



Into the Digital Future: Gender, Technology, and Skilling in Latin America

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Introduction

It is evident that the pervasion of new digital technologies can create new employment opportunities in industries and occupations related to Information Technologies (ITs). The realisation of these opportunities, however, relies on the acquisition of skills and competencies necessary to thrive in the new digital economy.

The impact that these new technologies have on women, who have historically faced disadvantages in the labour market, is particularly complex. On the one hand, there is a shift toward more flexible forms of work—notably in the platform economy—that could foster entrepreneurial initiatives and make remote and digital professional careers viable. On the other, the IT industry offers new work opportunities, offering higher wages and better working conditions. These changes have the potential to allow women opportunities to expand their personal and professional development pathways. However, a persisting gender gap in digital and technical skills remains a major challenge, hindering their ability to benefit from the opportunities that the digital economy births.

The gender disparity in women's access to education in crucial fields such as science, technology, engineering, and mathematics (STEM) is well-documented and remains a global challenge. However, there limited evidence is available on alternative pathways for training in labour market segments related to new technologies, particularly through Technical and Vocational Education and Training (TVET) systems. TVET, encompassing skill development programs

at various levels and fields of study, serves as an avenue for individuals seeking to learn the skills and competencies related to specific occupations and areas of professional development. In this report, we focus on evaluating the participation of women in TVET, with a specific emphasis on paths relating to IT.

This report is based on an exploratory-descriptive methodological strategy, the analysis of secondary data to characterise Latin America and the Caribbean's labour markets with a gender lens, and the examination of TVET systems of three Latin American countries: Argentina, Chile, and Colombia. We conducted semi-structured interviews with government officials and field experts from the selected countries.

The three countries were chosen as national case studies due to their varying TVET systems. In Argentina, formal TVET is governed by the National Institute of Technological Education (INET). Trade unions also play a significant role in managing and overseeing programs across local jurisdictions. In Chile, the private sector—supervised by the Ministry of Labour—is a major supplier of job training programs. In Colombia, the National Learning Service (SENA) takes the central role, operating under the Ministry of Labour and involving both government and private sector participation in training program development and execution. By covering these three regions, we sought to take into account the diverse and heterogeneous nature of the Latin American vocational training ecosystem.¹

The study uncovers significant gender disparities in IT-oriented TVET across multiple levels. At the secondary education level, women in these specific fields represent only 24 percent of the enrolment in Chile and 30 percent in Argentina. The gap persists at the higher education level; in Colombia and Argentina, a mere 25 percent and 30 percent of students in Information and Communication Technologies (ICT) TVET courses are women. In professional training—the TVET segment oriented to the lower-skilled segments of labour markets—the share of women enrolled in IT-related courses is typically lower than that of male students as well as that of women in the overall professional training level.

The analysis reveals incipient yet meaningful advancements in the gender agenda in the three countries under analysis, marked by actions to broaden women's access to traditionally male-dominated training programs. Specific measures, such as implementing quotas in certain training programs, aim to democratise opportunities. Efforts are also being made towards supporting and enhancing women's educational journeys. In addition

to formal TVET systems, informal or non-formal gender-sensitive job training initiatives and programs are being implemented by various governmental bodies in collaboration with stakeholders from the IT industry or civil society organisations. These programs often offer more flexible formats, and are better aligned with the needs of many women, even if the certifications obtained may not be formally recognised by the educational system.

This report aims to shed light on the complex relationships between the vocational and technical skills development system, the effects of technological change on labour markets, and gender equity in Latin America. In Section 2, we provide use a gender lens to offer an overview of the key trends influencing current and future labour markets in the region. Section 3 delves into TVET systems in Argentina, Chile, and Colombia, focusing on gender disparities in technology-oriented programs. Finally, in Section 4, we assess how training proposals integrate gender policies that specifically foster the development of technology skills among women.

Labour market trend analysis for Latin America & the Caribbean

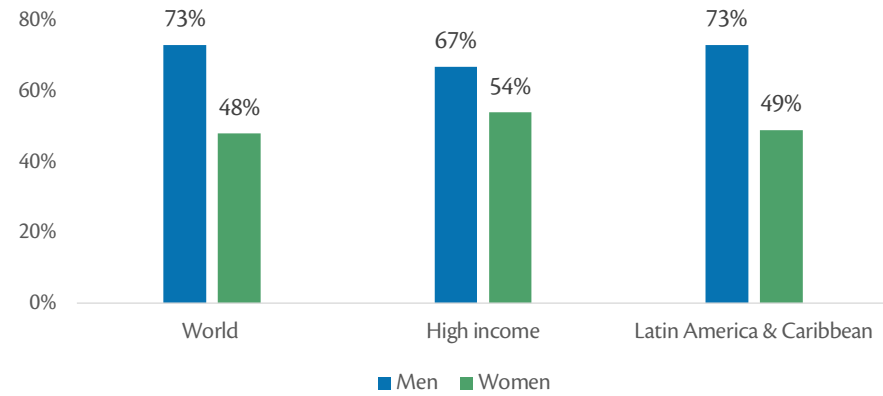
How forward-looking and responsive TVET systems are depends on the characteristics of the labour market and the economic context they serve. With the primary goal of facilitating access to employment opportunities, TVET tends to mirror the existing economic landscapes, concentrating training efforts in prevailing areas and industries. An orientation toward future-oriented jobs is not inherent to training systems, and requires deliberate coordination efforts involving TVET governance bodies, policymakers planning for production policies, leaders of strategic industries, and workforce representation.

In this section, we explore the existing economic and occupational structures of Latin America and the Caribbean (LAC) to identify the most relevant industries and occupational profiles. Identifying the prevalent industries is central to an understanding of the actual demand for work and skills. To do this, we rely on sectorial and occupational data published at the country level by the International Labour Organisation (ILO) and the World Bank in 2023. As part of the analysis, we look into the gender composition of industries and jobs in the region, with a focus on those considered to be more resilient to ongoing technological trends, or more “future-oriented.” We compare the share of women in these areas with that of high-income countries and global averages to assess the extent to which women are represented in forward-looking occupations, such as those in science and technology.

The first key difference that emerges between working-age men and women is reflected in the labour force participation rates. Worldwide, seven out of 10 working-age men are engaged in the labour force—either employed or actively seeking employment. In contrast, this figure drops to five out of 10 for women. This discrepancy is mirrored in LAC, where participation trends closely resemble the global averages. Specifically, 73 percent of working-age men in the region are active participants in the labour force, compared to only 49 percent of their female counterparts. The gender participation gap is considerably smaller in high-income countries, where the rate of men in the working force drops five percentage points with respect to LAC's, and that of women increases by 6 points. Figure 1 illustrates how high-income countries exhibit a 13-percentage-point gender gap in participation rates, while LAC sees a 22-percentage-point gap.

The low participation rates of women contribute, in turn, to an unbalanced labour market in LAC, where women make up only 42 percent of the workforce despite representing 52 percent of the working-age population. Their lower engagement in the labour force is associated with women's historically larger share of responsibilities in household and care tasks, which are unremunerated and often not included in national accounts.² In this context, it is crucial to keep in mind that gender analyses based on labour market statistics exclude a considerable share of Latin American working-age women.

Figure 1
Labour force participation by gender



Source: Own elaboration based on International Labour Organisation (ILO, 2023).
Note: Average values for each aggregate were computed based on the most recent data available for each country as of January 2023.

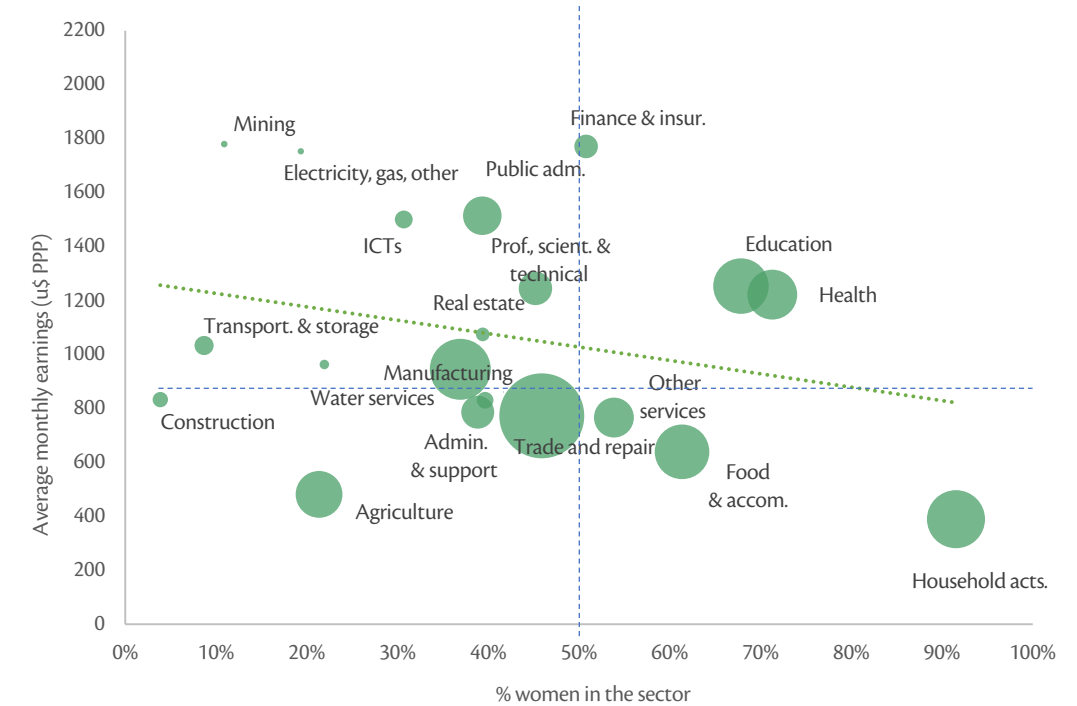
For women who are part of the labour force, some challenging working conditions prevail. In terms of job access, while high-income countries exhibit gender-neutral patterns of unemployment, the unemployment rate for women is 11.8 percent in Latin America, nearly four percentage points higher than for men. Informality, on the other hand, is considerable for all workers, with the informality rate in the region standing at 52 percent for women and 54 percent for men.³

Women also tend to earn less than men. Figure 2 depicts a negative correlation between average earnings at the sectorial level (vertical axis) and the share of women in each sector (horizontal axis). At the bottom-right quadrant are sectors like household services, other services, and food and accommodation, where wages (and productivity) are lower and women are over-represented. In Latin America, education and health emerge as the two main female-predominant sectors with above-average earnings, where

women constitute approximately 70 percent of the workforce. In contrast, women constitute a minority in well-paid sectors such as mining, electricity, public administration, real estate, transportation and storage, and our focal industry, IT. The financial industry, professional and scientific sector, and trade show a more balanced gender representation, with women making up nearly half of the workforce.

