



DESK STUDY

Paraguay and Poland



Co-funded by
the European Union



Contents

1. VET analysis.	3
3. Structure of the National Offer in VET	8
3.1. Ministry of Education and Sciences (MEC):	9
3.1.1. MEC’s Technical and Vocational Training programs in Asunción and the Central Department in the sectors of Metal and Energy.	13
3.2. Ministry of Labor, Employment, and Social Security (METSS).....	14
3.2.1. MEC’s Technical and Vocational Training programs in Asunción and the Central Department in the sectors of Metal and Energy.	15
4. Private offer	19
5. Fields of Innovation	21
6. Conclusions.....	22



Taking into account the differences resulting from the demand for employees with specific professional qualifications in the European Union countries, it can be concluded that the European Union guidelines in this area, which determine the directions of development of VET vocational education, play an important role. On average, 50% of young Europeans aged 15-19 participate in I-VET (Initial Vocational Training) at upper secondary level. However, this EU average masks significant geographical variations in participation ranging from 15% to over 70%². Based on current data provided by the Ministry of Education and Science in the school year 2022/2023 - 58.5% of students of all types and grades of secondary schools (including post-secondary schools) pursued vocational education, the remaining 41.5% of students pursued general education³. For comparison, in 2020 in Germany, 59.6% young people was in vocational education and in France and Spain these percentages were at the level of 39.7% and 37.1%, respectively. In Germany, a very popular model of vocational training is the model of the so-called Dual mode, where the student is employed and works 3-4 days a week for the employer, realizing the practical part, and 1-2 days at school realizing the theoretical part.

In the case of Poland, VET vocational education can be considered in two periods, before and after 1989, which concerned fundamental political changes in the country. It is, however, worth paying special attention to this second period of time. More than 30 years have passed between 1989 and now, when both the education system and the needs of the labor market have changed very dynamically. In Poland, supervision over vocational education is carried out by the Ministry of Education and Science (in polish - MEN), and the last major reform of education covering this area was carried out in 2017 (Warsaw, 11 January 2017. ACT of 14 December 2016 Education Law).

After 1989, a very dynamic development of industry took place in Poland, which gained even greater momentum after accession to the European Union in 2004. Both the labor market and new economic opportunities were created, which contributed to the development of many new industries. Currently, after more than 30 years, Poland is entering a new reality and has to face many new challenges, such as digitization, energy transformation, or the challenges of industry 4.0, which entail very large changes in employment and labor market requirements.

1. VET analysis.

In Paraguay, technical and vocational training are organized according to the collaboration between different entities and ministries. The National Council for Education and Labor is the advisory body that coordinates and develops the main lines of action in this field. The two key

² <https://education.ec.europa.eu/education-levels/vocational-education-and-training/about-vocational-education-and-training>

³ <https://www.gov.pl/web/edukacja-i-nauka/nowa-jakosc-szkolnictwa-zawodowego-w-polsce--podpisanie-pierwszych-umow-w-ramach-branzowych-centrow-umiejtnosci>



ministries in generating and regulating the supply of technical and vocational training are the Ministry of Education and Sciences (MEC) and the Ministry of Labor, Employment and Social Security (MTESS). Detailed information on these aspects and other relevant initiatives in the field of technical vocational training in Paraguay are presented below.

- The MTESS offers two programs:
 1. The National Service for Professional Promotion (SNPP): the main objective of this institution is to provide immediate responses to the labor market through courses aimed at individuals pertaining to different levels and sectors of the economy. The SNPP presents broad coverage nationwide, exercised through its headquarters, regional and sub-regional offices, collaborating centers and mobile units.
 2. The National System of Vocational Training and Education (SINAFOCAL): this entity focuses on the quality of training offers, the certification of labor skills and the improvement of employability, adapted to the social and economic needs of the country. SINAFOCAL registers, analyzes, develops, and disseminates reports and research on the labor market to contribute to decision-making in active employment policies.

- MEC: plays a fundamental role in technical and vocational training through Secondary Education. One of the objectives of Secondary Education is to develop vocational training in line with the demands of the country's productive sector. Technical Baccalaureate, organized into three modes (Industrial, Agricultural, and Services), seeks to provide technical training to students in response to labor needs and changing regional and global circumstances. While education is not limited to vocational training, the technical education modes aim to respond to specific labor market needs.

- National Catalogue of Professional Profiles: The Interdepartmental Technical Unit (MEC and MTESS) has promoted the creation of the National Catalogue of Professional Profiles⁴ in 2015. This catalogue is a key instrument within the qualification system, aiming to harmonize training offers and ensure their relevance. The National Catalogue of Professional Profiles is based on Qualification Levels, which represent the degree of professional competence required in production systems. These levels are established based on criteria such as technical-professional mastery, initiative, autonomy, responsibility, coordination/participation, decision-making, and the complexity of work.

The Qualification Levels in Paraguay are summarized as follows:

Level 1: Elementary and routine activities with constant supervision.

Level 2: Technical activities with a certain degree of analysis and autonomy.

⁴ https://www.mec.gov.py/cms_v2/adjuntos/14596?1504633756



Level 3: Complex and non-routine activities in specific work contexts with some autonomy.

Level 4: Highly complex activities involving project planning, management, and supervision, as well as expertise.

Level 5: Highly complex professional activities involving maximum autonomy and responsibility in design, direction-setting, and management.

It is important to note that professional qualification refers to the set of competences acquired through training and work experience. Industrial or Agricultural Technical Baccalaureate education falls in qualification level 2.

Regarding the legal framework that supports technical and vocational training in Paraguay, several laws, regulations, resolutions, programs and plans relevant to this field have been identified. The Paraguayan legal framework demonstrates the interest of the Paraguayan State in strengthening vocational training.

