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on Women in Latin America and the Caribbean

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GENDER EQUALITY AND WOMEN'S AND GIRLS' AUTONOMY
IN THE DIGITAL ERA: CONTRIBUTIONS OF EDUCATION AND DIGITAL
TRANSFORMATION IN LATIN AMERICA AND THE CARIBBEAN

Regional Consultation prior to the Sixty-Seventh Session of the Commission on the Status of Women,
whose priority theme is "*Innovation and technological change, and education in the digital era
to achieve gender equality and the empowerment of all women and girls,*" within the framework
of the 64th Meeting of the Presiding Officers of the Regional Conference on Women
in Latin America and the Caribbean.

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INTRODUCTION

Latin America and the Caribbean face the impact of a series of cascading crises -social, educational, health, employment, food, climate and energy- that impose multiple and complex challenges (ECLAC, 2022a). The countries of the region are facing increasing difficulties related to investment and production, the global financial crisis, geopolitical tensions, war, and the resurgence of inflation. The region needs not only to focus its policies on reactivating its economic and productive systems, which have been deeply affected and strained by the COVID-19 pandemic, but also to advance in transformations that will enable the transition to low-carbon, high-tech economies that are at the same time inclusive and sustainable.

This scenario of prolonged, multidimensional crisis and unequal recovery has had a disproportionate impact on women. The pandemic has aggravated the persistent structural challenges of gender inequality. These are: socioeconomic inequality and poverty; discriminatory and violent patriarchal cultural patterns and the predominance of the culture of privilege; the sexual division of labour and the unjust social organization of care; and the concentration of power and hierarchical relations in the public sphere (ECLAC, 2017). These challenges reinforce each other, limit the full validity and enjoyment of the rights of women and girls, as well as their participation in different spheres of society, including that which concerns societies and economies in the digital era. At the same time, they manifest themselves differently among different groups of women according to the intersection between gender inequalities and inequalities based on age, ethnic-racial status, education and income levels, territory, among others (ECLAC, 2022b).

Women are the ones who cushioned the effects of the crisis to a greater extent. This situation is manifested in the increase in unemployment, informality, violence and poverty, as well as in the precariousness of their living conditions. In particular, it is evident in the unfair social organization of care, with a drastic increase in the burden of domestic work and unpaid tasks. During the pandemic, due to the saturation of health systems and the closure of schools, care services were transferred to homes, as well as the accompaniment in the educational process of boys and girls (UN Women, 2020; ECLAC, 2021a). Prior to the pandemic, globally 76.2% of the time dedicated to unpaid care work was performed by women (ILO, 2019; ECLAC, 2022b). In 2020, the time dedicated to feeding, cleaning, and playing with girls and boys increased by 8.4 percentage points more in women than in men, and the time dedicated to accompanying girls and boys in teaching and training tasks increased by 12.3 percentage points (UN Women, 2021a; ECLAC, 2021a). In addition, the reduction in economic activity affected informal and domestic workers in the first instance, losing their livelihoods almost immediately (UN Women, 2020). This demonstrates the need to move towards a change in development style that puts care and sustainability of life at the center (ECLAC, 2022b).

In recent years, technological changes have occurred at an exponential rate, particularly in digital technologies, which have a cross-cutting impact on society and the economy, transforming production, management, and governance systems. The pandemic has accelerated this trend towards digital transformation, becoming both an opportunity and a challenge for the region.

The digital economy is a catalyst whose development and deployment take place in an ecosystem characterized by the growing and accelerated convergence between various technologies. This process triggers innovations in all areas and generates new dynamics in the labour market and society (ECLAC, 2016; 2018). The need for skills in areas of science, technology, engineering and mathematics (STEM), and for professionals in information and communications technologies (ICT), is growing in all sectors and opens up new possibilities for skilled jobs with good pay, less routine and repetitive. Digital skills are becoming necessary in all activities that are being digitized, not only as conditions for the jobs of the future, but also to guarantee rights and citizen participation (ECLAC, 2022b).

Digital technologies can drive inclusive growth and contribute to fostering structural change for a transformative recovery with gender equality. However, for women to be able to take advantage of the benefits of digitalization, it is necessary to generate conditions of equality and protection in the digital world and opportunities for the development of the necessary capacities and skills in a changing context (ECLAC, 2019a). In this sense, education constitutes a key element to ensure the full participation of women in economic, political and social life in the digital era. However, education systems in Latin America and the Caribbean face old and new tensions in responding to these demands and guaranteeing the right to quality education throughout life.

The change in education systems demands definitions on the ways in which digital technologies will be integrated. The pandemic brought to light pending demands, accelerated previous advances and highlighted the urgency of promoting a strategy for innovation and digital transformation of education. This refers both to the training processes of students and teachers through the use and appropriation of digital technologies for teaching and learning, as well as to educational management tasks to expand access and reduce coverage gaps (Huepe and others, 2022). It is essential to promote universal access to and use of technologies for all people as fundamental requirements to ensure the right to inclusive and quality education, and to equitably distribute the benefits of digital transformation. In this regard, it is a priority to advance in the strategy for the creation and development of digital public goods as established in the Report of the Secretary-General "Roadmap for Digital Cooperation"[1] (United Nations, 2020).

In the region there are significant gender gaps both in relation to the acquisition of digital skills that particularly affect women (ECLAC, 2022b), as well as their participation in STEM areas (Bello, 2020). This has repercussions on their low insertion in the labour market in occupations linked to these areas. This situation is part of a labour market strongly marked by the lower participation of women and gender occupational segregation–the overrepresentation of women in informal jobs, in sectors of lower productivity and in occupations at risk of being automated (World Economic Forum, 2021; United Nations, 2022), and under-representation in leadership positions and in areas linked to technology, especially in decision-making positions –aspects that condition their autonomy (Vaca-Trigo and Valenzuela, 2022; Bercovich and Muñoz, 2022).

Digital technologies are rapidly transforming society, driving unprecedented changes and generating profound challenges. The digital revolution can contribute to generate conditions for women to enjoy full political, economic, and social equality and participate in innovation processes or they can simply widen pre-existing gender gaps and generate new gaps (Gurumurthy, Chami and Alemany, 2018). To enhance the inclusion scenario and reduce the risk of increasing gender inequality in the new dynamics of the digital era, it is key to formulate appropriate comprehensive policies that address the structural challenges of gender inequality with proactive policies, regulations that guarantee the exercise of rights in the digital era and advances in affirmative measures to foster equality between women and men. Otherwise, there is a risk of perpetuating and deepening existing discriminatory patterns (Muñoz, 2021; Bercovich and Muñoz, 2022; Vaca-Trigo and Valenzuela, 2022).

In a very complex international and regional context, which requires rethinking short- and long-term public policies, the 67th Session of the Commission on the Status of Women (CSW 67) to be held from 6 to 17 March 2023 has as its priority theme "Innovation and technological change and education in the digital era to achieve gender equality and the empowerment of all women and girls." In view of the CSW67 and the previous Regional Consultation within the framework of the 64th Meeting of the Presiding Officers of the

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[1] According to the Secretary-General's 2020 Roadmap for Digital Cooperation Report, digital public goods encompass open source, open data, open artificial intelligence models, open standards, and open content.

Regional Conference on Women in Latin America and the Caribbean, it is necessary to analyse the opportunities, challenges and implications that the scenario of the digital revolution and the context of changes resulting from the pandemic impose for the empowerment of women and girls in their diversity in the region.

I. ADVANCES IN GENDER IN THE DIGITAL AGE: GLOBAL AND REGIONAL COMMITMENTS AND OPPORTUNITIES

At both the international and regional levels, progress can be observed in the creation of agreements, particularly in the Regional Gender Agenda. The emphasis is on reducing gender gaps and biases in education and in the production of scientific and technological knowledge, on promoting inclusive digital transformation processes, and on accelerating structural change for sustainable and inclusive development.