Certain sectors have been identified as “future-oriented” due to their resilience in the face of continuous changes in technology, demography, and other domains. These sectors, such as health and education, are expected to experience growth in demand as they are enhanced rather than threatened by new technologies and aging populations. The health sector is considered strategic in light of the demographic shift towards aging populations, which tends to increase the demand for health services. Similarly, education is crucial due to the rising demand for early education and continuous learning

Figure 2
Average earnings (US\$ PPP) and female participation (%) by sector in LAC



Source: Own elaboration based on World Bank data (2023)
Note: The size of the bubbles indicates the relative number of employees in each sector. The left and right quadrants are delimited by gender equality in sectorial participation, that is a 50 percent share of women in a given sector, while the top and bottom quadrants are divided at the overall average earning level in LAC.

throughout life. Women constitute the majority in these areas, as well as in other sectors within the care economy. Nevertheless, their integration is notably lower in industries responding to technological change trends. In the crucial ICT fields, strategic due to their key role in developing and supplying essential technologies to the broader economy, women only constitute 30 percent of workforce.⁴

A clearer picture emerges when occupations are considered instead of sectors. Drawing on the

literature specifically related to the impact of technological change on labour markets, certain job categories are deemed more compatible with technological advancements, while others are more subject to automation. Automation refers to the use of advanced technologies—such as artificial intelligence and robotics—to perform tasks traditionally carried out by humans. These technologies have the potential to transform industries and occupations, impacting the nature of work and requiring adaptation in the skills and competencies of the workforce.⁵

We apply the methodology developed by Frey and Osborne to assess the potential automation of jobs in Latin America: we classify occupations into three groups—those with low feasibility for automation (depicted in green in Figure 3), those with high feasibility (represented in grey tones), and those in-between (highlighted in yellow).⁶ Management and professional roles involve a smaller proportion of tasks

susceptible to automation. Conversely, occupations related to elementary work, clerical work, sales, and machine operation, are considered highly susceptible to automation. Technicians, craft and trade-related workers, and agricultural jobs fall in the middle range.

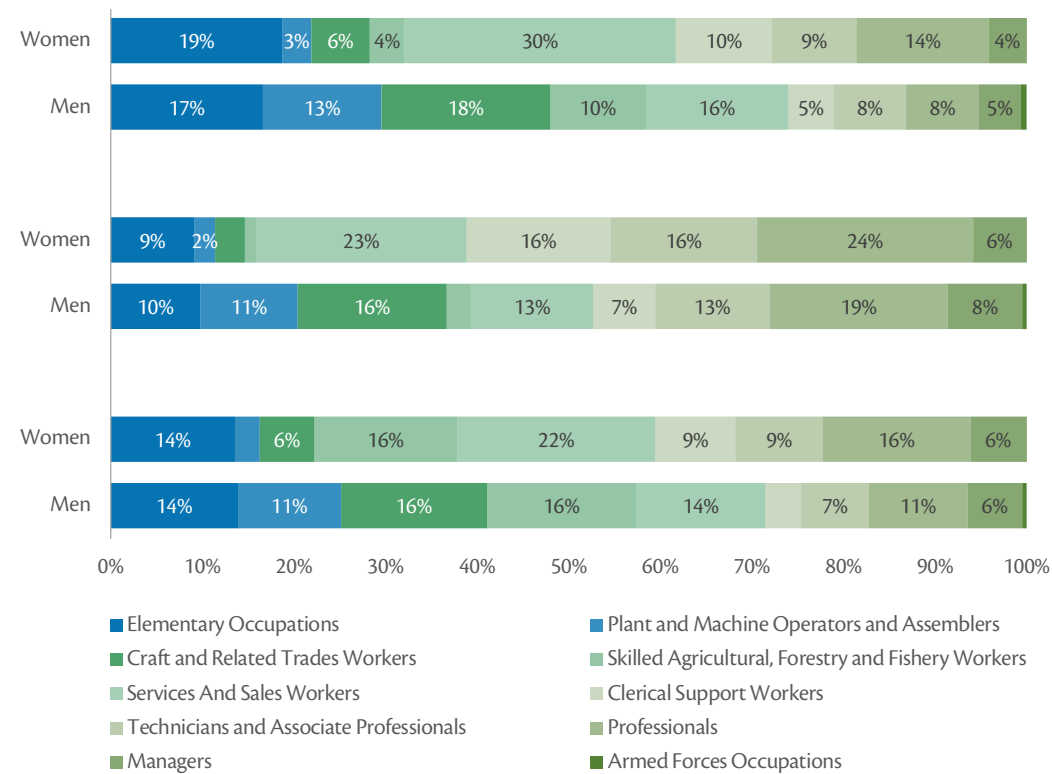
As shown in Figure 3, when considering the feasibility of automation, a larger percentage of employed

women are in “safe” occupations compared to men. In Latin America, this is mostly explained by a large share of women in professional roles among those who work (14 percent of the female workforce, compared to 8 percent of men). This, in turn, may be influenced by the higher participation of women in university studies. However, women are also a majority at the other end of the automation spectrum: when combining elementary occupations, service and sales workers, machine operators, and clerical workers (those depicted in grey on Figure 3), 62 percent of working women are in highly-automatable occupations, while the same category encompasses 51 percent of men. This can be attributed to the high participation of women in service and sales, and clerical work, where their involvement is twice that of men. Thus, while women are concentrated more at the extremes of the automation scale, male workers tend to occupy more mid-range occupations

related to craft and trade, agriculture, and technician work. A critical distinction between LAC and high-income countries is that the latter have significantly larger shares of managers and professionals and fewer employees in high-risk occupations, attributable to more modern economic structures.

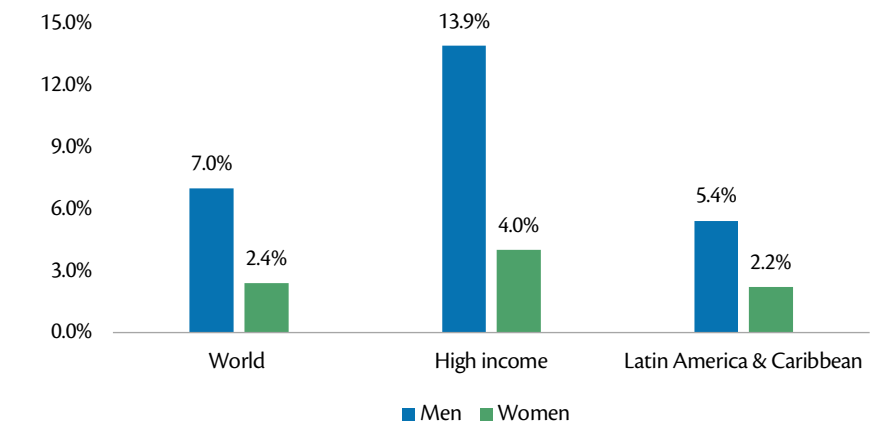
The prevalence of jobs specifically related to science and technology is a crucial aspect to consider when assessing how forward-looking an occupational structure is. These roles are critical in fostering a forward-looking innovation ecosystem, driving technological advancements, and adapting existing technologies. A robust science and technology sector is essential for harnessing the benefits of emerging technologies and for supplying resilient and good-quality jobs to the workforce. In order to examine the science and technology occupations, we worked with more granular occupational data and followed López-

Figure 3
Occupations by share (%) and gender



Source: Own elaboration based on World Bank (2023) data and Frey and Osborne (2017)
Note: Occupations with a low proportion of automatable tasks (index values between 0 and 0.3) are depicted in green tones, those with a high proportion of automatable tasks (values between 0.7 and 1) are represented in grey tones, and those falling in-between are shown in the yellow tones.

Figure 4
Labour force participation by gender



Source: Own elaboration based on International Labour Organisation (ILO, 2023).
Note: Average values for each aggregate were computed based on the most recent data available for each country as of January 2023.

Bassols et al.⁷ in selecting professionals and technicians in the areas of science and technology, and ICT.

As depicted in Figure 4, work opportunities in science and technology are scarce in LAC, where they only account for 2.2 percent of women's employment and 5.4 percent of men's. This is in stark contrast with high-income countries, where these occupations employ 4 percent of women and almost 14 percent of male workers. To put it simply, the likelihood of a Latin American woman working in science and technology would nearly double if she were in a high-income country, or more than double if she were a man in her own region.

Despite the differing sizes of the science and technology sectors in various countries, women consistently

constitute a minority in these roles. As these jobs tend to offer better remunerations and working conditions than average, their underrepresentation in these fields contributes to the overall gender gaps observed in labour markets across the world. The root causes of the low female participation in science and technology are many but can be partially traced back to women's educational trajectories. Just like the gender gap in women studying Science, Technology, Engineering, and Math (STEM) fields is well documented—they represent only 35 percent of graduates in LAC⁸—similar patterns are observed in alternative paths. The rest of this report shifts focus to Technical and Vocational Education and Training, a critical set of educational pathways that can also lead to technology-focused careers.