Following, some of the most important laws and regulations are mentioned:

- National Constitution of the Republic of Paraguay: Establishes the concept of education and the responsibility of the State in the organization of the national education system, which includes both the private and public sectors.
- General Education Law 1264/98: Establishes the general provisions on education in Paraguay, defining the structure and functioning of the education system.
- Law N° 5749/17 "Establishing the Organic Charter of the Ministry of Education and Sciences": Defines the responsibilities and functions of the Ministry of Education and Sciences in the organization of the national education system.
- Law No. 1.652/00 "Creating the National System of Vocational Training and Education (SINAFOCAL)": Establishes the creation of SINAFOCAL, an organization responsible for promoting and coordinating vocational training and education in Paraguay.
- Law No. 1265: Modifies Law No. 253/71, which created the National Service for Professional Promotion.

In addition, there are specific laws that pertain to the relationship between education and work, such as the Law on Educational Work Internship, the Law on Higher Technical Educational Work Internship, the Labor Code, the First Employment Law, and the Code of Childhood and Adolescence.

As for relevant decrees and resolutions, notable ones include Decree No. 4678 "National Vocational Training Strategy" and Resolution No. 3127/14 MEC, which approves the regulation of the processes of opening, enabling, operating, and closing higher technical education institutions.



In terms of plans and programs, it is important to mention the National Development Plan 2023, which seeks to coordinate actions to reduce poverty, achieve inclusive economic growth, and promote equitable social development, including strategies related to education and technical-vocational training. The Public Policy for the Education of Youth and Adults 2011-2024 is also notable, as it aims to provide competency-based vocational training programs in coordination with other government entities, the labor market, and social organizations.

Analyzing education in Poland, it can be said that it is widely available and free at all stages of education, moreover, the following education structure is distinguished, including vocational education:⁵:

In Poland, it distinguishes the following structure of education:

- 8-year primary school;
- 4-year general secondary school;
- 5-year technical school;
- 3-year first stage sectoral vocational school;
- 2-year second stage sectoral vocational schools;
- 3-year special school preparing for work;
- post-secondary school (maximum 2.5 years);
- Academic (Bachelor program 3-4 years + master 1-2 years or integrated 5-6 years);
- PhD 2-4 years.

The duration of education in Poland and in most European Union countries is about 9-10 years, but there are also countries where this time is even 13 years. Typically, the age of students is between 7 and 16 years old. In Poland, vocational education is very popular, as evidenced by the inclusion in the higher education system of the possibility of learning also in the form of part-time studies, i.e. in a form that takes place during weekends. This allows you to combine the current profession of, for example, an engineer with the possibility of continuing education. In Poland, the part-time (weekend) form is becoming more and more popular every year. In addition, an important role in the process of preparing employees for the industrial sector are the offers of courses with the possibility of implementing them as part of lifelong learning, these courses in many cases are free, reimbursed, subsidized or require a small fee.

Supervision over vocational education in Poland is exercised by the Ministry of Education and Science, but European cooperation in vocational education and training has a long history and dates back to 2002 and the so-called Copenhagen process, as well as the subsequent actions of Bruges and the Riga⁶ conclusions. In addition, in November 2020, the "Osnabrück Declaration

⁵ Dobromir Dziewulak, POLITYKA OŚWIATOWA, Przegląd ekspertyz z wybranych obszarów oświatowych (lata 2008–2018), wydawnictwo sejmowe, Warszawa 2020

⁶ <https://education.ec.europa.eu/education-levels/vocational-education-and-training/about-vocational-education-and-training>



on vocational education and training as an enabler of recovery and just transitions to digital and green economies" was approved. This declaration was endorsed by ministers responsible for vocational education and training from EU Member States, candidate countries, EEA (European Economic Area) countries and European social partners. Vocational education and training has been identified as the main area of cooperation under the European Education Area initiative for 2021-2030.

An important issue in the field of VET education in Poland and throughout the European Union are the mechanisms of financing education support, which include, among others, such programs as: Erasmus + or the European Social Fund Plus. At the same time, these activities are supported under the strategic framework of the European Education Area for 2021-2030, where a special Working Group has been established to deal with the issues of Vocational Education and Training and Green Transformation. At the same time, a subgroup for schools - dealing with education for environmental sustainability - was included in the work of this group. One of the tasks of the group is to encourage mutual learning and the exchange of information and best practices between Member States, which will certainly contribute to the development of vocational education in the European Union countries over the coming years. The activities carried out under this metavet program also fit into these mechanics. Another tool supporting VET activities in the European Union is the "Cedefop" operating since 1975, i.e. the European Center for the Development of Vocational Training, which is one of the decentralized agencies of the EU, based in Greece. Its key tasks include supporting the development of European policy in the field of vocational education and training. At the same time, Cedefop helps the European Commission and EU Member States and their social partners to develop a relevant European VET policy⁷.

Due to the very dynamic development of digital tools, modern manufacturing technologies such as 3D printing, the increasing importance of automation and robotization of production and precise measuring tools, there are problems on the market related to finding employees with appropriate professional qualifications in almost all European Union countries. It seems that VET education, especially at the level of sectoral schools, and a properly prepared offer of courses can contribute to solving the above-mentioned problems and contribute to economic growth and improvement of working conditions of employees, which is very important in the European Union, also due to the growing role of trade unions.

Comparing the presented VET system in Paraguay with the system in Poland, one can notice both common features and some differences. It is worth noting that Paraguay has a Technical Baccalaureate, organized into three modes (Industrial, Agricultural, and Services), which is not used in Poland. In addition, Paraguay has a National Catalog of Occupational Profiles which is based on as many as 5 levels of qualifications. In both countries, a long-term approach to the

⁷ <https://www.cedefop.europa.eu/pl/about-cedefop>



development of the VET industry is visible, as exemplified by the VET development programs in Paraguay for 2011-2024 and in Poland 2022-2025 and the European Union 2021-2030.