At the international level, the intersection between gender and STEM has been addressed in several global instances and commitments. One of the milestones took place in 2015 when the 2030 Agenda for Sustainable Development (2030 Agenda) was adopted. Goal 4 on inclusive, equitable and quality education states: "by 2030, ensure equal access for all men and women to quality technical, vocational and higher education, including university education," and "by 2030, significantly increase the number of youth and adults who have the necessary skills, particularly technical and vocational, to access employment, decent work and entrepreneurship" (United Nations, n.d.). In target 4.5 of Goal 4, emphasis is placed on eliminating gender disparities in education and ensuring equal access to all levels of education and vocational training. Complementarily, the targets of Goal 5, specifically aimed at achieving gender equality, point to the need to recognize and value unpaid domestic and care work by advancing in the provision of public services and co-responsibility (Target 5.4), and the need to ensure the full and effective participation of women at all levels of decision-making in political, economic, and public life (United Nations, 2015). In 2017, the Committee on the Elimination of Discrimination against Women (Comité para la Eliminación de la Discriminación contra la Mujer) formulated General Recommendation No. 36 on girls' and women's right to education, which expands the approach to Goal 4 and makes specific recommendations relevant to the field of science, technology, engineering, and mathematics.

Moreover, on the 75th anniversary of the United Nations, Member States committed to strengthening global governance for the sake of present and future generations and, to that end, requested the Secretary-General to submit a report with recommendations to advance the agenda and respond to current and future challenges. Their report "Our Common Agenda," presented in 2021, looks ahead to the next 25 years and calls for inclusive, interconnected and effective multilateralism to better respond to humanity's most pressing challenges. Among its recommendations, the report calls for special attention to be paid to youth, through the transformation of education, training and lifelong learning. The document calls for shaping the future of learning by investing in literacy and digital infrastructure to bridge the digital divide (United Nations, 2021).

At the regional level, it is important to emphasize how gender and technology are addressed in the Regional Gender Agenda, which highlights the Brasilia Consensus (2010) and the Santo Domingo Consensus (2013), the Montevideo Strategy (2016), the Santiago Commitment (2020), and more recently the Buenos Aires Commitment (2022). Although it is in the Santo Domingo Consensus where the link between gender and technology is emphasized (Muñoz, 2021), the set of agreements establishes as a priority that public policies in Latin American and Caribbean countries should encourage access by women and girls of all ages to information and communication technologies in order to broadly exercise their right to freedom of expression, educational activities and economic activities. The Buenos Aires Commitment (2022) goes further by recognizing that, in order to create conditions conducive to the autonomy of women,

adolescents and girls in all their diversity, investment in skills and technology must be strengthened, as well as including affirmative actions to encourage their participation, permanence and completion of education in STEM areas (ECLAC, 2022c).

In relation to the digital transformation and the development model, the 2030 Agenda raises the urgency of moving towards new models of growth and development with more sustainable and inclusive consumption and production patterns, while recognizing technologies as a means to do so. In particular, "enhancing the use of enabling technology, in particular information and communications technology, to promote the empowerment of women" (Target 5b). Within the framework of the Regional Conference on Women in Latin America and the Caribbean, concern for access to, use and development of technologies with a gender perspective has been formulated as part of the need to move towards a new productive and technological paradigm with equality and sustainability. However, as stated in the Montevideo Strategy for the Implementation of the Regional Gender Agenda in the Framework for Sustainable Development by 2030, if the appropriate policies are not in place, there is a risk of deepening the structural challenges of gender inequality (ECLAC, 2019a; Vaca-Trigo and Valenzuela, 2022). In the framework of the 60th Presiding Officers of the Regional Conference on Women in Latin America and the Caribbean (2021), it was agreed to promote the *Regional Alliance for the Digitalization of Women in Latin America and the Caribbean*[2] with the objective of reducing gender gaps in terms of access, skills development and use of information and communication technologies by women and girls, and promoting the full participation of women in the digital economy together with the Implementation of the Regional Gender Agenda in the Framework for Sustainable Development by 2030.

The centrality of unpaid care for the achievement of gender equality has been a priority in the agreements since the First Regional Conference on the Integration of Women in the Economic and Social Development of Latin America and the Caribbean in Havana (1977), which have been deepened in the last two decades (ECLAC, 2021b). The 2030 Agenda states that the achievement of gender equality is cross-cutting and inseparable from the rest of the Agenda's goals, and SDG 5 promotes in Target 5.4 the recognition and valuation of unpaid care and domestic work. The Regional Gender Agenda constitutes a roadmap for achieving Sustainable Development Goals (Bidegain, 2017). The Montevideo Strategy states that the unfair social organization of care limits women's autonomy and contributes to reproducing gender inequalities, which intersect with other dimensions of social inequality (socioeconomic, ethnic, racial, and territorial). The XIV Regional Conference on Women (which took place in Santiago, Chile, in 2020) indicated the priority of moving from the recognition of care as a human right to its cross-cutting implementation and the design of comprehensive care policies and systems from a gender, intersectional, intercultural, and human rights perspective. In the context of the digital divide, understanding unpaid care as one of the origins of inequalities between men and women is key, since the disparate burden of these tasks conditions a greater scarcity of time for them, an issue that conflicts with the constant need to improve and update skills in an environment where services and demand are constantly evolving (United Nations, 2022).

In this regard, it is urgent to advance in the implementation of comprehensive care systems, as urged in the recent Buenos Aires Commitment (2022 new letter), adopted by the countries of the region at the XV Regional Conference on Women. This implies advancing in social co-responsibility among those who provide it: the State, the market, the private sector, and families (ECLAC, 2022), in order to establish a fairer distribution between women and men of power, resources, time, wealth and work, which will allow them equal access to the opportunities of the digital transformation.

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[2] See Agreement 11 of the Sixtieth Meeting of the Presiding Officers of the Regional Conference on Women in Latin America and the Caribbean, https://repositorio.cepal.org/bitstream/handle/11362/47114/S2100440_en.pdf?sequence=1&isAllowed=y.

II. EDUCATION IN THE DIGITAL AGE: A KEY FACTOR
FOR WOMEN'S EMPOWERMENT

A. Gender inequalities in education

Before the COVID-19 pandemic, the countries of Latin America and the Caribbean were already facing an educational crisis linked mainly to access, permanence, and graduation at different levels of education, and in terms of the quality of education systems (Huepe and others, 2022).

The region has made progress in terms of access, especially in primary education, where levels close to universal access have been achieved in most of the countries of the region. Significant gaps persist by socioeconomic level and geographic area (urban-rural), a low level of access to educational development programmes and pre-primary education for children aged 0-5 years, and wide inequalities in terms of completion of secondary education according to the territory where students live, ethnic-racial origin, disability status, and migrant and refugee status (UNESCO/ECLAC/UNICEF, 2022; Huepe and others, 2022).
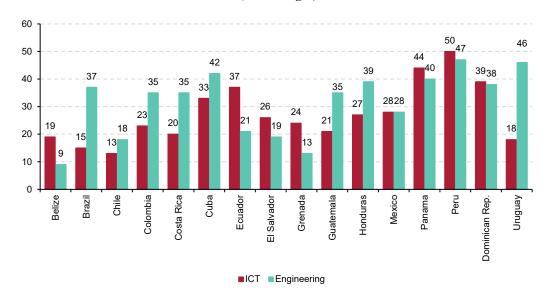
From a gender perspective, the increased access of girls, young women and women to education is considered one of the great advances in Latin America and the Caribbean in recent decades. So much progress has been made that currently the completion rate of women in secondary education is 6.1 percentage points higher than that of men (ECLAC, 2022c). This is due, in part, to the fact that the male population experiences more difficulties in their school career, with higher levels of repetition and dropout (UNESCO/ECLAC/UNICEF, 2022). However, women's higher educational credentials do not translate into better jobs and wages once they enter the labour market (ECLAC, 2022d).