Gender and technology in the Technical and Vocational Education and Training system

Technical and Vocational Education and Training in Latin America

In broad terms, TVET comprises different educational modalities that integrate theoretical and practical skills, knowledge, and competencies, tailored for distinct occupational fields or the broader labour market.⁹ Many institutions and mechanisms come together to achieve this, ranging from formal education avenues at the secondary or higher

education levels to informal ones, such as courses typically referred to as training for work or vocational training. This heterogeneous landscape, marked by a blend of public and private initiatives, results in intersecting—and often conflicting—interests in the coordination of training programs. TVET's institutional arrangements stand out as the most diverse component of national education systems, incorporating diverse structures and programs that often operate in parallel, independent paths.¹⁰

Formal systems of TVET in LAC generally include the following levels:

- » Secondary technical education (ISCED 2 and 3)¹¹, an elective secondary education-level modality with specific institutional arrangements varying in different countries and even within them.
- » Higher technical education (ISCED 4 and 5), encompassing both post-secondary and higher education levels with a technical or technological focus.¹² These programs are typically offered by non-university centres.
- » Professional training (ISCED 4) focuses on developing skills and techniques tailored to specific occupations or personal and economic advancement goals and may not necessarily require the completion of secondary school.¹³ Furthermore, in some countries, successful completion of programs at this level may grant access to higher education.

TVET in Latin America has adopted the following common and unique features: a) training offering organised around large national institutions, such as the National Service Learning (SENA) in Colombia or, in some cases, institutions that are simultaneously national and sectoral; b) governance bodies involving employers, workers and government representatives; c) financing sustained through mandatory payroll contributions from companies; and d) autonomy with respect to regular education systems and in closer proximity with the labour market.

The institutional responsibility of both secondary technical and higher technical levels of TVET predominantly falls within the domain of ministries

of education in most Latin American countries. Regulatory aspects are generally governed by the organic education laws, with exceptions like Argentina, which has a specific legislation and regulatory entity dedicated to TVET.

In addition to formal TVET education, Latin America hosts a range of informal and non-formal training programs facilitated by public or private actors. These programs have diverse purposes and structures, often operate concurrently with formal systems, and, when the public sector is involved, may run under different ministerial departments. Although coordination with the formal tracks is mostly absent, they play a significant role in training the workforce and the unemployed.

Despite the strengths of these long-standing, highly institutionalised TVET systems, the region faces challenges. According to a study by CINTERFOR,¹⁴ the skills gap in the region is substantial and persists despite the historical trend of growth in the number of workers with higher educational levels. Furthermore, ongoing technological transformations have fostered a shared understanding of the crucial role of digital skills, emphasising the significance of TVET in this context. Such challenges, in turn, are intertwined with, and exacerbated by, another unresolved issue that strongly characterises TVET-related trajectories: gender inequality.

Training on new technologies: A Challenge in Terms of Gender

Studies¹⁵ indicate that individuals engaged in the digital economy tend to be younger and more highly educated compared to the broader workforce. However, as illustrated in Section 2, these sectors

reflect a sharp gender imbalance, with women significantly underrepresented both in ICT sectors and the broader science and technology occupational category. Gender disparity in technology-intensive jobs goes beyond participation and has been researched for decades, with academic papers emphasising gaps in wages, working conditions, training, and professional promotion.¹⁶ With regard to digital skills, the evidence reveals differences that significantly affect the quality of job opportunities available to each gender.¹⁷ For instance, when it comes to expertise in the digital—tasks like sending emails with attachments, using spreadsheets, or writing computer programs—women rank lower than men in practically every region.¹⁸ Such imbalance challenges the need to transform the region’s labour markets to meet the increasing demand for technological skills as much as women’s possibilities to take part in this growing segment.

In a landscape that necessitates equipping workers with digital skills, TVET plays a pivotal role. However, access to such programs is notably limited for women, especially in the domain of IT-related skills.¹⁹ Having developed from the needs of the mid-20th century manufacturing sector, technical and vocational education has historically been tailored toward male workers. Although the imperative to increase women’s access to TVET has reached the Sustainable Development Goals (SDG), a recent regional study stresses that vocational training programs—especially those focused on STEM—are still predominantly perceived as male-oriented.²⁰ Figure 5 illustrates that the share of women enrolled in TVET fields related to “industry, production, and technology” remains a minority.

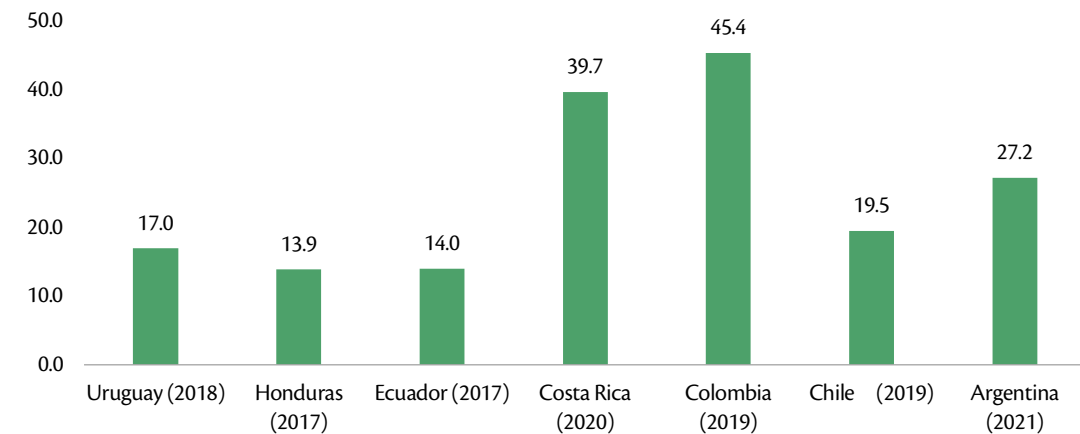
Some studies have pointed to existing inequalities in technical and vocational education, evident not only in the distribution of students across various specialisations, but also in their socialisation and learning experiences within these institutions, where gender stereotypes can be both created and perpetuated.^{21 22} Specialised courses in technical secondary education and professional training often align with gender-based labour division trends in the broader job market. Mechanic courses are typically geared toward men, while confection courses are directed at women, making the educational offerings inherently gendered.

Sepúlveda’s study²³ examines the reasons behind gendered disparities in the selection of fields in TVET. She posits that deeply ingrained sociocultural beliefs result in the normalisation of traditional perceptions of how education and work look for men and women. These beliefs are reinforced in home environments and socialisation processes. Various aspects of the educational environment, including lesson content, spatial arrangements, course schedules, practice environments, acceptable jokes, and the dynamic between professors and students all serve as settings in which the differences and inequalities between men and women are either subtly or explicitly cultivated.

The next section provides a detailed analysis of gender gaps in IT-oriented TVET in Argentina, Chile, and Colombia. It explores the distinct educational structures and options in each country in order to highlight the gender-related challenges associated with training in new technologies.

Figure 5

LATIN AMERICA. Share of women among the total students enrolled in secondary TVET in the field of “industry, production and technology” (percentages, different years)



Source: Sevilla (2021).

Gender Gaps in Training for New Technologies: Views from three Latin American countries

A broad regional overview carries the risk of overlooking some of the complexities and local nuances of the interplay between technological change, skills development, and gender dynamics. To provide a more comprehensive overview, in this section we supplement our regional analysis with an examination of training institutions with a gender

perspective in three Latin American countries: Argentina, Chile, and Colombia. The analysis was based on an exploratory-descriptive methodological strategy that included the revision of secondary documentary sources regarding TVET systems and the elaboration of six semi-structured interviews with female government officials or experts in TVET from the three countries. The selection of these countries is based on a contrasting strategy that captures the diversity and heterogeneity of the Latin American vocational training ecosystem.



ARGENTINA

Argentina is a federal country in which provinces are responsible for the provision of education and a central council within the Ministry of Education ensures standards and coordination. In this context, the country relies on a specialised body for the governance of TVET—the National Institute of Technological Education (INET)—dependent on the Ministry of Education. Governed by a specific law on technical and vocational education, these institutions include secondary-level technical education (ISCED 2 and 3), non-university higher-level technical education (ISCED 5), and professional training. The latter does not require the completion of secondary education as a prerequisite for access and is therefore not considered ISCED 4 (post-secondary non-tertiary education).

Professional training is partially delivered through collaborations with civil society organisations, primarily labour unions, giving the training landscape a distinctive character. In addition to professional training programs provided by INET, the Ministry of Labour also plays an active role in providing non-formal training throughout the country, establishing a parallel training path to the official one.

In TVET at the secondary level, study plans are one year longer than traditional secondary education, and offer more extensive vocational training paths. In the final year, students are mandated to undertake professionalising internships, a crucial component of their technician formation. In line with its historical

structure, secondary-level technical education predominantly focuses on training aimed at working in the private sector, with most enrolled students being male. Data from INET (2021) indicates that out of a total of 693,289 students enrolled in secondary technical education, only 33 percent were female (see “all fields” of “secondary technical education” in Figure 6).