In Poland, due to the dynamically progressing industrial transformation 4.0 and very low unemployment, there is a shortage of qualified employees, in particular in the metal, electronic, electrotechnical and energy industries. This situation has a direct impact on the increase in salaries of qualified employees, which makes VET vocational education more and more popular in Poland and almost throughout the European Union. Numerous sectoral vocational schools and vocational training centers are being established in Poland, which closely cooperate with industrial centers, which play the role of patrons of given majors/specialties, strengthening the laboratory base and practical issues of science. It is worth noting that in order to increase the involvement of industry in vocational education, a package of facilities and improvements was developed and implemented in terms of tax reliefs for companies supporting schools providing vocational education as well as public institutions and centers. This situation increases the quality of the training provided and the adjustment of the content of education to the expectations of the local employment market.

It seems that due to the growing importance of VET both in Paraguay and in Poland, there is a need to analyze the existing mechanisms of functioning and, in some cases, to implement solutions to improve the education process with the adaptation of curricula adequate to the assessments and those planned to be implemented in the next few years.

3. Structure of the National Offer in VET

Technical and vocational training in Paraguay is promoted by two ministries: the Ministry of Education and Sciences (MEC) and the Ministry of Labor, Employment, and Social Security (METSS). Below is a detailed description of the vocational trainings offered by each of these ministries, coupled with a mapping of Technical and Vocational Training offers in the city of Asunción and the Central Department in the areas of Metal and Energy, which is the main focus of this diagnosis.

In addition to the Ministry of Education and Sciences and the Ministry of Labor, there are also various public organizations that play an important role in generating training and vocational programs in the country. Nevertheless, one of the challenges Paraguay faces is the lack of coordination and articulation among these institutions, which hinders the maximization of resources and efficiency in the provision of technical and vocational training.



3.1. Ministry of Education and Sciences (MEC):

As mentioned before, the Paraguayan educational system has various components dedicated to Technical and Vocational Education and Training. These include Technical Secondary Education, which provides comprehensive training to students in specific technical areas; Higher Technical Education, which focuses on providing advanced expertise and skills in specialized technical fields; Vocational Training for young people and adults, which aims to develop basic and advanced work skills; and Job Training, which aims to strengthen the skills required in the workplace.

Regarding the General Education System:

- a. Primary Education: In general, the cycles of Primary Education (EEB) are not oriented towards specific or specialized training for productive activities. However, within the curriculum of the Work and Technology Area, corresponding to the Second and Third Cycle of the EEB, three fundamental axes are addressed: Home, Microenterprise, and Enterprise. These axes emerged in response to social needs and demands in the production, distribution, and use of goods and services. Their objective is to facilitate the acquisition of basic labor skills and promote the responsible development of students according to their potential. Nevertheless, the Third Cycle offers the Agricultural Professional Initiation Program. This program seeks to meet the training needs of the rural sector, providing teenagers with basic tools to produce, process, consume, market, and manage the products of their family farms in a sustainable manner. Furthermore, upon completing this program, students can continue their middle-level studies.
- b. Secondary Education: In secondary education, there exists a difference between the Scientific and the Technical Baccalaureate. Both present a duration of three years and are aimed at young people aged 15 to 18 who have completed the Third Cycle of the EEB. The Scientific Baccalaureate emphasizes Social Sciences, Basic Sciences, and Arts and their Technologies.

- The Technical Baccalaureate:

It allows students to receive professional training that goes beyond the traditional definition of technicians in the current industrial and commercial field. The objective is for students to acquire basic competencies required in the workforce and obtain basic knowledge in a specific technological field. The areas and specialties offered pertain to the Industrial, Service, and Agricultural sectors. Currently, 27 specialties are being implemented in the economic sectors of agriculture, industry, and commerce, in 692 institutions that offer Technical Baccalaureate throughout the country. The training programs are organized into general and technical subjects, according to the sector they are targeting, thus allowing for the continuation of higher



education studies and more advanced technical training. Additionally, humanistic subjects and an optional plan that caters to the needs of each sector are included. The workload varies depending on the specialty, and the development of internships is encouraged.

The specialties offered in each sector include the following:

- Industrial Sector: Electricity, General Mechanics, Automotive Mechanics, Electromechanics, Electronics, Civil Construction, Industrial Chemistry, Industrial Manufacturing, Food Processing and Preservation, Metal Mechanics, Electrotechnics, and Mechatronics.
- Services Sector: Accounting, Business Administration, Marketing, Computer Science, Health, Graphic Design and Advertising, Geographical Sciences, Environmental Sciences, Sports Science, Hospitality and Tourism, Artisanal Production, Cooperative Movements and Journalism.
- Agricultural Sector: Agriculture and Agro-Mechanics.

On the other hand, Paraguay offers Vocational Technical Education: It is a modular curriculum offer that is articulated with higher education studies, as established by the General Education Law. It is aimed at graduates of the 9th grade or those who have not completed Basic School Education, provided they meet the minimum age requirement of 17 years and pass an examination regulated by the Ministry of Education and Sciences.

In 2022, according to the data of the School Map of the Ministry of Education and Sciences (MEC)⁸, the enrolment in secondary education in Paraguay reached 258,379 students. Out of this total, 23.5% (60,681) pertains to the technical baccalaureate programs. Within technical education, a total of 46,460 students are enrolled in educational institutions financed by the State through the MEC. The departments with the highest number of students in the various technical baccalaureate programs are the Central, Alto Paraná, Caaguazú, Itapúa, and Asunción departments. Regarding the Technical Industrial Baccalaureate, the School Map records a total of 8,174 students enrolled in 2022. In the Metal Mechanics specialty, there are 67 students, which represents 0.8% of the total number of students. In Electricity, there are 1,716 students, which represents 21% of the total number of students.

c. Higher Education: It is offered after secondary education and aims at the personal, academic, and professional development of students, as well as the creation of expertise, the development of thinking in various disciplines, and the extension of culture and services to society. There exist both university and non-university formats, and undergraduate degree programs offered by universities have a duration ranging from four to six years. Currently, the country has around 54 universities, of which 7 are national. In addition to universities, there exist Higher Institutes,

⁸ https://mapaescolar.mec.gov.py/mapa_escolar/maps/index



which are specialized training units in a specific field of science. These institutions offer both undergraduate and postgraduate programs.