However, the pandemic revealed the equity and quality deficits that characterize the education systems in the region. On the one hand, in 2019 there were already significant performance gaps evident between lower-income students (quintile 1) and higher-income students (quintile 5) according to the results of performance tests in mathematics, language, social sciences and natural sciences.

On the other hand, prior to the pandemic, gaps by educational area were already evident: female students performed worse than males in mathematics and science during basic education, and these disparities widened in the lowest quintiles (ECLAC, 2022d). This pattern of gender inequality by discipline deepens as schooling progresses, becoming more acute in higher education and in technical-professional education, where gender gaps widen in terms of the participation of girls and young women in the STEM field: globally, women represent 35% of those who enrol in STEM areas (ECLAC, 2022d). In Latin America and the Caribbean, the proportion of female graduates of STEM careers in general does not reach 40% in most countries. This proportion is even lower in ICT areas: in Brazil only 15% of ICT graduates are women; in Chile, 13%; Costa Rica, 20%; Uruguay, 18%. In other countries, the proportion is higher, but in no case does it exceed 50% (see figure 1) (ECLAC, 2022d).

Several studies have addressed the factors that explain the progressive exclusion of girls and adolescent women from STEM subjects and careers at different educational levels. Several reasons contribute to understanding the low participation of women in these areas and their disadvantages in terms of progression and achievement (ECLAC, 2022d). Self-selection bias is the main reason why girls do not opt for STEM education. This decision is influenced by socialization processes and stereotypical ideas about gender roles and, in particular, the representation that careers in these fields are male-dominated (UNESCO, 2019).

Figure 1
Latin America and the Caribbean (16 countries): ratio of women in total tertiary education graduates in engineering and information and communication technologies (ICT)
(Percentages)

Source: United Nations Educational, Scientific and Cultural Organization (UNESCO), "A new generation: 25 years of efforts for gender equality in education," Global *Education Monitoring Report,* Paris, 2020.
Note: Latest available information; percentage of female graduates in tertiary education according to UNESCO Institute for Statistics classifications: information and communication technologies, and engineering, manufacturing, and construction.

Stereotypes are acquired early in life and can negatively affect girls' interest, dedication, and performance in these fields, as well as their aspiration to pursue these careers. It is also identified that women find it more difficult than men to identify with STEM areas and that personal efficacy, linked to the assimilation of gender stereotypes or recognition of those beliefs in others. There is a belief that women are more proficient in reading and languages, while men are more proficient in mathematics, science, and technology (United Nations, 2022). This belief seems to be supported or reinforced by parents and teachers, which added to the absence of supports and role models, affects the results that women obtain in education in these areas (Blackburn, 2017; Sevilla and Farías, 2020; UNESCO, 2019; ECLAC, 2022d). Likewise, girls' interest and motivation with respect to STEM fields are influenced by the social context, which encompasses the educational level and profession of fathers and mothers, the socioeconomic level of the family, the expectations of parents who hold traditional beliefs, and the media (ECLAC, 2022d; UNESCO, 2019).

At the school level, women's participation, performance, and progression in STEM subjects is linked to teachers' skills and strategies, as well as their beliefs and attitudes towards their students (UNESCO, 2019; Mullis and others, 2012; ECLAC, 2022d). On the other hand, effective teaching practices can either cultivate a constructive learning environment that motivates and engages girls or, conversely, function as mechanisms that reinforce stereotypes and shape unequal learning opportunities for boys and girls in relation to knowledge areas (UNESCO, 2016a; ECLAC, 2022d). Textbooks and educational materials constitute another fundamental aspect in that they can convey explicit and implicit messages about the roles and abilities of boys and girls in STEM. The availability of equipment, materials and resources is a key element in fostering girls' interest and learning in STEM subjects.

In the different levels and modalities of the region's education systems, inequalities are manifested with their own specificities (see diagram 1). In technical and vocational education (TVE), an educational modality whose teaching and learning processes are closely linked to the world of work, gender inequalities are mainly found at the secondary level and vary according to the career; on average, only 30 out of every 100 students are women (ECLAC, 2022d).

The early vocations of girls and young women in traditionally male disciplines are restricted due to cultural stereotypes that condition access (Buquet and Moreno, 2017). Likewise, within technical schools with a predominance of male students, strongly rooted patriarchal and discriminatory cultural patterns are reproduced that produce hostile training environments for women (ECLAC, 2022d).

In higher education, gender inequalities are manifested through the reproduction of horizontal segregation in the fields of knowledge and through vertical segregation in academic careers. Androcentric biases in the generation and appropriation of knowledge reproduce inequality in the developments that derive from it, and create barriers in terms of access, permanence, and promotion of women in scientific-technological careers. In addition, during their working careers, women face other obstacles such as lower amounts of funding for research, and greater difficulty in obtaining venture capital for science and technology start-ups than their male peers, which translates into greater barriers for research, development, and innovation in their areas of work (Bello, 2020). The low proportion of women graduates in the STEM field has effects not only limiting the creation of a critical mass of professionals that should include more women, but also with respect to training in gender equality for men and women, and the reduction of gender biases in scientific and technological production (ECLAC, 2022d).

Diagram 1
Structural challenges of gender inequality and its manifestations in the participation of women in higher, technical, and professional education in the field of science, technology, engineering, and mathematics (STEM)

Structural challenges of gender inequality	Manifestations in the educational system and in the environment	Manifestations in higher education, in the field of science and technology	Manifestations in vocational-technical education
Sexual division of labour and unequal social organization of care	Overload of domestic and care tasks as a barrier to training and labour market insertion Gender socialization: from the family to the actors of the educational system	Conditional time spent learning information and communication technologies, and studying science, technology, engineering, and mathematics Lower presence in science, technology, engineering, and mathematics-related careers	Segregation of careers and trades
Patriarchal, discriminatory cultural patterns and predominance of the culture of privilege	Gender socialization Experiences of the pedagogical model at the secondary level with gender biases Discrimination against female graduates in labour market insertion and transition	Gender stereotypes in academic and scientific communities Stereotypes regarding women's lack of capabilities in science, technology, engineering, and mathematics Self-perceived low efficacy and poor academic performance in subjects related to science, technology, engineering, and mathematics at the secondary level	Gender stereotypes in vocational choice and educational offerings Hostile training environments for women in masculinized environments

Concentration of power and hierarchical relations in the public sphere	Little promotion of careers in science, technology, engineering, and mathematics directed towards women Lack of family, school, and teacher support Low participation of women in management positions in science, technology, engineering and mathematics careers and faculties Lack of support and role models	Power structure in science Androcentric construction in the production of knowledge and in technoscientific developments Public policies in science, technology, engineering, and mathematics that do not apply a comprehensive and systematic approach to gender equality	Male-dominated teaching and management roles Unequal valuation of women's and men's technical skills: for equal training, treatment and opportunities are unequal
Socioeconomic inequality and poverty persistence of poverty	Early entry into the labour market Gender digital divide Low availability of household goods and supports	Difficulties for poor households to access science, technology, engineering, and mathematics studies, which require more time and resources	Reproduction of labour gaps in labour market insertion (participation, occupation, unemployment, wages, among others); perpetuate inequality and poverty among women graduates of technical and professional education

Source: *Social Panorama of Latin America and the Caribbean*, Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2022.