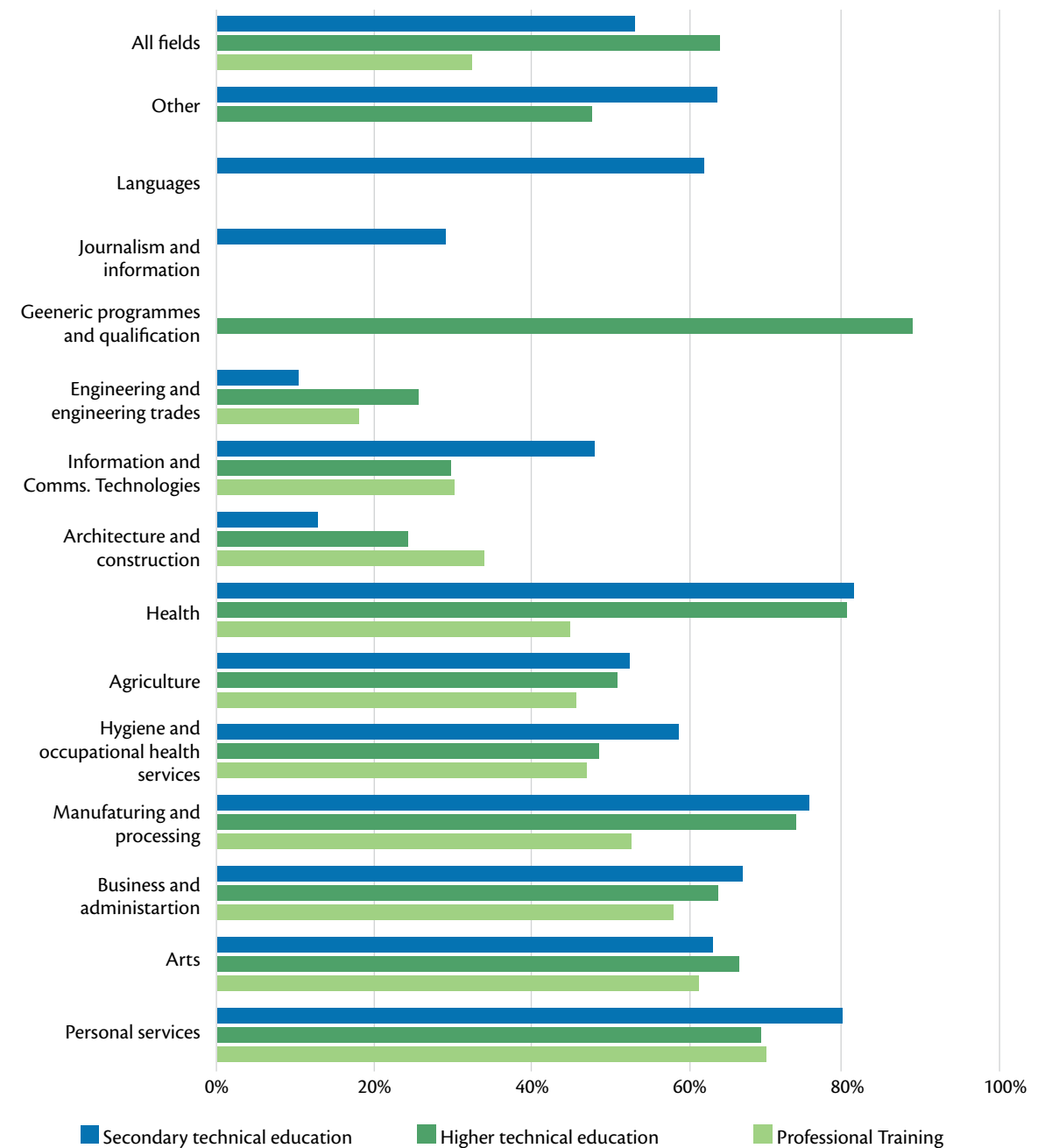
To examine the distribution of students across fields of study, we standardised the fields reported by INET, which follow ad-hoc naming criteria, using UNESCO’s Detailed Field Description Manual.²⁴ Figure 6 illustrates the gender-segregated distribution of women in various TVET trajectories and fields. It highlights a notable concentration of women in personal services, arts, and business, in contrast to lower representation in architecture, engineering, and Information and Communications Technologies (ICTs). The latter encompass programs certifying skills in software development, programming, informatics, and computer system components, among others. The graph underscores that women enrolled in these specialisations amount to less than 30 percent.

TVET at the higher education level is supplied by non-university tertiary institutions. These offer shorter pathways compared to university degree programs, with a specific technical specialisation. At this level, and following similar patterns to female participation at the university level, women comprise 64 percent of enrolled students.²⁵ However, an examination of women’s share at different specialisation fields reveals that only 29.8 percent of those enrolled in ICT-related programs are women, as illustrated in Figure 6.

In the domain of professional training, courses are supplied by dedicated centres or civil organisations—primarily unions—within each Argentine province.

Figure 6

LATIN AMERICA. Share of women among the total students enrolled in secondary TVET in the field of “industry, production and technology” (percentages, different years)



Source: Sevilla (2021).

Training is typically of short duration and includes pathways for reskilling and specialisation. Additionally, there are parallel professional non-formal training offerings under the Ministry of Labour, aimed at continuous skilling and reskilling efforts.

In the domain of professional training, women make up 53 percent of the overall student population. These training programs are tailored to specific job roles and do not necessarily require students to complete secondary education. They consist of short-term vocational courses designed to equip students with skills for specific occupational roles. In Argentina,

these programs are structured into vocational themes and are offered in public centres, as well as through collaborations with unions, business chambers, or other organisations. Remarkably, the representation of women in ICT courses stands at 48 percent (see Figure 6). While this is an important achievement in a context where women often lag behind in digital skills compared to men, it is important to highlight that professional training predominantly involves less advanced IT training, concentrating on fundamental digital skills such as basic computer use, document handling, and spreadsheet applications.

represents only 5.82 percent of the overall enrolment, the share of women falls to 24 percent. As shown in Figure 7, this information contrasts with women's enrolment in education and dressmaking, where they represent 90 percent of all students, or STEM fields like chemistry, where 64 percent of students are women.

Another important factor to consider is the number of secondary-level students who pursue a STEM degree following their graduation, either at the university or higher technical education level. According to Sevilla,²⁷ women who graduate from STEM-oriented TVET at the secondary level are much more likely to enrol in a STEM program, with 24 percent of them doing so. This stands in contrast to the 5 percent who enrol in STEM after completing a non-STEM TVET secondary degree and the 13 percent who enrol in STEM after obtaining a

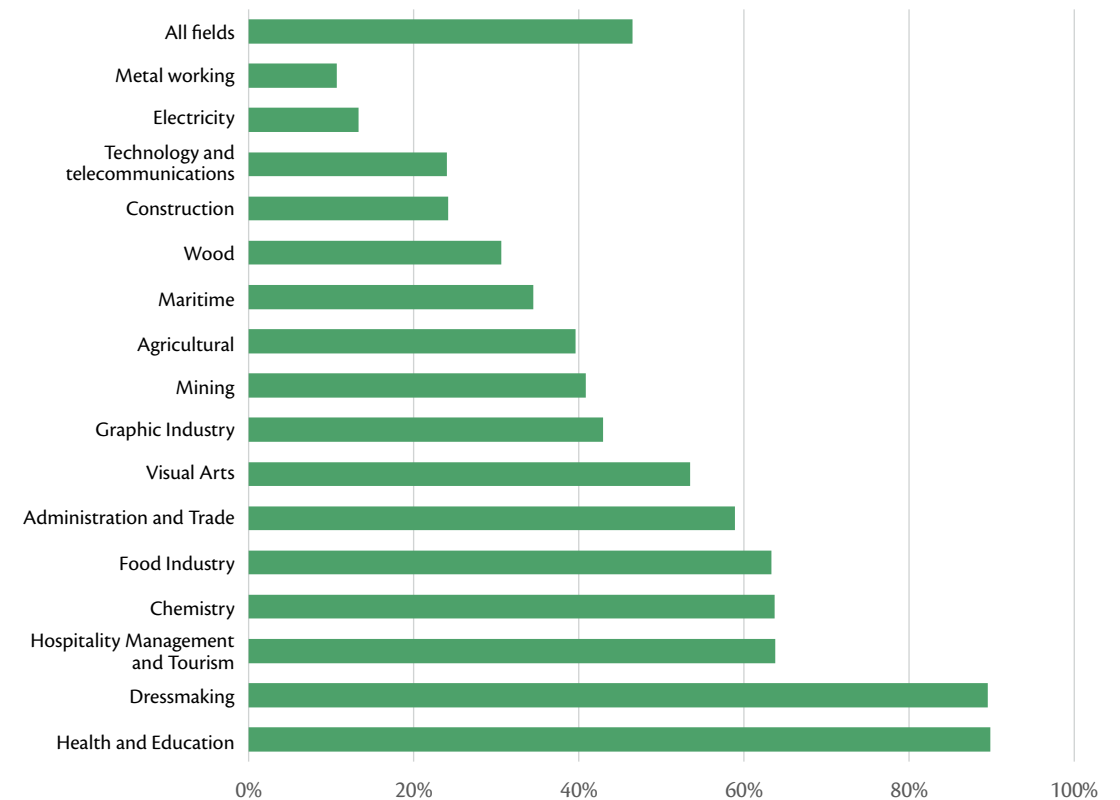
CHILE

In Chile, the formal education system distinctly defines formal TVET as the technical-oriented modality within the overall secondary and higher education system. While many of the institutions supplying secondary technical education are of a public nature or supported by the government, the private sector plays a predominant role in higher technical education²⁶. Furthermore, as opposed to the Argentine case, there is no professional training format in Chile. The Ministry of Labour does, however, collaborate with education institutions to offer non-formal job training programs in coordination with companies from the private sector.

In the area of secondary technical education, 46.5 percent of students are women. Upon breaking down the information and focusing specifically on the Technology and Telecommunications field, which

Figure 7

CHILE. Share of women in upper secondary technical education, by field



Source: Own elaboration based on Centre for Studies - Ministry of Education of Chile (2021).

non-TVET secondary degree. Still, among male students, a significant 46 percent enrol in STEM after completing secondary STEM-oriented TVET education, while 20 percent of those graduating from non-STEM TVET programs do the same.

TVET at the higher education level is regulated by a 2018 law, which stipulates that Technical and Professional Higher Education in Chile comprises

two subsystems: the university and the technical-professional subsystems, respectively. The latter is comprised by both public and private technical training centres and professional institutes. However, technical training centres have very low enrolment incidence, representing only 0.7 percent of the total enrolment.²⁸ We therefore exclude this format for the purposes of this report.