Furthermore, higher-level technical courses are offered in the field of Higher Education. These programs consist of two or three-year courses with a modular curriculum designed according to the demands of the sector. Currently, these technical courses mainly focus on the tertiary sector of production (services), with a greater participation of the private sector. Unlike universities and higher education institutes, Higher Technical Institutes (ITS) must obtain approval from the Ministry of Education and Sciences to teach said courses. The accreditation of the programs is done in cohorts. ITS' offers are classified into Higher Technical courses and undergraduate workshop courses.

Higher Technical courses have a minimum duration of 1600 and a maximum of 2000 teaching hours, distributed over a period of two to three years, with a mandatory internship of at least 500 additional hours. To access these courses, completion of secondary education is required, and all titles and certificates at this educational level must be recognized and certified by the Ministry of Education.

Undergraduate workshop courses are short programs that address specific topics related to the institution's area of expertise. These courses can be conducted in-person, semi-face-to-face, or through distance learning, with a minimum workload of 40 teaching hours and not exceeding 300 hours. To enroll in these courses, having a high school or higher education degree is enough.

Currently, there are 409 accredited institutions throughout the country that offer programs in 22 out of the 23 professional families.

d. General Basic Education and Continuing Education: Additionally, the General Law on Education establishes two other forms of training: General Basic Education and Continuing Education. The objective of these programs is to offer an educational opportunity to young people and adults who left the educational system and intend to continue their academic training.

General Basic Education is conceived as a foundation for learning and lifelong human development. Its main objective is to empower individuals for the development of their character, work, conviviality, self-instruction, and self-management. It is aimed at people aged 15 or above who, due to various factors, were unable to access formal education or were forced to drop out of their studies.

On the other hand, Continuing Education is directed to young people and adults; it includes formal as well as non-formal programs. These programs cover academic and working aspects, providing the opportunity to acquire, update and develop knowledge in different areas of expertise. The Public Policy on Education for Young People and Adults 2011-2014 (MEC, 2011)



had established the importance of acquiring a fundamental set of skills, such as literacy. However, it has been recognized that these are not the only necessary skills.

Continuing Education Programs for Young People and Adults:

- **Formal and Non-formal Literacy:** this program is aimed at people aged 15 and above that are not able to read or write. In addition to literacy skills, basic training is provided in areas such as beauty therapy, tailoring and dressmaking, handicrafts, cooking, electricity, and gardening, with the aim of developing vocational skills that facilitate the entry in the job market.
- **Bilingual Basic Education for Young People and Adults (PJyA):** This formal program allows people aged 15 and above to complete their basic education. It is organized into four cycles, each lasting one academic year. Starting from the second cycle, Initial Vocational Training is incorporated; this is a non-formal program that aims to develop or reinforce basic work skills for a specific profession. Upon completing the fourth cycle, participants receive the certification of Graduate in Basic General Education and a certification as Assistant in the specialty of the chosen Initial Vocational Training.
- **Secondary Education for PJyA:** This formal program is designed for individuals aged 18 and above who wish to start or complete their secondary education. It consists of four semesters and can be implemented in in-person, hybrid, and distance learning modes. One option within this program is Secondary Education with vocational training in metal-mechanics, offered as hybrid learning. The metal-mechanics training aims to prepare individuals to work in the metallurgical sector. The vocational training component in metal-mechanics has a duration of two semesters, with theoretical and practical classes. Upon completing the four educational levels, participants obtain the title of Bachelor in Secondary Education for Young People and Adults. Additionally, upon completion of the Vocational Training component, including internships, a Level I Certificate in Metal-mechanics Vocational Training is awarded.
- **Initial Vocational Training:** This non-formal program has a duration of 80 hours and aims to develop key technical and social competencies necessary for the job market. Those who have completed the first cycle of Bilingual Basic Education for Young People and Adults or its equivalent in another educational modality, and are at least 16 years old, can participate in this program. Available specialties include handicrafts, design, tailoring and dressmaking, beauty therapy, languages, hospitality, gastronomy, tourism, community development, mechanics, and computer science. It is generally conducted in Resource Centers for Continuing Education and Basic Education Centers for Young People and Adults.
- **Vocational Training:** This non-formal program focuses on vocational training for a specific profession. Official Training and Skills Development Centers, private and subsidized, implement a specialized curriculum. The courses have a duration from 1 to 3 years, with varying hour loads. Young people and adults aged 15 and above, whether



they have completed primary education or not, can access this modality. Available specialties cover areas such as handicrafts, design, tailoring and dressmaking, beauty therapy, languages, hospitality, gastronomy, tourism, community development, mechanics, computer science, administration, and office skills.

3.1.1. MEC's Technical and Vocational Training programs in Asunción and the Central Department in the sectors of Metal and Energy.

Continuing Education MEC Training Center in Central y Asunción:

Escuela Taller; Avance; Del Sector Eléctrico S.A; San Lorenzo; IPADE. Observation: Metal and Energy specializations are basic and general.

Educational institutions under the MEC that offer the following specialties in Technical Baccalaureate