B. Technological change and education from a gender perspective

The total or partial closure of educational centres during the pandemic affected 96% of the student population from primary to high school (Huepe and others, 2022). The countries implemented strategies in record time for the continuity of non-face-to-face education in remote and digital modalities, with the means available and with the generation of pedagogical innovations. The proposals included and/or combined many media: digital teaching and learning platforms, portals with multimedia resources, printed booklets, television and radio programming. Among others, the case of Uruguay's "Ceibal en casa" (Ceibal at home) can be mentioned, in which it was proposed to use the structure of the Ceibal Plan, designed as a complementary modality to face-to-face education, in a completely remote modality through devices, platforms and resources generated by it (Huepe and others, 2022; Vincent-Lancrin, Cobo and Reimers, 2022). In Chile, the "Aprendo en línea" strategy; in Mexico, "Aprende en casa," a modality implemented on the structure of Telesecundaria–instruction with a long tradition–, which was complemented with radio broadcasts and a virtual component for content evaluation; the transmedia proposals "Seguimos educando" in Argentina, and "Aprendo en casa" in Peru.

The construction of the countries' strategies for the continuity of education revealed significant challenges in relation to unequal access to equipment such as computers, tablets and cell phones of various capacities, and access to the Internet with a stable and sufficiently fast connection. According to data collected at the beginning of the pandemic, 46% of children in the region between 5 and 12 years of age lived in households that were not connected to the Internet and household access to digital devices was also unequal: while between 70% and 80% of students in the highest socioeconomic levels (fourth quartile) had laptops at home, between 10% and 20% of students in the first quartile had these devices (ECLAC, 2020a).

The differences in connectivity between urban and rural areas are particularly alarming: while 68% of urban households in the region were connected to the internet in 2018, only 23% of households in rural areas had access (ECLAC, 2020a). In the most digitally developed countries, penetration in rural areas reached 40% or 50% of the population, while in the least digitally developed countries it averaged 10%. At the same time, 67% of the countries in the region did not have download speeds that would allow simultaneous data-intensive activities.

In addition to the barriers to access these technologies, there was also a lack of digital skills (especially among teaching and support staff and students themselves) that limited the possibilities of remote learning (ECLAC, 2022d). Prior to the pandemic, digital skills were distributed heterogeneously among students in the different countries of the region and within them, with socioeconomic level being an important explanatory factor behind these differences (OECD, 2019a; Trucco and Palma, 2020). In relation to teachers, in the years prior to the pandemic, some international studies already showed the demand of teachers for more training in the digital environment (ECLAC, 2021b; ECLAC and UNESCO, 2020; OECD, 2019b), a need that was confirmed in the abrupt transition to distance education in the face of school closures.

If education systems are not sufficiently prepared to address the transition to virtual or hybrid education, the inequality gaps that structure Latin American societies will widen. The educational experience in pandemics bears witness to this situation and confirms it. Those educational systems, educational centres and households that had greater availability of resources and capabilities were better able to face the process of change (Huepe and others, 2022).

On the other hand, in recent decades, educational experiences of different scales have been developed in the region that offer learning with innovative and inclusive proposals in the digital era. These experiences have proposed to build responses in relation to access and coverage, but also to educational quality and the transformation of teaching and learning practices through the incorporation of digital technologies as pedagogical support resources to improve these processes. In this sense, some of these initiatives stand out in that they promote variations in the grouping of students, in the definitions for the attention to learning trajectories and rhythms, in the design of pedagogical and curricular strategies, in the construction of digital educational resources (educational platforms, repositories, instant communication applications, among others), and in the mechanisms for tutoring and pedagogical accompaniment. Some significant experiences in the region are the Rural Secondary Schools mediated by technologies (Argentina),[3] the Centro de Mídias de Educação do Amazonas (Brazil),[4] the Language Platform of the CEIBAL-ANEP Plan (Uruguay),[5] the Tutoring Network (Mexico),[6] among others (Lugo and others, 2020a; 2020b; Álvarez and others, 2022; Vincent-Lancrin, Cobo and Reimers, 2022).

In the current scenario, countries have the opportunity to continue encouraging innovation at all levels and modalities of education systems, supported by the use of digital technologies. However, if historical debts and pre-existing inequalities in the region are not addressed, there is a risk of deepening them.

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[3]   More information [online] https://www.unicef.org/argentina/que-hace-unicef/educaci%C3%B3n/escuelas-secundarias-rurales-mediadas-por-tic.

[4]   More information [online] https://centrodemidias.am.gov.br/.

[5]   More information [online] https://www.ceibal.edu.uy/plataformadelengua.

[6]   More information [online] https://redesdetutoria.com/.

This scenario entails the urgent challenge of building equitable proposals from a gender, intersectional and intercultural perspective, which do not reinforce stereotyped roles, and which ensure that women and girls in all their diversity access, use and appropriate the processes of innovation and inclusive digital transformation, in order to erode the structural challenges of gender inequality (UNESCO, ECLAC and UNICEF, 2022; ECLAC, 2016). Specifically, a key aspect is the development of relevant digital skills in each context and stage of women's life cycle. The progressive development of these digital skills in the educational sphere is not only a necessary condition to enrich educational trajectories and teaching and learning processes, but also to enable them to face the technological change that characterizes modern societies and reverse inequalities in the different spheres of life of men and women from different territories, socioeconomic strata, places of origin, ethnic and racial status, among others. The development of these skills comprises different levels of competence: basic digital skills (which allow users to access and execute basic operations on digital technologies), generic digital skills (which include digital literacy and information management, digital communication and collaboration, digital content creation, digital security and privacy, and management and knowledge of digital human rights), and higher-level skills (specialized skills that form the basis of occupations and professions specialized in ICTs) (Bercovich & Muñoz, 2022).

The integration of digital technologies in educational systems could provide solutions to generate educational processes tailored to the interests, needs and motivations of students, recover learning, prevent school dropout, and expand educational coverage, especially at the secondary level. This aspect is relevant for the design of pedagogical proposals that contribute to the development of autonomy of women living in remote areas, to extend women's access to higher education, support lifelong learning and contribute to active participation in social life (Pardo Kuklinski and Cobo, 2020; Darling-Hammond and others 2021; Huepe and others 2022; Álvarez and others 2022). However, the integration of digital technologies in educational systems must have a gender perspective, in order to avoid deepening the gaps and biases that mark women's educational trajectories at an early age.

The implementation of hybrid education strategies, which combine face-to-face and virtual instances, requires rigorous planning in order to take advantage of their potential, while at the same time contextualizing their design according to the problems and questions of the different territories and particular scenarios to ensure their relevance. This requires a review of the historical determinants of access to schooling in each area in Latin America and the Caribbean, the specificities of the educational systems, educational policies, and the concrete possibilities of implementation in terms of technical, social, political and economic feasibility. Likewise, these strategies require rethinking the contents and the way they are taught, to avoid the reinforcement of gender stereotypes in education through digital media.

The use of digital technologies to improve school trajectories and enrich educational experiences is conditioned by teachers' abilities to use and incorporate them in the framework of innovative pedagogical models. This process requires spaces and time for training and accompaniment for experimentation and reflection (Álvarez and others, 2022). Teacher training includes not only the development of digital skills but also pedagogical skills for their integration into the educational process, soft skills, and communication skills to function in the new hybrid scenarios (ECLAC-UNESCO, 2020; Cruz-Aguayo and others, 2022), and knowledge for educators to use technologies without deepening gender stereotypes.

In Latin America and the Caribbean, the education sector employs 9.7% of employed women in the region and is one of the most feminized sectors of the labour market, with women accounting for 69.2% (ECLAC, 2022e). The greater feminization of work in education is a characteristic of the preschool and primary levels of education, which involve the most intense direct care work. Despite the professional preparation and the numerous demands required of the teaching staff, these levels are characterized by the lowest salaries in the sector: the hourly wage of preschool and primary education personnel represents

79.2% of the average remuneration of teachers in secondary education, and 48.9% of the hourly wage in tertiary education (ECLAC, 2022e). Training strategies should consider improving the working conditions of women teachers, who, in the context of the pandemic, have had greater difficulty in reconciling domestic and unpaid care work and teaching, both of which have been intensified.