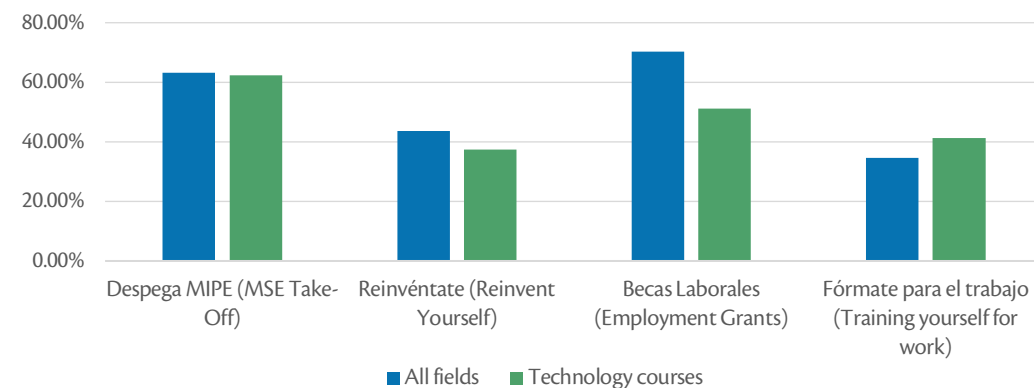
Total enrolment at professional institutes stands at 528,580 students, with women representing 52 percent.²⁹ Despite the equal distribution between male and female students, the data reveals significant gender segregation in study programs linked to specific occupational fields characterised by traditional gender roles. Women account for 11.3 percent of the total enrolment in technology and telecommunications programs, 4.4 percent in electricity and electronics, and 5 percent in mechanics and automation.³⁰

Beyond the formal education sector, the primary public agency overseeing vocational education, as well as the certification of competencies, is the National Service for Training and Employment (SENCE), operating under the Chilean Ministry of

Labour. While SENCE has its offices in major cities, it does not directly offer training courses. Instead, it collaborates with Training Technical Agencies (OTECs) distributed along the territory. Although OTECs supply private courses, SENCE secures tuition-free training for a share of students. Simultaneously, OTECs, often affiliated with companies, can leverage the Tax Franchise Program, enabling them to partially offset course costs through tax deductions.

Figure 8 depicts the share of women enrolled in SENCE's professional training programs, comparing all fields with technology-specific ones. While the percentage of women is significant in courses focused on technology (programs "Despega MIPE" and "Fórmate para el trabajo"), their participation falls in other cases.

Figure 8
CHILE. Share of women in SENCE (all fields versus technology-specific fields). 2021.



Source: Own elaboration based on SENCE Directory - Year 2021



Higher technical education in Colombia is governed by the Technical and Technological Education Law of 2002, which delineates two main modalities: professional technical training and technological training. Professional technical training (ISCED 4 and 5) focuses on building the competencies, skills, and technical expertise necessary for specific roles within the productive or service sectors. Technological Training (ISCED 5 and 6) provides a foundational education for scientific and theoretical knowledge, fostering innovative thinking, and developing capabilities to design and transform production processes.

Colombia's distinctive institution for TVET at the higher-education and professional training levels is the National Learning Service (SENA), established in 1957 through collaboration between workers, employers, the Catholic Church, and the International Labour Organisation. SENA has evolved into a national public entity with legal autonomy, falling under the jurisdiction of the Colombian Ministry of Labour. It currently stands as the primary public provider of vocational training in the country covering 80 percent of students pursuing technical or technological training programs. SENA stands out for its inclusive approach, involving not only the State but also active participation from companies. For individuals lacking a high school diploma, SENA offers a test

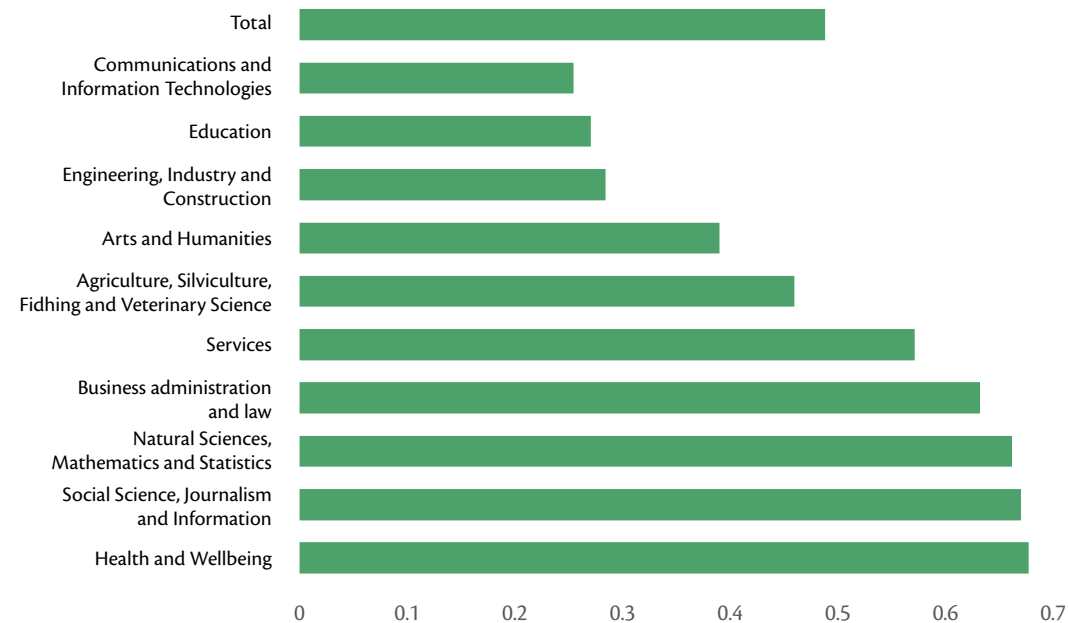
(Certificates of Professional Aptitude) for entry. It caters to those with basic education, offering training geared towards roles such as operators or assistants. Additionally, SENA conducts short courses known as "complementary training," allowing individuals to enhance skills in various areas, often delivered through closed-offer courses in collaboration with companies.

In contrast to previous cases, in Colombia, there is no significant gender gap in the participation of women in technical secondary education when considering all fields: among 37 percent of secondary school students attending technical schools, 53.2 percent were women. In the fields of industry, production, and technology, women's representation remains considerably high at 45.4 percent.³¹ However, there are gaps at the higher-education TVET level: data from the Higher Education Information Integrated System in 2020 reveals that 48.9 percent of students enrolled in TVET programs were women. The distribution of the total number of students across various fields of education, as presented in Table 4, varies considerably, with only 25.4 percent of students in Information and Communication Technology degree programs being women.

The regulation for Technical and Technological Education facilitates the transition from secondary technical education to higher education by validating specific curricular content. Additionally, the National Development Plan 2018-2022 allows students to obtain a dual certification upon graduating from secondary technical education, including a high school diploma and a professional technical degree. This collaborative effort between SENA and the

Figure 9

COLOMBIA. Share of women in higher technical education, by field



Source: Own elaboration based on SNIES - National System of Higher Education Information (2020)

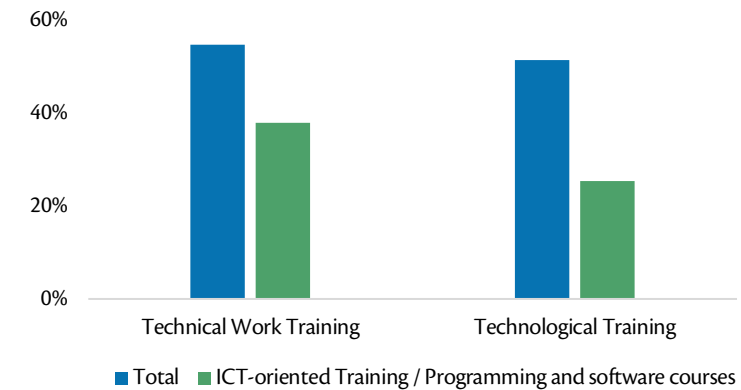
Ministry of Education aims to enhance students' practical skills, provide opportunities in the country's production sector, and facilitate their integration into the workforce. Moreover, it enables students to achieve professional status in shorter time frames, offering technologist credentials in certified programs that allow them to pursue further studies at specific universities. Dual programs saw 54 percent of enrolment among women.³² However, detailed data on the disciplinary areas in which men and women are trained are not available, limiting our understanding of gender segregation.

SENA also serves as the primary provider of professional training level education. It offers a "work technician" degree, which takes approximately 15 months and is aimed at vocational training in one of three qualification levels: technical auxiliary, technical operator, and technical specialist. According to SENA, 54 percent of 2021's trainees were women. Another path relates to "supplemental training" and refers to the ongoing training of workers. In this case, the share of women was 62 percent.³³

Men dominate programs related to ICT. Table 2 illustrates that the percentage of women enrolled in

Figure 10

COLOMBIA. Share of women in students in Technical Work Training (overall and in Programming and Software courses) and Students in Technologist Training (overall and in ICT-oriented courses).



Source: Own elaboration based on SENA's open data base (2021)

Programming and Software within "technical work" training courses is 38 percent. In the case of the "technologist" orientation (which corresponds to the higher education technical level), women represent 25 percent of the enrolment in ICT-oriented programs.³⁴

In summary, gender gaps are evident across various levels of TVET. In secondary education, women pursuing technology-focused programs constitute a minority in Argentina and Chile, making up 30 percent and 24 percent of students, respectively. In Colombia, the gender gap is narrower, with women representing 53 percent of overall secondary TVET students and 45 percent of ICT-related courses. A similar pattern emerges in enrolment in technology-oriented higher education technical programs: the proportion of women in ICT is 30 percent in Argentina and 25 percent in Colombia, while in Chile, they constitute only 11 percent of the total enrolment in technology and telecommunications programs.

Finally, in Professional Training, Argentina displays no significant gendered differences in enrolment, with women comprising 48 percent of those enrolled in ICT programs. In Colombia, women represent between 25 percent and 38 percent in different modalities of Technologist Training and Technical Training. In Chile, women's participation in technology courses within Professional Training ranges from 37 percent to 62 percent across various programs.

