link with the academic university field that brings centres closer to highly current technological content.

1.3 Current situation in Poland

The main educational reforms in the field of vocational training took place in Poland in 1989 along with the political transformation that took place. During this period of more than 30 years, vocational education has changed dramatically. The last major reform in this area was implemented in 2017 and concerned the extension of compulsory education in vocational technical schools and the creation of the so-called first and second stage sectoral vocational schools. At the same time, a special action plan in the VET industry for 2022-2025 was created in Poland, which strengthened the role of regional enterprises in the vocational education process. In the European Union, vocational education and training has been identified as the main area of cooperation under the European Education Area initiative for 2021-2030.

Vocational education in Poland has a very long tradition, therefore its reputation is currently at a high level. People who are vocationally educated are perceived as reasonable and have no problem finding a job on the current market.

The Polish economy is currently in a very good situation and is developing very dynamically year on year, which results in very low unemployment despite the recent problems resulting from the COVID-19 pandemic. All the more so, there is a shortage of qualified employees on the market, which, despite the good situation of vocational education in Poland, causes a gap in the labor market and a lack of qualified employees, especially in the metal industry. It follows that rapidly developing countries require high-level vocational training. The Polish energy industry is also undergoing

transformations related to the need to move away from the basic source of energy, which has been coal so far. This situation creates a lot of new jobs related to the production, operation

and servicing of renewable energy sources: wind, solar, water, etc. The transition to the digital model and the electrification of means of transport mean that more and more industries are looking for employees in such professions as electrician, electrical engineer, etc. Observing changes on the labor market and the needs, it is clear that in the near future there will also be a shortage of many employees in the positions of mechanics and automation, which is in particular related to the implementation of automation and robotization of production in Poland.

2. Paraguay's needs in terms of VET

Technical and vocational education in Paraguay is driven through two ministries: the Ministry of Education and Sciences (MEC) and the Ministry of Labor, Employment, and Social Security (MTESS). However, alongside these, various public organizations also play a significant role in generating training and labor development programs. Nevertheless, one of the challenges the country faces is the lack of coordination and alignment among these institutions, hindering the maximization of resources and efficiency in the provision of technical and vocational education.

In terms of resources and quality of technical education, a notable disparity is observed among different regions of the country, limiting access and the quality of training in certain sectors. Addressing this calls for greater equity in terms of distributing infrastructure, pedagogical resources, and personnel for vocational training.

Given the absence of skills measurement and accreditation, the establishment of an evaluation and accreditation system for acquired competencies becomes necessary to facilitate the assessment of students' knowledge and skills, as well as their integration into the job market.

The mismatch between educational offerings and sectoral demands underscores the necessity of aligning curriculum with the labor reality, favoring graduates' entry into the workforce and enhancing the industrial sector's competitiveness. This could be related to the limited involvement of companies in the development of educational policies and programs, impeding the identification of sectoral needs and restricting the adaptation of technical training to those demands.

A pivotal element in the industrial sector's hiring process is a worker's prior experience. In this regard, the potential for internships within the framework of technical training is crucial for students.

Furthermore, the need to strengthen teacher training is recognized. Providing up-to-date and relevant training to technical education instructors is important so they can convey

knowledge and practices aligned with the needs of the industrial sector.

It can also be highlighted as pertinent the need for greater promotion to encourage more women's inclusion in technical and vocational training programs overall.

2.1 Skills needs

The necessary skills are related to the country's key industrial sectors as mentioned above. These sectors include the agro-industrial sector, the construction sector, the ICT sector, the meat and dairy sector, land cargo transportation and storage, textile industries, among others.

Regarding the needs of the agro-industrial sector, there is a deficit in areas such as PLC (Programmable Logic Controller) management and programming, as well as mechatronics. These skills are fundamental for the development and optimization of production processes in the agricultural sector.

Moving to the land cargo transportation and storage sector, some trends include green logistics, collaborative and shared transportation, intelligent fleet management devices, artificial intelligence (AI), and the Internet of Things (IoT). The automation of logistics processes also plays a significant role, with the implementation of automated solutions in various operations. In terms of hiring requirements, new software systems such as Transportation Management Systems (TMS), Warehouse Management Systems (WMS), real-time tracking and traceability systems, fleet routing software, among others, are in demand.