Connectivity and available digital equipment are conditioning factors for the implementation of hybrid models. There are deep disparities in student access and the socioeconomic and territorial gap widens even more in the access and use of technologies by women, which requires an intersectional approach that addresses the inequalities experienced by migrants, young women, indigenous women, Afro-descendants, and those living in rural areas or in situations of vulnerability (ECLAC, 2016). It is key to increase network coverage and quality to ensure universal and affordable access, and to facilitate access to digital devices, all of which are necessary for effective and quality connectivity. The deployment of digitalization entails addressing the sub-regional disparities experienced by women, as well as disparities within households, which could condition the use of devices among family members. These strategies call for alternatives guided by principles of equity in accordance with the contexts and particularities of women's groups so as not to reinforce social exclusion (IICA, IDB and Microsoft, 2021).

Digital education also implies an adaptation of educational systems through the creation of new resources, the use of platforms and the generation of digital content. It is key to promote the development of high quality educational content and resources, free of gender bias and stereotypes that complement learning in hybrid scenarios, are available free of charge, are easy to access and use, are aligned with the curricula–of basic and priority curricular areas, such as comprehensive sexual education– and territories, are adaptable to the diversity of users, including attention to special education, rural, intercultural bilingual, and various demands in vulnerable contexts (Huepe, Palma and Trucco, 2022; Lugo and others, 2021).

There is evidence of improved learning results from the use of digital platforms that allow the adaptation of content to the evolution of students (Cruz-Aguayo and others, 2022). Therefore, it is necessary to build a virtuous circle between regulation by States and the digital ecosystem to ensure participatory development and the inclusion in education systems of quality technological solutions, without gender bias, with a perspective of education as a right for children, adolescents, young people and adults (Lugo and others, 2021).

A central axis of the digital transformation of education systems lies in information systems for education management, understood as the set of processes that enable the collection, aggregation, analysis and use of data and information in education, the management, administration and planning of education systems, and the design, monitoring and evaluation of policies (Huepe and others 2022; Cruz-Aguayo and others 2022; Arias Ortiz and others 2021). In the region there are still important challenges and opportunities for the development and improvement of these systems, an aspect that becomes more relevant to ensure the quality of education and to monitor and strengthen the educational trajectories of students (Álvarez and others, 2022; Arias Ortiz and others, 2021; Telecom Advisory Services, 2022a, 2022b).

Education in the digital era requires, from a perspective of rights and gender equality, promoting the educational trajectories of girls and women in the field of STEM, not only to influence the inequalities present in the labour market, but also to provide them with opportunities to study and work in the field of their choice. This implies, not only ensuring equal access to the different areas of study, but also fostering affirmative conditions and measures that promote permanence and graduation in all areas, including quality technical, professional and higher education in the field of STEM (ECLAC, 2022b).

III. THE DIGITAL ECOSYSTEM: OPPORTUNITIES AND CHALLENGES
FOR WOMEN IN A CONTEXT OF CHANGE

Over the last decade —and accelerated by the pandemic—, advances in the development of digital technologies and the transversality of their applications have driven innovation and transformations in consumption, production, and business models.

In particular, the digital transformation has an impact on society and the economy as a whole (ECLAC, 2022a), it has the potential to enable new forms of creation of value with positive effects on the well-being of people, the competitiveness of the economy and environmental sustainability (ECLAC, 2022f), and provides new tools for the region to respond to the current crisis, overcome the difficulties of long-term development and make progress in terms of social inclusion and sustainability on the road to achieving the Goals of the 2030 Agenda.

Digital technologies are transforming society in multiple aspects, generating new and profound challenges. They undoubtedly represent an opportunity to modernize and transform the productive matrix. At the same time, however, certain risks must be considered, for example, that the platform economy may reinforce the concentration of power in a few transnational corporations to the detriment of the region's economic and social development, and deepen pre-existing gaps and inequalities.

Digital development combines the adoption of advanced digital technologies, telecommunications infrastructure and mobile networks, ICT industries (software, hardware, and ICT services) and the network of economic and social activities facilitated by these technologies (ECLAC, 2013). Three dimensions of digital development can be distinguished in these transformations, which work synergistically and produce impacts at the social, productive and state levels (ECLAC, 2022a): the Connected Economy, the Digital Economy and the Digitized Economy (see diagram 2). In all cases, they have an impact on women's autonomy in the digital era.

The digital transformation introduces a new paradigm that cuts across social, labour and productive dimensions. This transformation produces major disruptions that can contribute to the improvement of inclusion and equality, based on a diversification of the productive structure and sustainable growth. But, at the same time, digital development is a source of concentration of economic power derived, fundamentally, from the business model of digital platforms. This produces information asymmetries for the benefit of large technology companies that hold the power to define the rules of operation, which can cause deterioration in the capacity of countries to develop technologies (ECLAC, 2022f).

In turn, the impact of digitization is not homogeneous across and within countries. The scope of these transformations depends largely on economic, social and institutional factors, and on enabling aspects such as the digital skills of the population, infrastructure, innovation systems and governance that addresses the main challenges of digitization (ECLAC, 2022a, 2022f).

Diagram 2
Dimensions of digital development and its disruptive effects on society,
the productive sector and the State

Dimensions of digital development	Disruptive innovation	Impact from a gender perspective
Connected economy (telecommunications, hardware and software)	Ubiquitous connectivity of people and use of mobile applications Connectivity of homes, factories, cities **Relevant technology**: 4G, 5G, Fibre optics	**Opportunity:** benefits of internet, connectivity, access to services and mobile applications, higher paying jobs, access to education programmes. **Risk:** women's differential access to technologies. Not being able to take advantage of the benefits due to lack of equipment and significant connectivity.
Digital economy Digital service platforms	Digital goods and online service platforms Data-driven product and service optimization **Relevant technology**: Cloud Computing, AI, Big Data Analytics	**Opportunity:** access to digital goods and platforms. Benefits of new data-driven services. Employment of women in dynamic sectors. **Risk:** gender bias in technology development (AI) and data. Lack of basic and generic digital skills, such as higher-level skills.
Digitized economy Digitization of traditional industry	Data-driven production processes Intelligent robots **Relevant technology**: Edge computing, industrial and cognitive robotics	**Opportunity:** take advantage of the benefits of the digitalized economy: market incorporation is CTIM areas, especially in engineering. **Risk:** need for higher-level digital skills to lead data-driven production processes.

Society
- New models of communication and interaction
- New consumption models
- New skills

Production sector
- New management models
- New business models
- New production models

State
- New rules and regulations
- New governance

Requirements to erode gender gaps and to be able to take advantage of the benefits of digital transformation

Ensuring access to devices and meaningful connectivity to all women in their diversity

Develop critical and higher-level digital skills

Developing a comprehensive system of care

Ensure strategic data governance

Source: Prepared by the authors based on Economic Commission for Latin America and the Caribbean (ECLAC), *Towards transformation of the development model in Latin America and the Caribbean: production, inclusion and sustainability* (LC/SES.39/3-P), Santiago, 2022.

In addition, inclusive digital transformation requires addressing inequalities between women and men, addressing the risks associated with digital development from a gender perspective, such as women's differential access to technologies and gender biases in technological development, among others (see diagram 2). Indeed, 4 out of 10 women in the region are not connected or cannot afford effective

connectivity[7] (Vaca-Trigo and Valenzuela, 2022), which affects the deepening of gender gaps in terms of access, use, appropriation and even creation of new technologies. Moving towards inclusive digital transformation processes that ensure women's access to digital technologies and the development of advanced digital skills would enhance the achievement of transformation objectives and productive diversification in dynamic sectors, as well as promote environmental sustainability and the reduction of multiple inequality gaps (Vaca-Trigo and Valenzuela, 2022). Reactivating these sectors, in addition to boosting economies, could favour the recovery of women's employment (ECLAC, 2021c).