Within this context, although in early stages, specific gender policies in vocational training have been formulated to encourage women to pursue non-traditional female occupations. Noteworthy among these initiatives are efforts to promote technological skills among women, as observed in various countries across the region.³⁵ In the following section, we examine the progress made in Argentina, Chile, and Colombia.

Gender Policies, Programs, and Initiatives in TVET in Argentina, Chile, and Colombia

Gender Policies influencing TVET

Gender inequality has been a persistent focal point on the public policy agenda, with varying degrees of emphasis over the course of several decades. International conventions and forums have played a crucial role, setting global goals that influence the development and adjustment of local policies. The promotion of policies to counter gender inequalities is prioritised within the 2030 SDGs,³⁶ which consider gender equality as a pivotal element for development, integrating the rights of women and girls across all dimensions of life. Working towards the economic empowerment of women, enhancing their political representation, and eliminating gender discrimination are now widely acknowledged as global imperatives.

In the realm of educational policies in Argentina, the landmark Law on Comprehensive Sex Education of 2006 paved the way for significant advancements complemented by various programs and initiatives. This agenda gained prominence and widespread support following the “ni una menos” (not one less) movement, comprised of powerful demonstrations against gender-based violence and femicides. Momentum continued with demonstrations advocating for legal abortion, resulting in the passage of Law No. 27,610 on the Voluntary Termination of Pregnancy in late 2020.

Furthermore, the acknowledgment of non-binary identities has been regulated by law in 2012. Another

significant legislative development is the Mandatory Training on Gender, also known as the Micaela Law, implemented in 2019 and mandating that all individuals in public office undergo training on gender issues and gendered violence. The substantial progress in integrating gender policies led to the establishment of the Ministry for Women, Genders, and Diversity in 2019. However, the Ministry was dissolved at the end of 2023, as part of the restructuring process of the executive power under a new administration, which reduced the number of ministries from 19 to nine.

In Argentina, a key initiative in TVET is the establishment of the Commission on Gender Equality at INET in 2018. The primary objective of this commission is to drive initiatives that seamlessly integrate a cross-cutting gender perspective into TVET. This entails two complementary goals: first, infusing a gender perspective into TVET curricula, and second, enhancing the enrollment of women and other diverse groups in TVET programs. The commission actively conducts training sessions and awareness-raising activities, disseminates statistical data, generates targeted consulting materials, and organises various events, as elaborated in the subsequent subsection.

In the case of the Ministry of Labour, the inclusion of a gender approach has been sustained for several years. It started by bringing in gender challenges and perspectives into social dialogue initiatives among key stakeholders. This approach led to the establishment

of a Tripartite Commission on Equal Opportunities in the Workplace in 2005, fostering collaboration among unions, companies, and the State. The commission played a fundamental role in advocating for policies promoting workplace equality and combating gender-based discrimination. The Ministry further established the Counselling on Workplace Violence Office and the Gender and Equality of Opportunities in the Workplace Coordination Office, emphasising the commitment to developing state policies that embed a cross-cutting gender perspective in all workplace-related programs and initiatives. In 2008, the “Training with Equality for Decent Work” program was introduced, focusing on the education and training of domestic workers and care providers, building upon previous programs like FORMUJER. More recently, new offices, such as the Gender and Sexual Diversity Counselling Office, have further ensured that the gender perspective permeates political definitions and initiatives, crafting proposal initiatives for each ongoing program administered by the Ministry.

In Colombia, the commitment to gender equality is reflected both in the overall regulatory framework and in the 2018-2022 National Development Plan, “Pact for Colombia, Pact for Equality”. The latter includes a dedicated chapter on gender, titled “Pact for Equality for Women”. Additionally, the Ministry of Labour, following a 2008 Law, has initiated the implementation of the National Workplace Equality Program with a Gender Approach. This program strategically focuses on promoting the social and economic recognition of women’s work, implementing various mechanisms to ensure equal pay rights, and conducting campaigns to eradicate violence and discrimination against women in the workplace. Since 2013, the EQUIPARES

program, led by the Ministry of Labour with support from the Office of the Presidential Adviser on Equality for Women and the UNDP, has collaborated with companies and organisations to address and reduce the gender gap in workplaces.

As the primary provider of TVET in Colombia, SENA has actively participated in the ICT ALLIANCE since 2018, collaborating with the Ministry of ICT, the Ministry of Education, and the Ministry of Labour. In conjunction with the Sectorial Committee on Technology and Digital Talent Management, this alliance focuses on identifying the relevance, quality, and quantity of human talent required by organisations in both the ICT and non-ICT industries.

Presently, gender-related matters in the country fall under the purview of the Office of the Presidential Adviser on Equality for Women (CPEM), reporting to the Vice-Presidency. CPEM is tasked with various functions, including the design of cultural and communication strategies to promote gender equality and women’s empowerment. It actively participates in developing and implementing mechanisms to monitor compliance with domestic laws and international treaties related to gender equality. The CPEM also coordinates the Gender Affairs Observatory and works towards fostering strategic partnerships with government sectors, the private sector, women organisations, NGOs, universities, and research centers for the effective implementation of gender public policies. Following the inauguration of the new administration in August 2022, the Ministry for Equality and Gender was launched in 2023.

In Chile, the Ministry of Education established the Unit for Inclusion, Citizen Participation, and Gender Equality (UIPE) in 2018. Collaborating with

the Ministry for Women and Gender Equality, they initiated the “#EducationwithGenderEquality” work plan, encompassing three key pillars: i) ensuring quality with equality in the classroom, ii) promoting more vocations and opportunities, and iii) fostering zero tolerance for gender-based violence. Within these pillars, various initiatives have been launched with a specific focus on TVET. This includes specialised courses on gender equality designed for teachers, administrators, and principals of technical and vocational schools, as well as online mentorship programs for female students to guide them in choosing TVET degrees.³⁷ Another major step towards the reversion of gender and technology gaps was the creation in 2016 of the Ministry for Women and Gender Equality. This Ministry works independently or collaborates with other public bodies, international organisations, and private companies, to champion various programs, including “AllWomenConnected,” and “2021-2030 Workplace Equality.” These initiatives are designed for men and women to have equal opportunities, rights, and responsibilities in the workplace from a cross-cutting perspective.

An important development in Chile was the recent creation of the Action Plan on Gender Equality and Equity in Technical and Vocational Training. This plan, crafted by the United Nations Development Program and Alberto Hurtado University for the Ministry of Education, addresses critical obstacles related to gender and technical and vocational education, identified through national research. The plan recognises that many gender inequalities in technical and vocational higher education stem from the segregation of training programs, with certain fields predominantly attracting either male or female students. It proposes approaches, principles, and

strategies to develop initiatives that transform the landscape of TVE institutions with a focus on gender and inclusion.

Thus, a framework of significant, albeit incipient, advances can be observed in the public gender agenda, creating a favourable context to develop concrete strategies for addressing gender inequalities in the workforce and related training. Within this context, programs and initiatives specifically tailored for technology training are beginning to emerge, incorporating a gender perspective. The next subsection reviews a selection of these programs and initiatives, exploring their diverse designs, characteristics, and goals. In many cases, these initiatives do not emerge directly from the TVET sphere but stem from specific supplementary programs, resulting in a complex and overlapping landscape of training initiatives. At the same time, there is also evidence of public-private collaboration in these initiatives, as well as the integration of gender actions from different perspectives and approaches.

TVET Initiatives with a Gender Approach

This section explores the most notable programs and initiatives in each of the examined countries related to TVET. The analysis was carried out using official public information along with interviews with public officials with expertise in the areas of TVET and gender. The aim was to identify programs designed for TVET students that incorporate a gender perspective, as well as other initiatives focused on digital skills training, specifically targeting women or incorporating a gender approach. The analysis is not exhaustive but offers a general characterisation

of the landscape concerning proposals from the public sector related to new technologies and gender. The results of the analysis are summarised in a comparative table at the end of the section, outlining their designs, target populations, actions, reporting organisations, and the various modalities in which a gender approach is implemented.

As noted previously, a persistent challenge across countries is gender-based segregation within different specialisations and areas of TVET, with women notably underrepresented in technology-related fields. In response to recent policy guidelines aimed at addressing these disparities or, in some cases, extending beyond them, several programs have been introduced to foster gender-inclusive access in a variety of IT-oriented formation programs.

For instance, in Argentina, INET has launched the “Voces de la ETP” (TVET Voices) initiative, which highlights the life stories of women who have graduated in technical and vocational education to inspire younger students. Additionally, the “TIC TAC hora de innovar” (TIC TAC time to innovate) program has been established through a collaboration between the Argentine Ministry of Education, Fundación YPF (an NGO associated with Argentina’s national energy and oil company), and companies ARSAT (a public telecommunications company) and Microsoft. This public-private partnership aims to recognise innovative projects addressing energy, mobility, waste, and connectivity challenges in a competition format. The contest is open to female students aged 12 to 18 in secondary technical education. A panel of specialists evaluates and selects three projects per each of the six secondary school levels. Prizes include solar energy kits, automation and energy efficiency

kits, electronic devices, and merchandise for team members and their schools.

In Colombia, SENA has implemented two notable gender initiatives. The first one, in collaboration with the SheWorks platform (a remote work platform company), involves offering courses aimed at equipping women with tools and skills for teleworking. The second program, in partnership with Tigo (a local telecommunications company), introduces a specific quota for women in information technology training programs, focusing on areas such as Data Analysis, Software Programming, and Digital Security Controls. Additionally, there are specific programs targeting the development of digital skills of secondary students in technical education. An example, based in Colombia but under the Government of the City of Medellín, is the “Ser+STEM” program, designed to encourage the participation of tenth and eleventh-grade female students in the ICT field. The program also provides support for innovation projects by young adults through the “Semillero de innovación competitiva” (Seedbed of Competitive Innovation) program.