In the industrial field of ICT, concerning technologies and skills with potential impact on the national market, artificial intelligence (AI) is mentioned as the most relevant, followed by applications like machine learning, contributing to Robotic Process

Automation (RPA). Logistics robotization and Industrial Internet of Things (IIoT) are also highlighted as technologies of growing importance. Other mentioned technologies include big data, cloud computing, Edge computing, Internet of Things (IoT), home automation, 3D printing, networking and communications, telemedicine, mobile applications, and quantum computing.

In the textile industry, personnel with skills in design, garment production, quality control, and production management are needed. For the automotive/auto parts industry in Paraguay, advanced cognitive, physical, and manual skills are most relevant for sectoral innovation. Basic cognitive and technological skills are also important, while social and emotional skills have intermediate importance.

2.2 Profession which are the most wanted in VET aspect in Paraguay

Below, some of the most demanded occupations are presented, organized by the most relevant industrial sectors in the country. In the construction sector, the following positions stand out currently: Heavy Machinery Operator (Complex), Live Line Specialist, Surveyor, and Soil, Asphalt, Concrete Specialist Lab Technician, among others.

In the transportation sector, the primary long-term hires focus on roles such as truck driver, electromechanical or general mechanics technicians, and operators of equipment or machinery supporting logistics, among others.

Within the ICT sector, the most demanded occupations include systems developers or programmers, sales representatives, web developers or programmers, computer equipment repair technicians, mobile application developers or programmers, network technicians, implementers, computer systems analysts, pre-sales service advisors, and receptionists.

Additionally, in this sector, it's worth noting that with the increased demand for IT solutions, a significant number of IT engineers, systems analysts, and developers are

required, primarily. However, the most in-demand professional profile is that of aprogrammer.

2.3. Advantageous and disadvanatgeous of current VET in Paraquay

Technical and vocational education in Paraguay faces various challenges, such as gaps in digital skills, inadequate infrastructure and equipment, and a disconnect between the educational curriculum and the demands of the job market. However, there are also opportunities to enhance this education through strategic partnerships, teacher training, and skill development in emerging areas.

While there is a diversity of offerings from the public sector, it's evident that a significant gap still exists between these offerings and the innovation needs expressed by the private sector. It is crucial to promote coordination between the public and private sectors to address these challenges and fully capitalize on opportunities in the realm of technical and vocational education in the country.

In terms of the private sector, the provision of technical training by certain industrial product companies stands out. These companies offer technical training programs focused on their own products, which proves highly effective as these are short, free courses that concentrate on the use of the specific products employed in theindustry.

One advantage or opportunity lies in the legal framework that recognizes vocational training as a strategic factor for the country's development. In this regard, specific regulations such as Law No. 1.652/00 "Creating the National System of Training and Labor Training (SINAFOCAL)"; Decree No. 4678 "National Strategy for VocationalTraining"; and Resolution No. 3127/14 of the MEC, which approves regulations for the processes of opening, enabling, operating, and closing institutions of higher technical education, are noteworthy.

It's also important to mention the Public Educational Policy for Education of Youth and Adults 2011-2024, which aims to provide competency-based vocational training programs in coordination with other state entities, the labor market, and socialorganizations.

3. Argentina's needs in terms of VET

The extent to which innovative technologies (4.0) are adopted within the manufacturing industry varies according to the type of company. In the case of micro and small enterprises, 4% have a high level of technification, while 37% are in the process of

convergence. For medium-sized companies, around 11% incorporate these innovative tools and 65% are assimilating them. Regarding large companies, this number is 30% for the incorporation of innovation tools, and 59% are in the process of assimilating them.

The main obstacles which hinder change are both internal, such as a certain conservative view from hierarchical and managerial levels, and external, in the case of the uncertainty generated by a macroeconomic context of great instability. There can also be resistance to change typical of small family organizations, as well as a lack of knowledge about the potential of new technologies. The difficulty of accessing financing should also be considered in this scenario as an important element that hinders the incorporation of machinery and innovative technology.

From the perspective of vocational training centers, the main need is to increase the connection with the productive sector. The coordination with companies and the continuous training of teachers are key issues for vocational training to fulfill its primary objective, which is to provide workers with the tools they need to achieve better integration into the job market.