A. Digital ecosystems as an opportunity for inclusive and sustainable development

The digital transformation has great potential to reduce historical structural gaps through the possibilities of innovation in different areas and improved productivity (ECLAC, 2022a). It is also triggering innovations in economic sectors and the labour market, facilitating access to better services, such as health and education, creating new public goods and services with data, and enabling improvements in the functioning of States, public administration, and democratic processes through the impact of social networks and the opening of government data. These opportunities must be seized for the benefit of women's autonomy in a context of accelerated change.

Digitalization provides opportunities for work and professional development associated with digital skills and solutions within the digital economy, such as teleworking, telemedicine, and distance and technology-enabled education. However, women are not yet taking full advantage of the benefits of this digitalization. These opportunities can deepen inequality if comprehensive policies for regulation, protection and inclusion are not in place. To this end, it is necessary to reduce technological gaps in favour of building an inclusive digital society (ECLAC, 2022a), in order to advance towards sustainable development with gender equality and full participation of women.

Inclusive digital transformation is a driver for reversing inequalities and digital divides throughout the life cycle of women. Opportunities exist to ensure access, use and appropriation of different digital goods and services, as well as to appropriate and be producers and creators of technology. However, if the conditions for the active and equal participation of women in this area are not considered, there is a risk of maintaining and deepening the structural challenges of gender inequality.

A digital ecosystem is an open, adaptive, and distributed sociotechnical system that includes a complex network of organizations and institutions that dynamically interact and collaborate with each other to create and distribute value in a digital environment (Brynjolfsson, & McAfee; 2014; Tushman, & O'Reilly, 2016). It is made up of companies from the productive sector, the educational and research system, and has a set of regulations that provide a framework for the ecosystem. A digital ecosystem involves three dimensions: new modes of information and content production; different social behaviors related to the use and consumption of goods and services; and an economic and social impact that is more important than that of information and communication technologies considered in isolation. This implies considering the set of services and requirements of different nature that are provided from and through telecommunication networks, the set of infrastructures that enable the provision of such services, as well as the interaction between service providers of different nature that constitute the extended value chain of Internet services (Katz, 2015).

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[7] Average for the 11 countries that have data for this calculation: Bolivia (Plurinational State of), Brazil, Colombia, Chile, Costa Rica, Ecuador, El Salvador, Mexico, Paraguay, Peru and Uruguay. For more information see Vaca-Trigo and Valenzuela, (2022).

The development of an inclusive digital ecosystem requires a public policy focus on a cross-cutting gender, intersectional and intercultural agenda, and has a strategic role in the development of the countries of the region.

Some countries currently have digitalization strategies that include the development of digital infrastructure, digital services, artificial intelligence and the development of digital skills, but in most cases, they are based on a deterministic perspective of technology. It is necessary to question the naturalized characteristic of technology that assumes that its mere availability is a sufficient condition for economic and social development, without recognizing that the appropriation of technologies is a complex process of socio-technical construction where, in general, the gender perspective is not present. Nor is there a single way of creating or developing technology, nor an inevitable path, nor a single way of producing knowledge. The production of knowledge and technologies respond to particular institutional, social, political, economic configurations (Thomas and others, 2014; Kreimer and others, 2004).

Technologies, as socio-technical products, are shaped by the social relations that produce and use them (Wajcman, 2006). In this way, they are able to reproduce underlying power relations. Therefore, as long as women are underrepresented in their access, use, appropriation, design and development, they will not be able to benefit equitably from the digital revolution (Bercovich and Muñoz, 2022; Muñoz, 2021).

In this sense, it is necessary to consider various dimensions that should be present in technological development towards the constitution of a sustainable development model oriented towards equality in the exercise of rights by the entire population and throughout the life cycle (see diagram 3). All people have the right to access technology, to use digital solutions in the different areas of their performance, to appropriate its codes and to generate knowledge with and from it.

Diagram 3
Dimensions of technological development from a gender perspective

Dimension	Issue	Action
Access	• 4 out of 10 women are not connected or cannot afford effective connectivity	Improve Access to effective connectivity and affordable devices for women
Use	• Digital skills deficits, especially advanced digital skills	Promote the use of technologies, strengthening the devleopment of basic, generic and advanced digital skills
Apropriation	• Decreased women's participation in the online labor market, and less access to digital services (online education, health services, financial services)	Generate trust with technology to improve the quality of technology use in different areas of life
Creation and Development	• Low presence of women in careers related to STEM fields. In addition, they are exposed to digital gender violence, linked to invasion of privacy, non-consensual disclosure of intimate images, among others	Promote educational trajectories of women in STEM areas and create safe spaces for them to be key players in digital innovation

Source: Own elaboration.

B. Universal access, use and appropriation of information technologies are essential steps in building inclusive digital ecosystems and economies

The digital divide is shaped, in the first place, by inequalities in access, use and appropriation of ICTs. In Latin America and the Caribbean, the use of the benefits of the Internet is unequal: it is estimated that 244 million of its inhabitants do not have access to these services (Vaca-Trigo and Valenzuela, 2022).

Women experience more precarious conditions when accessing the Internet, due to poor connections, lack of regular access, lack of an appropriate device or insufficient data (Alliance for Affordable Internet-A4AI, 2020). Indeed, globally, the gender gap in internet access increased by 55% between 2013 and 2019 (World Wide Web Foundation, 2020).

In terms of connectivity, four out of ten women in the region is not connected and/or cannot afford connectivity. The cost of mobile and fixed broadband service for the population in the first income quintile in the region averages 14% and 12% of their income, respectively, which explains why a high percentage of this low-income population does not have access to the Internet. Given that women are overrepresented in lower-income households in the region, this explains why there are more women in households that are not connected (ECLAC, 2021c; 2022b, 2022d).
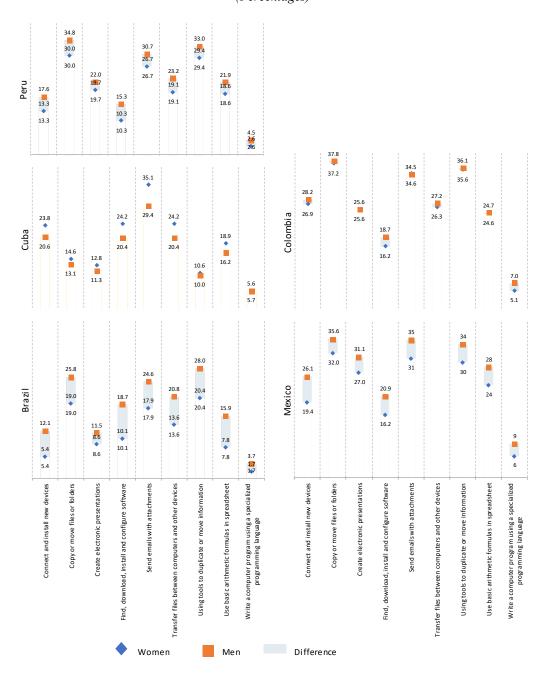
In terms of device availability, although in general terms, access in the region is higher than in other regions of the world, the results of the Gallup World Survey (IICA and others, 2020) show that there are differences from one country to another, and that in the 23 countries analysed in Latin America and the Caribbean there is a gap in favour of men in terms of cell phone ownership. Although 83% of men and 80% of women had access to and used a cell phone in the period between 2017 and 2018 (Agüero, Bustelo and Viollaz, 2020), it was observed that access to the Internet through these types of devices had limitations in terms of usability and connectivity experience compared to tablets or computers. Regarding computers, microdata from the AfterAccess survey conducted in 2017 and 2018 in six countries in the region indicate that access is more widespread among men (54%) than among women (45%). Therefore, the gender gap is also linked to the quality of the equipment that women access (ECLAC, 2022d).