- a) Electricity: Colegio Técnico San Francisco, Colegio Técnico y Centro de Entrenamiento Vocacional Pdte. Carlos A. López, Colegio Técnico Nacional, Colegio Parroquial Subvencionado San Blas, Colegio Nacional Jardín de Itauguá, Colegio San José, Centro de Capacitación Técnica de Luque, Centro Educativo de Alto Desempeño de Luque, Colegio Nacional Pablo Patricio Bogarín y Colegio Nacional de E.M.D Arq. Tomás Romero Pereira, Colegio Técnico Departamental Dr. Eusebio Ayala.
- b) Electro-mechanics: Colegio y Escuela Técnica Sagrado Corazón de Jesús - Salesiano, Colegio Técnico Nacional y Colegio Nacional de E.M.R Dr. Fernando de la Mora.
- c) Electronics: Colegio Técnico y Centro de Entrenamiento Vocacional Pdte. Carlos A. López, Colegio Técnico Nacional, Colegio Politécnico Cooperativa Multiactiva Capiatá LTDA, Centro de Capacitación Técnica de Luque, Instituto Paraguayo de Telecomunicaciones y Centro Educativo de Alto Desempeño de Luque.
- d) Electrical engineering: Escuela Nacional de Comercio N°1 Alfonso B. Campos y Colegio Politécnico Privado Subvencionado Johannes Gutenberg.
- e) Auto Mechanics: Colegio Técnico y Centro de Entrenamiento Vocacional Pdte. Carlos A. López y Colegio Técnico Nacional.
- f) General Mechanics: Colegio Técnico y Centro de Entrenamiento Vocacional Pdte. Carlos A. López, Colegio Técnico Nacional, Colegio Nacional San José, Instituto Paraguayo de Telecomunicaciones y Colegio Nacional de E.M.D Arq. Tomás Romero Pereira.
- g) Mechatronics: Colegio y Escuela Técnica Sagrado Corazón de Jesús y Colegio Nacional de E.M.D Arq. Tomás Romero Pereira.

MEC's Vocational Training Institute' Options – MEC's Intermediate Level:



The specialization in Dual Electronics and Mechatronics is offered at the Colegio Técnico y Centro de Entrenamiento Vocacional Pdte. Carlos A. López. In the same way, the specialization in Dual Mechatronics is offered at the Colegio Técnico Departamental Dr. Eusebio Ayala.

Technical Professional Training Option – National University:

National University of Asunción - Faculty of Engineering - Paraguayan Institute of Telecommunications. Offer: Technical Industrial Baccalaureate in the specialties of Electronics, General Mechanics, and Technical Specialist in Mechanics.

National University of Asunción - Polytechnic Faculty. Offer: Professional Training in the specialty of Electricity, with the program in Technical Specialist in Electricity and emphasis on industrial electrical installations; Technical Specialist in Electricity with emphasis on industrial automation with PLC.

National University of Asunción - Faculty of Architecture, Design, and Art. Offer: Training in Digital Manufacturing; Digital manufacturing as a factor of territorial development; Digital manufacturing of printed circuit boards with CNC milling machine.

3.2. Ministry of Labor, Employment, and Social Security (METSS)

Within the MTESS, the General Directorate of Employment (DGE) holds responsibility for these tasks. To fulfill its mission, the MTESS has the National System for Vocational Training and Education (SINAFOCAL), a technical body responsible for designing and implementing professional and labor training programs in various areas.

Its main objective is to register, analyze, develop, and disseminate reports and research on the labor market to contribute to decision-making regarding active employment policies. This institution focuses on ensuring the quality of training offers, the certification of labor competencies, and the improvement of employability, aligned with the country's socio-economic potential and needs (SINAFOCAL, 2020).

On the other hand, the National Service for Professional Promotion (SNPP) works under the MTESS to offer technical and professional training in areas such as industry, construction, computer science, and administration, among others. According to the SNPP (2020), its training approach is focused on national development, as it provides immediate training responses to the demands of the labor market. Its wide range of courses covers various levels and sectors of the economy, reaching all national departments through its central headquarters, regional offices, sub-regional offices, collaborating centers, and mobile units.

Regarding the educational offers of the SNPP, the Higher Technical Program stands out. It is offered in three campuses: the Paraguay-Korea Advanced Technology Center (CTA), the Paraguay-Japan Professional Training Technology Center (CTFP-PJ), and the Paraguay-Japan Higher Technical Institute (ITS-PJ) in the Caaguazu Regional Office. Additionally, the SNPP offers



a variety of courses at the Higher Technician level in areas such as industrial electronics, industrial electricity, cooling systems and air conditioning, programming of computing tools, occupational risk management, industrial mechatronics, and industrial plant management.

3.2.1. MEC's Technical and Vocational Training programs in Asunción and the Central Department in the sectors of Metal and Energy.

Ministry of Labor Technical Training Offers, SINAFOCAL courses in Asunción y Central:

a) Family: Electricity, Electronics and Telecommunications (Modalities: face-to-face, distance and hybrid).

Areas: Refrigeration and air conditioning, Electronics, Electricity, Mechatronics.

Specialties: Maintenance and repair of refrigeration equipment, Installation of single-phase split air conditioner, Repair of cell phones, Electrician's assistant, Industrial maintenance in electricity, Analog PLC units, Alarm installer, Door-to-door electrician, Power factor improvement technique, Single-phase motor winding, EV3 robotics, Door-to-door electrician (e-learning system).

Specific proposals identified: CordeZ Program: Implementation of the STEM teaching methodology (Science, Technology, Engineering and Mathematics) that uses robotics as an educational platform, since this field is multidisciplinary.

b) Family: ICT - Informatics

Areas: Computer Science, PROCADIS.

Specialties: Informatics operator, Excel spreadsheet, Operator, Social network administration, Computerized typing, Information systems technologies, Network technology and connectivity, Google Drive Office Automation, Cloud computing, Basic technical drawing, PC maintenance and repair, Advanced Microsoft operator, Introduction to programming, Networks IV - SUBNETTING and VLSM technique, Bootstrap web design, Corel graphic design, Cybersecurity systems, Dreamweaver CC, AutoCAD 3D, Introduction to programming.

Technical Training Offer of the SNPP in Asunción and Central

a) Technological Center for Vocational Training Paraguay-Japan

Offers of Superior Technicians: Programming of computer applications, Industrial Mechatronics, Industrial Electricity, Industrial Electronics, Refrigeration and air conditioning, Occupational Risk Management, Industrial Plant Management. Characterization:

Mechatronics, composed of two modules: 1) Basic Operator and Basic Electronics or Basic Electricity, with the subjects Industrial Automatic Production Control, Industrial Maintenance in Electricity, Industrial Mechanical Maintenance, Industrial Maintenance in Electronics, Elevator Maintenance, Electropneumatic Control by PLC and Pneumatic and Hydraulic Technology. 2)



Sequential Control by Contact, with the subjects: PLC Automation, Advanced PLC Instructions, PLC Analog Units, HMI Human Machine Interface, SCADA Program and Sensor Use Technique.