In the City of Buenos Aires, Argentina, under the Ministry of Education, the “Aprender Programando 5.0” (Learning while Programming 5.0) Program is taking place. This program targets students in the last two years of secondary school, offering training courses in Web Development, Videogames with Unity 3D, Mobile Apps with Kotlin, Drones with Python and 3D Design and Printing, and Introduction to Websites. Aligned with the “Digital Women” community initiative, which seeks to reduce gender gaps in the sector, the program encompasses various activities, initiatives, and projects aimed at enhancing women’s participation in the digital field. The courses

specifically aim to provide girls and teenagers with tools to challenge gender stereotypes and to spark an interest in the digital world. Consequently, 40 percent of the course quota is reserved for women.

Digital skills training programs that provide certifications and degrees exist outside the formal educational system. However, since Argentina lacks a formal mechanism for recognising these skills, they are not officially acknowledged, potentially resulting in an overlapping or parallel training structure. The national program “Argentina Programa,” (Argentina Programs) initiated by the Ministry of Economy collaborates with universities and companies, offering courses without formal TVET recognition. Another initiative is the G+T (Gender and Technologies) Center, under the Chief of Cabinet of Ministers, which focuses on inter-ministerial and public-private coordination for its courses on digital skills aimed at women and gender nonconforming individuals.

Women have a substantial presence in certain training programs, particularly when entrepreneurial women seeking specific digital tools for their business development are involved, even if these initiatives do not explicitly incorporate a gender approach. In Chile, SENCE implements programs tailored for this worker profile, providing courses on digital skills with a significant participation of women. The “Despega MIPE” (Lift-off Small and Medium sized Enterprises) program, as illustrated previously in Figure 8, exemplifies this, with a 62 percent participation rate of women in technology courses.

What strategies take gender into account? First, certain programs adopt a positive discrimination approach by establishing a specific quota for women

in the course. An example is the “Codo a Codo 4.0” (Shoulder to Shoulder 4.0) Program in the City of Buenos Aires. The program aims to provide tools that facilitate integration into the labour market of the IT sector and, specifically, to promote women’s participation with the goal of enhancing their employability. To achieve this, a 50 percent quota of vacancies is established for women in courses on programming, software development, and other digital skills. Other programs directly target women of a certain age and characteristics. Chile’s SENCE, in collaboration with the Ministry for Women and Gender Equality and technology companies, operates the “Mujer Digital” (Digital Woman) program. This initiative provides 59 online courses that are free and open for women to register, with the only requirement being that they are over 18 years old.

Acknowledging the pervasive and historic nature of gender inequality in TVET, agencies such as INET in Argentina, adopted comprehensive and cross-cutting policies. In 2018, INET established the Gender Equity Area of Technical and Vocational Education and Training with the explicit aim of integrating a gender perspective uniformly across its offices and programmatic domains. Similarly, in the Province of Buenos Aires, the Provincial Institute of Job Training, under the Ministry of Labour, has adopted a transversal gender perspective. This institute initiated the “Oficios sin Prejuicios” (Jobs with No Prejudice) campaign, aspiring to make training offerings and labour market integration inclusive and accessible for all individuals, irrespective of gender.

Another category of interventions addresses the challenges women face during their training. These initiatives include support and mentorship programs

for female students, featuring ongoing consultation spaces, talks with women working the IT industry, and mentorship programs. A notable example is Argentina’s aforementioned “Learning While Programming” program and Chile’s “Programa Tu Oportunidad” (Program Your Opportunity) initiative. The latter, developed by Claro (a Latin American telecommunications company) and UN Women, focuses on digital skills training and is distributed through Municipal Labour Information Offices in the Metropolitan Region of Chile. The program includes the provision of a tablet for participating women and the opportunity to apply for employment mentorships, where experienced individuals from the industry offer advice, support, and information.

Other interventions function with the objective to equip women with specific resources like computers or other digital devices, and provide them with accessible workspaces. This approach aims to ensure a more gender-equitable distribution of material access to technologies. An example is the “Espacio Mujeres TEC” (“TEC Women Space”) program in the Province of Córdoba, Argentina. Developed collaboratively by the Ministry for Women, Gender and Diversity the Ministry of Technology, Science and Innovation, and the Women in Technology civil organisation, this initiative offers a physical space and material resources with the goal of promoting the development of technological skills for women and diverse groups, fostering entrepreneurial talent in the technology sector, and reducing the digital gender gap. The space features a co-working area, meeting room, library, and fully equipped facilities for childcare for children between 18 months and ten years. Additionally, the program offers a “Formación Técnica en Tecnología”

(Technology Technical Training) program, providing introductory and intensive practical courses covering basic tools in different IT specialisations and essential knowledge for technology use.

Finally, it is worth noting that certain programs include specific actions for the inclusion of the LGBTQ+ community. This is particularly evident in Argentina, where more progressive policies aligned with the gender diversity agenda have been instituted. An example is the “Santa Fe Capacita en Economía del Conocimiento con Perspectiva de Género” (“Santa Fe Educates in Knowledge Economy with a Gender Perspective”) program. This initiative represents a new facet of the Santa Fe Educates program, led by the Ministry of Labour, with collaborative efforts from the Ministry of Ministry for Women, Genders, and Diversity, and the Ministry of Production, Science, and Technology. The training courses are targeted at women and individuals within the LGBTQ+ community aged between 16 and 45 years.

In summary, various strategies are employed to integrate gender perspectives into IT training. Some initiatives have been developed within existing TVET programs, and operate within established structures and methods. Interviews with public officials revealed that such initiatives are being implemented gradually, as there is greater consensus that TVET can perpetuate sexist biases in the absence of gender strategies. Other initiatives originate outside the TVET system, emerging from diverse institutional structures, often with active participation from companies and greater format flexibility. Below, we provide a summary of each of these categories.

Actions within the TVET system include:

- » Introducing attraction strategies oriented to women in out-reach and diffusion campaigns
- » Establishing female quotas (and, to a lesser extent, other gender-nonconforming identities), employing a positive discrimination logic.
- » Supplementing technical training for women with digital skills (based on training programs, innovation contests, and company talks, among others).
- » Incorporating a gender perspective into the entities responsible for implementing TVET as a cross-cutting policy.

Actions beyond the TVET system involve:

- » Work training technology programs specifically designed for women, not formally recognised within the educational system, typically implemented by labour, gender, or technology-oriented public entities.
- » Public-private partnerships in training proposals related to new technologies, often featuring active participation from the private sector, including online courses, mentorships, or the provision of digital equipment.

Table 1
Programs and initiatives of training on new technologies with a gender perspective

Program/ Initiative	Implemented by	Actions	Formal TVET?	Remote/In-person	Coordination w/ companies	Coordination w/ intrnl. Orgs.	Geograph. scope	Target population	Women quota or focus	Women support/ attraction strategy	Labour market integration support
ARGENTINA											
Argentina Programs	Min. of Economy	Programming & digital skills	No	Remote/ In-person	Yes	No	National	Men & Women	No	No	No
G+T Center	Chief of Cabinet of Ministers	ICT training and mentorship	No	Remote/ In-person	Yes	Yes	National	Women & gender diversities	Yes	Yes	Yes (firm talks, mentorship)
Tic Tac Time to Innovate	INET/ Min. of Education	STEM project contests	Yes	In-person	Yes	No	National	Women (secondary)	Yes	Yes	No
Voices of TVET	INET/ Min. of Education	Visibility of TVET female graduates	Yes	Remote	No	No	National	Women (secondary)	Yes	No	No

Program/ Initiative	Implemented by	Actions	Formal TVET?	Remote/In-person	Coordination w/ companies	Coordination w/ intrnl. Orgs.	Geograph. scope	Target population	Women quota or focus	Women support/ attraction strategy	Labour market integration support
Shoulder to Shoulder	Min. of Education (City of B.A.)	Programming & digital skills	No	Remote	Yes	No	National	+18 men and women	Yes	Yes	Yes (firm talks, mentorship)
Learning Programming	Min. of Education (City of B.A.)	Programming & digital skills	Yes	In-person	Yes	No	Provincial	Men & Women (secondary)	No	Yes	Yes (firm talks, mentorship)
Trades With no Prejudice	Min. of Labour/Min. for Women (Prov. B.A.)	Training in untraditional trades	Yes	In-person	No	No	Provincial	+18 men and women	No	Yes	No
Digital Trades Program	Min. of Labour (Prov. B.A.)	Digital skills	Yes	In-person	No	No	Provincial	+18 men and women	No	No	No
TEC Women Space	Min. for Women/ Min. of Science & Tech (Córdoba)	Coworking space and digital skills	No	In-person	No	Yes	Provincial	Women	Yes	Yes	No
Santa Fe Educates	Min. of Labour (Santa Fe)	Digital skills	Yes	In-person	No	No	Provincial	+16 women & gender diversities	Yes	No	No
CHILE											
Digital Woman	Min. of Labour/ Min. for Women	Digital skills	No	Remote	Yes	No	National	+18 women	No	No	No
MSE Take-Off	Min. of Labour	Digital skills for SMEs	No	Remote/ In-person	No	No	National	+18 men & women	No	No	No
Reinvent Yourself	Min. of Labour	Unemployment/									
Vocational skills	No	Remote/ In-person	No	No	National	+18 men & women	No	No	No		
Employment Grants	Min. of Labour	Subsidies and Unemployment/									
Vocational skills	No	In-person	No	No	National	+18 men & women	No	No	No		