In addition to the gaps in basic access to the Internet and mobile devices, there is the low quality of Internet service that affects women in the region. A study conducted by A4AI in Colombia, Ghana and Indonesia showed that most women, when they access the Internet, do so in suboptimal connection conditions, as they do not have minimum thresholds of effective connectivity (Alliance for Affordable Internet-A4AI, 2020; Vaca-Trigo and Valenzuela, 2022; ECLAC, 2022d).

Beyond the problem of differential access for women, a major gap stems from their lower level of digital skills to understand, control and generate trusting links with technology (see figure 2). According to UNESCO's survey of nine digital skills, in the countries where these data are available, less than half of the population has digital skills and, when it comes to more complex activities (programming, configuring software or devices, or using spreadsheet formulas, among others), the proportion of people who say they are competent is very low (less than 9%). There is also a greater gender gap related to digital skills, leaving women at a disadvantage (ECLAC, 2022d).

The digital skills deficit is one of the main barriers that women face in taking advantage of the potential that the Internet offers. The digital skills gap deepens if other factors are also considered, such as age, education, racial ethnicity, place of residence, income level and access to digital devices (Vaca-Trigo and Valenzuela, 2022; Bercovich and Muñoz, 2022).

The limitations experienced by women in access to digital infrastructure, availability of devices and connectivity, in terms of speed and broadband (Sey and Hafkin, 2019), create impact regarding the restriction in access to public goods and services: health information and health procedures, online education, social assistance services and government and private procedures, for example, e-commerce; and restriction in access to financial products, particularly for women-owned businesses. During the COVID-19 pandemic confinement, lack of access to technology was a barrier to obtaining online help services in cases of violence, obstacles that increased women's vulnerability to seek help.

Figure 2
Latin America (5 countries): youth and adults with ICT skills, by skill type and gender, circa 2019
(Percentages)

Source: Own elaboration based on data from UNESCO Institute for Statistics. In the category "Connecting and installing new devices," data for Mexico and Peru correspond to 2018. In the category "Writing a computer program using a specialized programming language," data for Peru also correspond to that year.

Innovation and digital technologies bring increasing personal and social benefits and, therefore, the cost of not having these resources available also increases and increases the gap and exclusion (ECLAC, 2019; Pedraza, 2021).

Full participation in the digital world not only implies the possibility of exchanging information, ideas and knowledge: digital goods facilitate access to rights such as education, employment, health and justice, among others, impacting the full exercise of women's citizenship (Vaca-Trigo and Valenzuela, 2022).

C. The future of work and its implications for women's employment

As mentioned above, the digital transformation is bringing about profound changes in the economy and society, and the world of work is no stranger to such changes. Technologies are creating new jobs related to digitization and the platform economy, but at the same time they are altering the structure of occupations and employment, and, with it, the generation, restructuring and destruction of jobs (ECLAC, 2022f) (see diagram 4). According to previous studies (Apella and Zunino, 2022), in the last two decades Latin American countries have seen an increase in the demand for workers in occupations that make intensive use of cognitive skills and offer higher remuneration than other jobs, which tends to increase the risk of a greater polarization of the labour market to the detriment of women.
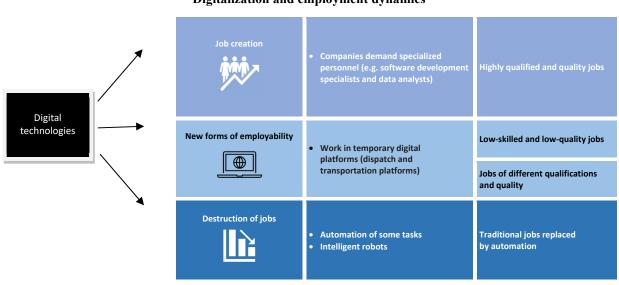
Diagram 4
Digitalization and employment dynamics

Source: Economic Commission for Latin America and the Caribbean (ECLAC); based on ECLAC, Economic Survey of Latin America and the Caribbean 202: Labour dynamics and employment policies for sustainable and inclusive recovery beyond the COVID-19 crisis, 2021 (LC/PUB.2021/10-P/Rev.1), Santiago, 2021.

Digitalization and process automation have a direct impact on women's employment (United Nations, 2022). The risks of technological substitution affect workers in different ways depending on the segmentation of the labour market in which they find themselves and show significant differences related to gender, educational level and age. According to ECLAC data (2022g), 26.7% of the jobs held by women have a medium or high risk of substitution, while 13.7% of the jobs have a low risk. Likewise, 59.6% of women are inserted in the labour market in low-productivity sectors that are generally not at risk of automation, such as cleaning, customer service, care, or educational activities, which excludes them from participating in more dynamic sectors. This situation carries the risk of increasing polarization in an already segregated labour market.

In the digital economy, jobs are changing and tend to reproduce traditional labour market biases and horizontal and vertical segmentation. Although telework allows greater autonomy for women, the phenomenon of labour precariousness in the digital context, from microwork and the trend towards lower wages, without safeguarding labour rights (Gurumurthy and others, 2018), and platform jobs, can deepen the segmentation facilitated by the flexibilization of schedules and spaces that enable multiple tasks.

Another aspect refers to the gender gaps that are reproduced by an unequal unpaid care system that persists in the digital era. Latin America and the Caribbean is characterized by an unfair social organization of care in households, given that the responsibility for care is unequally distributed between men and women, mainly as a result of the sexual division of labour, where women assume or are forced to assume the role of caregivers (ECLAC, 2021c).

In the region, about 76% of unpaid care work and domestic activities are performed by women (Vaca-Trigo and Valenzuela, 2022). Approximately 60% of women in households with children under 15 years of age report not participating in the labour market because of family responsibilities, while in households without children in the same age group this figure is 18% (ECLAC, 2021d). In 2020, during the pandemic, women had to absorb most of the overload of domestic and unpaid care work, as a result of health measures, in a context in which the workload was already unequal and represented three times that of men in the region before the pandemic (ECLAC, 2022d). Likewise, according to recent studies on household surveys conducted in 11 Latin American countries, during the pandemic female students significantly reduced the hours committed to study, which impaired both learning and the probability of successfully completing educational trajectories (Acevedo and others, 2021), affecting future labour market insertion.

Patriarchal cultural patterns, socioeconomic stratification, and the lack of supply of public and social services have a greater impact on lower-income households (ECLAC, 2021c). In the context of the digital economy, this scenario could be aggravated by several factors that condition the equal participation of women in the digital economy and in the digital ecosystem. In principle, stereotypes regarding women's lack of skills in the use of technology, and consequently —as mentioned above—, their lower presence in STEM careers, the deficient and disparate conditions of access to devices and significant connectivity mean that they have less autonomy and less access to dynamic sectors with high digital and technological content (Bercovich and Muñoz, 2022). Thus, women face greater barriers to accessing quality jobs and are increasingly relegated to unpaid care tasks.

D. The appropriation of information technology requires equal participation in the generation of knowledge

In the field of science there is a scarce participation of women and to heighten the seriousness of this situation it is necessary to refer to the feminist perspective of science (Harding, 1996 and 2012; Haraway, 2014), which makes a strong criticism of the objectivity of scientific development (also considering applied science and technology) as a situated product or social construction loaded with gender biases. The objectification and disqualification of women's perspective in science, the division of intellectual labour and the construction of totalizing and stereotyped representations (Radi, 2019), are a reflection of power hierarchies in science and technological production, insofar as the androcentric perspective defines priorities and characteristics of scientific and technological production, and are constituted as barriers that women face when entering, developing and remaining in scientific careers (Bello, 2020; Muñoz, 2021; ECLAC, 2017; ECLAC, 2022d), and to create and produce from a perspective that integrates the diversity of social needs and visions.