Electricity, module of Technical Assistant in Electricity organized by: Design and Applications Assisted by PCO, Assemblies and Installations, Electrical Applications, Electromechanics, Theory and Measurement.

Electronics, composed of two modules: 1) Technical Assistant in Electronics, organized by: Cellular Telephony, Analog and digital circuits, Color TV repairer. 2) Electricity and Automobile Mechanics: Autotronics.

Welding, composed of: Safety and Hygiene in industrial welding, Oxyacetylene welding, Coated electrode welding, TIG welding, MIG/MAG welding.

b) Advanced Technology Center Paraguay - Korea

Superior Technical Offer: Superior Technician in ICT of Development of Computer Systems, Superior Technician in Fashion Design and Women's Clothing, Superior Technician in Mechatronics in Automation and Industrial Control, Superior Technician in Mechatronics in Industrial Robotics. Characterization:

Superior Technician in Mechatronics in Automation and Industrial Control, composed of modules: Analog Control, Digital Control, Electronic Power Control, Pneumatic Control, Electropneumatic Control, Microcontrollers, PLC Control (Programmed Logic Control), SCADA System and Industrial Communication.

Senior Technician in ICT Development of Computer Systems, composed of modules: Introduction to information systems technologies, Web design, Network technology and connectivity, Administration of active network equipment, Java web programming, Web programming ASP.NET, Visual Basic .Net programming, Java Swing object-oriented programming, Report design with Jasperreport, Installation and configuration of Windows Server infrastructure server, Technical support for PC, Community Manager, Cloud computing management, Back-End Programming with PHP, Web programming with PHP, Basic 3D printer operator, C Programming Fundamentals, MYSQL database fundamentals, Online stores and catalogs with PRESTASHOP.

Superior Technician in Mechatronics in Industrial Robotics (No information has been accessed on its curricular composition).

In Poland, vocational education is provided depending on the age and situation of the employee, and one can distinguish the classic way that is included in the compulsory schooling, as well as the education after the end of compulsory education.



- The first (classic) path assumes vocational education in the field of compulsory education by completing a five-year technical school or a first and second degree sectoral school.
- The second way is related to lifelong learning and the implementation of preparatory courses for performing certain types of professions or participation in training.

In the case of the classic form of education, major changes have been made since 2019 to improve the vocational education process⁹. One of the key issues is the extension of education in technical schools (ISCED 354) from 4 to 5 years, followed by a professional exam and the matriculation exam, the passing of which entitles you to apply for further academic education, for example in the profession of engineering (3-4 years) with the possibility of obtaining a master's degree (additional 1-2 years). In addition, basic vocational schools were replaced by the introduction of 1st and 2nd degree sectoral schools.

- First stage sectoral vocational school (ISCED 353) lasts 3 years and ends with a vocational examination. In addition, it allows to obtain professional qualifications after passing a professional exam confirming qualifications in a given profession. After graduating from this school, there is a possibility of further education in the 2nd year of high school for adults or in a second-stage sectoral vocational school.
- A second stage sectoral vocational school lasts two years, and you can start studying there after graduating from a first stage sectoral vocational school. After graduating from a second-stage sectoral vocational school, another vocational exam and the matura exam take place, which also entitles students to pursue further academic education.

The Polish education system also includes the possibility of education in two additional forms:

- three-year special schools preparing for work (ISCED 243) for people with special educational needs, which allow obtaining a certificate confirming readiness for work,
- work preparation units for people with special educational needs in primary schools (ISCED 243).

At post-secondary level, vocational qualifications can be obtained in post-secondary schools (ISCED 453) lasting from one to two and a half years. The advantage of these schools is that they are focused strictly on vocational training, as they do not include general education. In order to be able to attend such a school, candidates should have a secondary or vocational secondary education. The work-based learning (WBL) varies according to the type of school. The lowest WBL is for technical colleges and the highest for post-secondary schools. Practical classes are

⁹ Wasilewska O., Matuszczak K., Kształcenie i szkolenie zawodowe w POLSCE – w pigułce, Instytut Badań Edukacyjnych, 2019.



conducted in school workshops, continuing education centres, vocational training centers and industry. In technical and post-secondary schools, and in the future also in sectoral (secondary) vocational schools, vocational (industrial) apprenticeships increasing the level of VET education are obligatory and last from 4 to 12 weeks, depending on the type of occupation.

Vocational qualifications can be obtained at any age, e.g. through participation in vocational qualification courses that take place in continuing education institutions, vocational training centres, schools providing vocational training, labor market institutions, entities conducting educational activity.

An important information is the fact that the certificate of completion of the vocational qualification course issued after its completion does not confirm professional qualifications (list of qualifications¹⁰), because the only official document confirming the possession of professional qualifications is the certificate of professional qualification issued by the regional examination board after professional examination. Qualification courses can be held in daytime, stationary and extramural mode. Participation in the course is free.

Important centers implementing vocational education are Vocational Education Centers – (in polish: Centrum Kształcenia Zawodowego - CKZ) and Continuing Education Centers, achieving very good learning outcomes. In order to intensify the work on the development of VET in Poland, the Ministry of Education and Science developed and in 2022 published a special action plan in the field of vocational education and training for the years 2022-2025¹¹. The key activities under this program regarding the VET industry include: support for people with disabilities in transition to the labor market, expanding the offer of additional professional skills and market qualifications, including those related to the energy and digital transformation, expanding the range of multimedia materials used in VET education, digitalization of vocational exams, the use of micro-qualifications, improving the quality and preparation of new staff in the VET industry, monitoring the careers of graduates, increasing the educational mobility of students, coordinating the lifelong learning policy.