3.1 Skills needs

Primarily, the most demanded skills are commonly known as "soft skills." Appropriate appearance and proper demeanor, punctuality, and communication abilities are highly valued by employers. Teamwork and collaboration are recognized as fundamental tools, and Vocational Training Centers foster these through the integration of various courses. This is a crucial aspect for the development of a knowledge-based

society. An example of this is the pairing of a design and additive manufacturing course with an automation course.

Secondly, in the case of certain courses and trajectory currently being offered, there is a strong interest among students in incorporating new content, such as IoT, Cloud, and collaborative robotics. This is due to a growing demand in the job market, which is starting to require profiles that are skilled in 4.0 technologies.

3.2 Profession which are the most wanted in VET aspect in Argentina

The most requested course offerings at the FUOCRA network centres are those that students believe will be in higher demand by the productive sector. In the case of energy-related courses, renewable energy and electricity in all its branches are included. Sustainable construction and climate control offerings are also courses which are highlysought after.

3.3. Advantageous and disadvanatgeous of current VET in Argentina

One of the main advantages of the Argentine Vocational Education and Training (VET) system lies in the participation of trade unions and the world of labor in the management of technical and vocational education institutions and public action programs. As mentioned earlier, in many cases, educational institutions are managed by trade unions. This way, Vocational Education and Training becomes an educational approach closely connected to the production and labor sphere. Mechanisms are established to align the offerings with occupations deemed strategic in various sectors of activity. Moreover, Vocational Training Centers have direct links with the scientific and technological system, facilitating technology transfer processes both to workers and to the network of small and medium-sized enterprises.

On the other hand, when identifying disadvantages, it's possible to note a certain lack of coordination among specialized public organizations in technical and vocational training, leading to duplicated efforts, overlapping actions, and resources. This relates

to the organizational structure. Another difficulty that might arise is a certain bureaucratization of the educational system's structures, which is not compatible with the dynamism required by the productive world in terms of training. Another element to consider as a disadvantage is the country's macroeconomic context, with a high inflation rate that hampers access to credit, thus impacting the increasing investment possibilities in new

machinery and innovative technologies.

4. Feasibility study

Based on the data obtained in the Desk Study documents for Argentina and Paraguay, it can be concluded that there is a real possibility of implementing the solutions currently functioning in European countries as part of VET vocational education training.

The analysis of the possibility of implementing certain solutions is supported by the assessment of the vocational education systems currently functioning in Argentina and Paraguay, which in many areas is the same as the European ones. Despite some differences, there is a clear emphasis and the need to implement certain solutions, which include the possibility of cooperation and implementation of certain solutions functioning in partner countries and the European Union in the area of:

- increasing the level of education through courses and training for employees already present on the labor market, while adapting the needs of employees to the requirements of the current changing labor market;

- making an attempt to standardize the level of education on courses with a simultaneous analysis of the implementation of national certifications;

- consider support for courses funded by the national institution or in certain areas of private institutions;

- increasing the practical part of courses and trainings with simultaneous expenditure on new equipment adapted to the present times;

- improving the process of developing curricula, taking into account the guidelines of regional/local company and their active inclusion in the education process,

as exemplified by the extension of existing teaching methods or taking the subject towards VET education in a dual form, as is the case, for example, in Germany and Switzerland;

- taking up the subject of increasing mobility in the field of VET education, analyzing good practices of the project's partner countries;

- analysis of the adaptation of didactic equipment and educational programs to current standards as part of the ongoing industrial transformation 4.0 and energu transition;

- development of digitization both in terms of teaching tools and curricula;

- developing modern materials, with particular emphasis on digital materials, with a focus on increasing access to education to a larger group of recipients, as well as encouraging them.

5. Conclusions

To sum up, it seems that the feasibility study is positive and thanks to the implementation of the project it will allow to find common mechanisms that can be implemented (among those indicated and not only), which will contribute to increasing the quality of vocational education, its popularization and will allow employers to acquire valuable employees. At the same time, it will allow to improve the working conditions of employees, their safety at work and financial security, which will certainly ensure good vocational education. It seems that the implementation of the national feasibility study guidelines should, of course, be preceded by consultations and an analysis of, for example, survey results.

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