Program/ Initiative	Implemented by	Actions	Formal TVET?	Remote/In-person	Coordination w/ companies	Coordination w/ intrnl. Orgs.	Geograph. scope	Target population	Women quota or focus	Women support/ attraction strategy	Labour market integration support
Train Yourself to Work	Min. of Labour	Unemployment/									
Vocational skills	No	Remote/ In-person	No	No	National	+18 men & women	No	No	No		
Entrepreneurial Women Connected	Min. for Women	Entrepreneurship	No	Remote	Yes	Yes	National	+18 women	Yes	No	No
Your Opportunity	Private	Digital skills	No	Remote	Yes	Yes	Regional	+18 women	Yes	No	Yes
COLOMBIA											
ICT Woman	Min. ICT	Digital skills	No	Remote	No	No	National	+18 women	Yes	Yes	No
SENA/ SheWorks	SENA	Digital and teleworking skills	Yes	Remote	Yes	No	National	Women	Yes	Yes	No
SENA/ Tigo	SENA	ICT training	Yes	Remote	Yes	No	National	Men & Women	Yes	No	Yes (firms practices)
ICT Training Processes	Secretariat for Women (Bogotá)	Digital skills	No	Remote	No	No	Local	+18 women	Yes	No	No
Ser+STEM	Secretariat for Education (Medellín)	ICT training and seedbed	No	In-person	Yes	No	Local	Men & Women (secondary)	Yes	No	Yes (work articulation)

Source: Own elaboration based on analysed programs and interviews

Gaps and way forward

Reversing gender inequalities in training for new technologies is a significant challenge in Argentina, Chile, and Colombia. In this document, we examined regional statistics illustrating women's position in strategic occupations within labour markets, country-specific IT-oriented TVET offerings, and different institutional arrangements for gender approaches in TVET. While public information on these issues is limited, various data sources allowed us to construct a preliminary view at the intersection of TVET, technology, and gender for these countries. The analysis shows that training programs continue to perpetuate traditional gender norms, particularly in IT-related fields, where TVET is often perceived as a male-dominated domain. This challenge emphasises the need for a critical examination of educational paradigms.

The assessment of labour market trends in Latin America and the Caribbean underscores the substantial underrepresentation of women, not only in labour markets at large—but in crucial sectors and occupations linked with new technologies. Within the ICT industries, which play a strategic role amid ongoing industrial and technological transformations, women account for only 30 percent of the workforce. Furthermore, merely 2.2 percent of female jobs in the region fall within science and technology occupations, compared to 5.4 percent for men. This underrepresentation extends to educational trajectories, where women studying STEM at the university level make up approximately 35 percent of enrolments, despite comprising

the majority of university students. The limited presence of women in these areas not only hinders their engagement in future-oriented jobs, but also constrains their participation in the development of the solutions and services that are shaping our social and economic futures.

TVET provides women with a meaningful avenue to acquire the skills and competencies required for accessing high-quality employment opportunities in the expanding field of the digital economy. This in turn strengthens the well-established TVET systems that characterise the region. Our study shows that despite different institutional formats and nuances aligned with national historical traditions, all three countries take their initiatives to the general population, emphasising the relevant role of TVET in bridging the gap between education and employment. However, there is a consistent pattern of lower participation rates of women in technology-oriented training courses across all three countries. In secondary technical education, women pursuing technology-focused degrees constitute a marked minority in Argentina and Chile. In higher technical education, the proportion of women in ICT courses is significantly low in Chile, Colombia, and Argentina. While Argentina shows no significant gender differences in enrolment in professional training, significant differences are observed in Colombia and many Chilean programs.

It is important to highlight the absence of data to allow systematic cross-country analyses, making precise comparisons across levels and fields of

TVET challenging. While overall data on TVET is accessible and often broken down by gender, detailed information on women's participation in well-defined fields remains elusive. This contrasts with the more widely available reporting of gender gaps in higher university education. Bridging this information gap could significantly contribute to enhancing technical and vocational education and training. Qualitative research on women's training trajectories in these sectors is highly valuable but typically focuses on countries with a more advanced approach toward gender and TVET rather than all Latin American countries.

Despite these gaps, the study shows an incipient, albeit significant, advancement in the gender agenda across the three surveyed countries. While public policies have included gender considerations for some time, recent years have shown a renewed focus on them. In some cases, this focus has extended to TVET systems for the first time. In this context, we have identified specific actions aimed at democratising women's access to training programs to which they have not traditionally enjoyed access, like those related to the IT industry. These include incentives to attract more women, the implementation of gender quotas, women's skill development, and the integration of gender perspectives in TVET institutions. Beyond TVET, various training programs are offered by other

public bodies, often in partnership with industry companies. The latter feature more flexible formats, potentially facilitating the inclusion of women even if they do not grant formal certificates.

However, the implementation of gender-focused approaches in TVET may encounter resistance within a system that has traditionally perpetuated gender biases. The study highlights that, despite the ongoing initiatives, historical gendered trends in TVET have not yet been reversed in the countries under study. There is also little evidence of their uniform adoption across other countries in the region. Furthermore, the sustainability of advancements in countries that have embraced these gender policies is uncertain and subject to the volatility of the extreme political shifts facing the region. An example is the recent downsizing of Argentina's Gender Ministry to a Secretariat level and the decree to remove from public documents gender-inclusive language by the right-wing administration that took office in late 2023. Other countries in the region that have transitioned from a left or centre-left administration to a right or centre-right one in their latest elections include Guatemala, El Salvador, Costa Rica, and Uruguay. A dynamic analysis of gender policies in TVET and the specific effects of this kind of political development is yet to be undertaken.

Endnotes

- 1 A more detailed analysis of the Argentine, Chilean, and Colombian case studies is provided in Millenaar (2023), available in Spanish. Sections 2 and 3 of this report synthesise the key insights and findings from that analysis.
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- 5 Carl Benedikt Frey, Michael Osborne, The future of employment: How susceptible are jobs to computerisation? Technological Forecasting and Social Change, Volume 114, 254-280, 2017
- 6 The categories are defined based on the value of the automation index derived from Frey and Osborne's methodology. Occupations fall into the low automation group if the index ranges from 0 to 0.3, the moderate group if it ranges from 0.3 to 0.7, and the high-automation group if it ranges from 0.7 to 1.
- 7 Vladimir López-Bassols, Mateo Grazzi, Charlotte Guillard and Mónica Salazar, Las brechas de género en ciencia, tecnología e innovación en América Latina y el Caribe. Resultados de una recolección piloto y propuesta metodológica para la medición [Gender Gaps in Science, Technology, and Innovation in Latin America and the Caribbean. Results of a Pilot Data Collection and Methodological Proposal for Measurement.] (Washington D.C: Banco Interamericano de Desarrollo, 2018).
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- 11 ISCED is the International Standard Classification of Education adopted by UNESCO to analyse and compare different education levels and disciplines across the world. Secondary education is generally divided into two levels (lower secondary –ISCED 2– and upper secondary –ISCED 3). In Latin America, secondary technical education usually corresponds to ISCED 3.
- 12 In the case of post-secondary education, only certain countries in Latin America offer vocational training at this level (ISCED 4). Entering the higher education domain, technical training generally includes tertiary-level programs (ISCED 5).
- 13 Claudia Jacinto, La formación para el trabajo como sistema. Curso Virtual: La formación para el trabajo de jóvenes. Herramientas teóricas y metodológicas [Vocational Training as a System. Virtual Course: Vocational Training for Youth. Theoretical and Methodological Tools.]. Programa de Estudios sobre Juventud, Educación y Trabajo (Buenos Aires: IDES-CIS-CONICET, 2019).

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Annex:

Reviewed regulations and other sources of information

Reviewed regulations by country

ARGENTINA

- Ley de Educación Nacional N° 26.206 [National Education Law No. 26,206]
- Ley de Educación Técnico-Profesional N° 25.058 [Technical and Vocational Education Law No. 25,058]
- Resolución CFE N°1/07 [CFE Resolution No. 1/07]
- Ley de Educación Sexual Integral N° 26.150 [Comprehensive Sexual Education Law No. 26,150]
- Ley de Identidad de Género N° 26.743 [Gender Identity Law No. 26,743]
- Ley de Capacitación Obligatoria en Género N° 27.499 [Mandatory Gender Training Law No. 27,499]

CHILE

- Ley General de Educación N° 20.370 [General Education Law No. 20,370]
- Ley de Educación Superior N° 21.091 [Higher Education Law No. 21,091]

COLOMBIA

- Ley General de Educación N° 115 [General Education Law No. 115]
- Ley del Servicio de Educación Superior N°30 [Higher Education Service Law No. 30]
- Ley de Educación Técnica y Tecnológica N° 749 [Technical and Technological Education Law No. 749]
- Ley Prevención y Sanción de formas de Violencia y Discriminación contra la Mujeres N° 1.257 [Prevention and Punishment of Forms of Violence and Discrimination against Women Law No. 1,257]

Other sources of information

- SITEAL-UIS (Sistema de Información de Tendencias Educativas en América Latina de la UNESCO) [SITEAL-UIS (Information System on Educational Trends in Latin America by UNESCO)]
- Glosario de la UNESCO-UNEVOC [UNESCO-UNEVOC Glossary]
- RFIETP- Registro Federal de Instituciones de Educación Técnico-Profesional (INET) [RFIETP- Federal Registry of Technical and Vocational Education Institutions (INET)]
- ENTE- Encuesta Nacional de Trayectorias de Egresados (INET) [ENTE- National Survey of Graduate Trajectories (INET)]
- Centro de Estudios, Ministerio de Educación de Chile [Center for Studies, Ministry of Education of Chile]
- Anuario del SENCE [SENCE Yearbook]
- SIES (Servicio de Información de Educación Superior) [SIES (Higher Education Information Service)]
- DANE (Departamento Administrativo Nacional de Estadística) [DANE (National Administrative Department of Statistics)]
- SNIES (Sistema Integrado de Información de la Educación Superior) [SNIES (Integrated Information System for Higher Education)]
- Base de Datos Abiertos del SENA [SENA Open Database]

JustJobs

NETWORK

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JustJobs convenes a global network of diverse stakeholders — including policy shapers, academics, and grassroots leaders — to deepen the practical implications of our research endeavours and amplify their impact. Through the combination of cutting-edge research and global knowledge sharing, we aim to forge a fresh, dynamic channel for policy dialogue on employment at national, regional and international levels.