In Poland, vocational education is provided in 229 professions, where professional qualifications are distinguished, which are a set of knowledge, skills and competences, after acquiring which one can perform specific tasks and perform certain activities. In the first-stage sectoral vocational school, one qualification was distinguished, and in the second-stage sectoral vocational school or technical and post-secondary school - one or two. The description of education in individual professions, including the set of compulsory teaching content, has been described in the form of expected learning outcomes. In addition, the criteria and the method

¹⁰ <https://efs.mein.gov.pl/wp-content/uploads/2019/07/Za%C5%82%C4%85cznik-nr-12-Szczeg%C3%B3w-lista-kwalifikacji-o-kt%C3%B3rej-mowa-w-kryterium-dost%C4%99pu-nr-5.pdf>

¹¹ Ministerstwo Edukacji i Nauki, Plan działań w zakresie kształcenia i szkolenia zawodowego na lata 2022-2025, Warszawa 2022.



of their verification, defined by the core curriculum for vocational education are also presented in detail. The core curriculum also includes all other necessary aspects, such as school equipment necessary to provide education in the field of individual qualifications and the minimum number of hours to implement the teaching content. Currently, the growing voice of employers is also taken into account in the process of developing educational programs, which allows the content of education to be adapted to the needs of the local labor market. However, the program must take into account the core curriculum for a given profession, but it may also include teaching content that goes beyond the scope of the core curriculum. Importantly, professional qualifications are confirmed in the system of external professional examinations (professional qualification certificate) and are carried out separately for each specific qualification.

Comparing detailed data on the structure of the vocational education system in Paraguay and Poland, there are clear similarities in the education system, but there are also differences in the approach to lifelong learning, as well as the courses and their certification. It seems that the activities carried out under the metavet program will allow for the exchange of experience in this area and will enrich the knowledge with the experience of project partners from both LAC and EU countries.

4. Private offer

Within the private sector, the offer of technical training by companies of industrial products stands out. These companies offer technical training programs focused on their own products, which is highly effective, since they are short, free courses and focus on the use of specific products used in the industry. In contrast, country's training institutes use obsolete models or brands that are not present in the current market. It is important to mention that these courses are usually non-formal and are certified by the same company supplying the brand. Some industrial products companies that offer closed technical training: Everest Engineering, Provindus, Epon, Electropar, Electromotor.

In addition, private vocational training institutes are also identified. Some offers of Private Technical and Vocational Training Institutes in the city of Asunción and the Central Department:

- Kolping Foundation. Offer: General courses in Mechanics, Basic Electronics, Automotive Mechatronics, Industrial Maintenance, and Technicians in Professional Automotive Mechanics; Senior technician in industrial maintenance. Observation: There are courses that have the possibility of Itaipu scholarships; has an agreement with the Chamber of Automotive and Machinery Distributors (CADAM).
- Center for Robotic Integration of Latin America (CIRAL). Offer: Special courses in the Robot Automation Education System (SEAR). They are modular courses and seek to



- prepare students in two specific areas: Robotics and Automation for the Industrial sector; Industrial Design and Robotics Line Simulation.
- Superior Technical Institute of the Paraguayan Center for Production and Quality (ITS CEPROCAL). Offer: Superior Technician in Industrial Mechatronics. Observation: IPU Centre oversees the Provision of Consultancy and Training Services.
 - Salesian Technical School "Don Bosco". Offer: Industrial Mechanics, Mechanical Turnery, Electronics, PLC 1 Programming, Electricity.
 - Superior Technical Institute of Electricity. Offer: Workshop Course "Solar Energy", Workshop Course "Electric Energy Distribution Systems", Workshop Course "Automation Systems and Control of Industrial Processes". Closed courses: Industrial Automation, Programmable Logic Controllers (PLC), Power Factor Correction, Industrial Electricity, Photovoltaic Solar Energy, Solar Thermal Energy, among others. Career "Superior Technician in Electricity", Career "Superior Technician in Electromechanics", Career "Superior Technician in Mechatronics".
 - UCSA Technology Center Offering: Cisco Networking Academy Courses; Furukawa Courses; Local Academy Courses; Oracle Database Course. The offer is mostly virtual, but has some face-to-face, hybrid and virtual.
 - MERCOSUR Innovation Center (CENIEM). Offer: Educational Robotics Course; Mechanical, Electrical Industrial Level. Comotica. Observation: Training relations with companies: Tupi household appliances and automotive.
 - Center for Professional Training and Training of the Energy Sector (CEFOCAPE). Offer: Electricity Level I, II, and Industrial.

In Poland, analyzing the private vocational education, it can be said that only a small part of it covers secondary education, i.e. sectoral VET schools or technical schools. To a large extent, however, it is focused on the offer of courses improving professional qualifications or preparing for passing a professional exam, which is a kind of supplement to state institutions in this area.

Of great interest in the context of improving the competences of employees present on the labor market or entering the market are courses conducted by specialized companies that provide technology for a given type of industry, where an example may be courses on the use of CNC machine tools or CAD and CAM software conducted by distributors of machines and devices. Such courses, however, are usually paid, but they allow you to quickly acquire knowledge about a given technology and enable you to take up employment using it, because in the case of highly specialized equipment, these courses enjoy a great reputation. Of course, these courses allow for improving the competences of already employed employees as well as acquiring them by new employees entering the labor market. Unfortunately, they do not end with a national certificate, but only with a company confirmation of participation or passing the exam. This short form of training will certainly develop very dynamically due to the needs of the labor market and the need to implement modern industry 4.0 tools. Perhaps it would be worth introducing the possibility of certification of such industrial short training courses in both analyzed countries.



5. Fields of Innovation

Following, challenges and opportunities related to this field are presented, with a special focus on the sectors of energy, metal, and technological innovation. These emerged from the literature review and interviews with key stakeholders in the field of technical and vocational training in Paraguay. It should be noted that the perspective was centered on the dynamics of the Central Department and Asunción, which could be a limitation when thinking about opportunities at the national level. This owes to the fact that Paraguay is characterized by a productive variety across its territory, variety that generates diverse offers and possibilities in different areas.

Challenges in Technical and Vocational Training: There is a growing demand for professionals with skills in areas such as programming, web development, cybersecurity, data analysis, and artificial intelligence. However, training in these areas is still inadequate, thus creating a gap between the demand and the supply of talent. Likewise, it is necessary to foster entrepreneurial and innovation skills among the Paraguayan population, such as critical thinking, creativity, problem-solving, teamwork, and business management, as well as digital literacy and basic competencies. There exists a gap in basic digital skills, such as the use of productivity tools and the comprehension basic technology concepts. Another element to consider is that the growth of e-commerce requires skills in areas such as online store management, digital marketing, social media management, and data analysis for online decision-making. Many companies and entrepreneurs lack these skills, thus reducing the use of e-commerce for their businesses. Regarding the needs of the industrial sector, there is a deficit in the electricity and electronics field, especially in the handling and programming of PLCs (Programmable Logic Controllers) and mechatronics. Although the engineering faculty offers training in these fields, these latter still present a lack of trained professionals.

Regarding gaps, attention should be paid to the gap in access to and use of digital technology, especially in rural areas and low-income communities. This limits the acquisition of necessary digital skills to fully participate in the digital economy.

When analyzing the Polish vocational education, taking into account the needs of the European Union countries in terms of innovation, it is worth paying special attention to several issues, primarily related to the energy transformation and the challenges of industry 4.0. Such a situation causes that new jobs are created regarding the employment of people dealing with new technologies for the energy industry. These issues relate to the ability to operate power equipment, its servicing, as well as assembly and production. These technologies are relatively new on the Polish market, which means that they are not always used during currently implemented VET activities. The solution to this problem on the Polish labor market may be the recently implemented formula of patronage by industrial companies of classes, for example in

Vocational Education Centers, certainly increases access to laboratory equipment and modern technologies.



In terms of VET Innovation, all European Union countries put a lot of emphasis on digitization aspects. Both the digitization of industry and digitization in teaching methods. The problem of digitization is not only about the transition to a digital format, but about ensuring wide access to information online and, most importantly, ensuring a high level of security of stored data.

Cybersecurity is one of the important challenges of VET training in European Union countries. This aspect also applies to working in the cloud or using tools such as the Internet of Things. Many intrusions into the internal networks of companies are made due to the lack of proper behavior by employees of enterprises, hence it is so important to take this aspect into account in VET activities in the future.

Optimization of production in the era of LEAN manufacturing is another challenge that determines the use of modern innovative tools both in industry and during training and VET education. These issues will certainly be addressed more and more in the future.

It is worth noting the recently very popular model of partially or fully online work in Poland and EU countries especially after COVID pandemic, where the use of innovative digital tools is almost indispensable.

Educational centers must strive to increase the share of modern equipment in their laboratories. This is due to the clear increase in the complexity of all products: cars, telephones, household appliances, and in many cases vocational education and training is focused on learning how to service, repair and operate such devices, which is a real challenge due to the implementing innovations in everyday products.

Comparing the technological challenges of both countries, one can clearly see similarities in key areas, such as the challenges related to the digitization of industry and emerging cybersecurity problems, as well as issues related to the need to implement all types of innovations, especially in the metal industry.

In addition, it is a great challenge to start the implementation of modern teaching tools in VET education in both countries, such as simulators, digital software, precise measuring instruments, 3D printing and many others related to the ongoing industrial revolution 4.0.

6. Conclusions

Technical and vocational training in Paraguay faces various challenges, such as gaps in digital skills, lack of infrastructure and equipment, and a mismatch between the educational curriculum and the demands of the labor market. However, there exist opportunities to improve vocational



training through strategic partnerships, teacher training, and skills development in emerging sectors.

It is essential to promote coordination between the public and private sectors to address these challenges and fully leverage the opportunities in the field of technical and vocational training in the country. While there exists a wide range of educational offers coming from the public sector, it is evident that there is still a significant gap between these offers and the innovation needs expressed by the private sector.

The trajectory of technical and vocational training is largely influenced by the market and the private sector. In light of this situation, it is necessary to question whether the necessary conditions are being created and if they are framed within a national development model that promotes job creation, rights, and a better quality of life for the population.

In the face of these challenges and opportunities, it is essential to establish an open and constructive dialogue that allows for the creation of strong ties with the industrial sector. This will contribute to creating the necessary conditions and guarantees to promote more effective technical and vocational training aligned with the demands and necessities of the labor market.

Analysing vocational education system in Poland, EU and the labor market and its needs, several conclusions can be drawn:

The recent reform of education, including vocational training, and the implemented action plan for 2022-2025 in Poland introduces many good changes regarding VET education. Cooperation between the industry and vocational training centers has been improved, which should certainly contribute to a better adjustment of the education program and make it much more focused on practical skills with the use of an industrial equipment and training base.

Extending the period of education in technical schools should also improve the quality of education, in particular when combining European tools to improve mobility, for example, which is implemented under the Erasmus + program in all European Union countries. It seems that European tools and support for mobility in this area will allow employees to gain international experience as part of VET learning. These issues are now measurable issues, due to the fact that monitoring of employees' careers has now started in Poland.

A big challenge due to the very dynamic development of industry and digitization are problems related to the provision of appropriate staff responsible for conducting didactic classes.

Summing up the situation of Vocational Education both in Paraguay and in Poland, it can be said that there are differences in terms of required skills depending on the dominant industrial sectors, however, the VET education system is currently being strengthened and developing in both countries, which is an optimistic issue. At the same time, the implementation of this metavet project will certainly increase awareness about the advantages and disadvantages of



both VET models implemented in Paraguay and Poland and in the future will allow for the development and introduction of new teaching methods and innovations.

The logo for 'metavet' features a stylized, wavy orange and red graphic above the word 'metavet' in a bold, black, lowercase sans-serif font.

metavet



Funded by the European Union. The opinions and positions expressed in this text are solely those of the author and do not necessarily reflect the views of the European Union or the European Commission. The European Union and the funding body cannot be held responsible for them.



Co-funded by
the European Union