Artificial intelligence developments, robotics, and management processes from large amounts of data (bigdata) are paradigmatic examples of the exclusion of women in technological frontiers. The under-representation of women in the design of artificial intelligence applications and the persistence of gender biases in datasets, algorithms, such as the neutrality perspective of science and technology that does not problematize the gender biases that seep into algorithms, programs, and robotic designs —insofar as they are created by experts who may present the biases of patriarchal society— reinforce gender stereotypes that stigmatize women and relegate them from these fields (UNESCO, 2019, 2020a, 2020c; Vaca-Trigo and Valenzuela, 2022). This technological determinism lacks a comprehensive gender perspective and risks deepening existing gaps. The rhetoric that "no governance is good governance," which has gained traction in discussions of the digital field, also exacerbates the challenges, for failure to correct the biased practices in which data-collection and targeted marketing operate risks that structural gender asymmetries will also be reproduced in the way data and artificial intelligence will be governed (Gurumurthy, Chami and Alemany, 2019).

In this context, the gender digital divide is evident in the fewer opportunities for full and equal participation in the innovation and digital ecosystem, as well as in the little or no role played by women in the creation and development of ICTs. This gap is significantly present in technological innovation processes: in Latin America and the Caribbean, the proportion of patents registered by groups of researchers in which there is at least one woman does not reach 28% of the total, on average (López-Bassols and others, 2018; ECLAC, 2022d).

Gender gaps are significant in STEM-related occupations. In addition to the lower participation of women, horizontal occupational segregation reflects the difficulties they face in gaining prominence in traditionally male occupations in these fields. Significant wage gaps are also observed in professional, scientific, and intellectual positions (see figure 3). As a result, women are almost absent from the frontiers of technological innovation.
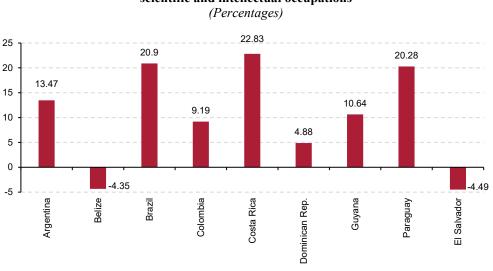
Figure 3
Latin America and the Caribbean (9 countries): gender pay gap in professional,
scientific and intellectual occupations
(Percentages)

Occupation (CIUO-08): 2. Professionals: scientists and intellectuals

Source: Own elaboration based on ILO online database. https://www.ilo.org/shinyapps/bulkexplorer52/?lang=es& segment=indicator&.

E. Conditions for reaping the benefits of the digital age with gender equality

It is important that the digital transformation involves strategic and dynamic sectors of the economy, in order to contribute to productivity, innovation and environmental sustainability, while adopting a comprehensive perspective of gender equality and inclusion in digital policies to ensure the reduction of digital gender gaps, as stated in objectives 17 and 22 of the Digital Agenda for Latin America and the Caribbean eLAC2024[8] (2022).

Technology alone does not guarantee improved service delivery and increased overall well-being and environmental sustainability. It must be combined with increased and more equitable access, especially for traditionally marginalized groups or those facing multiple and intersecting forms of inequality, especially women in all their diversity, as well as with designs centered on people, their needs and demands, to ensure its effectiveness and a focus on closing gaps. While technology development brings many potential benefits, trust and an innovation ecosystem must be fostered to bring all actors together to jointly develop and implement solutions, where women and gender equality play a leading role.

The construction of integrated digital ecosystems will allow women to take advantage of the benefits of activities with greater added value, participate in and benefit from the digital economy and platforms, or use digital goods and services. Incorporating the gender perspective requires the development of comprehensive policies that promote women's participation in the digital economy, recognizing and reducing the effects of the structural challenges of gender inequality that condition access, use and production of technologies.

IV. ERODING THE STRUCTURAL CHALLENGES OF GENDER INEQUALITY: VIOLENCE AGAINST WOMEN AND GIRLS AS A CRITICAL PROBLEM IN THE DIGITAL AGE

Patriarchal, discriminatory, and violent cultural patterns and the predominance of the culture of privilege constitute one of the most persistent structural challenges of gender inequality in the region, which are also manifested in the different forms of violence against women through the digital media. The Regional Gender Agenda identifies as a critical dimension for gender equality and women's autonomy the right to a life free from all forms of violence and discrimination, and explicitly mentions as one of its manifestations that which occurs in cyber media (ECLAC, 2019).

According to the Declaration on the Elimination of Violence against Women (United Nations, 1993), and the Report of the Special Rapporteur on violence against women, its causes and consequences on online violence against women and girls from a human rights perspective (United Nations, 2018), online gender-based violence against women and girls is understood as any action or conduct against women, based on their gender, that causes them death, physical, sexual or psychological, economic or symbolic harm or suffering, in any sphere of their lives, which is committed, instigated or aggravated, in whole or in part, with the assistance of ICTs. Technology-mediated violence has serious consequences for the victims, affecting in both the short- and long-term all areas of women's individual development, such as their autonomy, privacy, and trust.

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[8] The Digital Agenda for Latin America and the Caribbean (eLAC) is a strategy for 2024 that proposes the use of digital technologies as instruments for sustainable development. Its mission is to promote the development of the digital ecosystem in Latin America and the Caribbean through a process of regional integration and cooperation, strengthening digital policies that promote knowledge, inclusion and equity, innovation and environmental sustainability. It has the Economic Commission for Latin America and the Caribbean (ECLAC) as a strategic partner.

Cyber violence against women, girls and LGBTI+ persons is the most visible form of abuse, but not the only one. It is generally sexist and/or sexualized in nature and is expressed through various forms, such as threats, discriminatory speech, sexual harassment, stalking, sextortion,[9] disclosure of personal and confidential information (doxing), zoom bombing (showing racist and sexually explicit material to an unsuspecting audience), troll attacks, or identity theft. Other forms of digital violence include grooming (sexual harassment of girls and adolescents).

Digital gender-based violence is also expressed through invasion of privacy, the use of surveillance devices (spouseware or stalkerware), non-consensual disclosure of intimate images, or non-consensual pornography. In addition, people belonging to the LGBTI+ community, ethnic minorities or indigenous people are frequently the target of discrimination and hate speech through the Internet (Bello, 2020; UNESCO, 2019). These forms of violence do not originate due to the use of technology, but have been accentuated, facilitated or enhanced by it (Vaca-Trigo and Valenzuela, 2022).

The digital gender gap puts girls and women in unequal conditions to face cyber threats, not only because of the difference in skills, but also because, in addition, the inequality of gender can influence the uses and risks of the digital space, especially in a context where the design of digital technology is gender biased (Vaca-Trigo and Valenzuela, 2022).

Women, to a greater extent than men, have been and continue to be frequent victims of behaviours such as "sexual harassment," which in addition to being expressed in institutional settings is manifested in social networks and impacts in various ways on their experiences, their lives, their work careers, their educational performance and even in the ways they use and express themselves in the public space (Gherardi, 2016).

Discriminatory campaigns and discourse on networks reinforce violent attitudes against women and girls (ECLAC and CAF, 2020). Online political violence particularly affects women with a public profile, who are targeted to a greater extent than their male counterparts with the aim of undermining the way they are perceived (United Nations, 2022). These include political harassment, the risks faced by women human rights defenders, journalists, activists, and those involved in politics. Likewise, young women are increasingly using digital spaces to make their voices heard or influence global affairs and are, therefore, most at risk of being deterred as active citizens raising awareness and advocating for rights.

In this sense, these forms of online violence suffered by women hinder their full inclusion in digital ecosystems, force them to self-censor, reduce their interaction in online spaces, which undermines their autonomy, democracy, and human rights.

In the Santiago Commitment approved by the XIV Regional Conference on Women in Latin America and the Caribbean, in 2020, it was agreed, among other important points: "Strengthen policies and mechanisms for regulating digital financial technologies at all levels of government and coordination systems in Latin America and the Caribbean, in order to develop standards on records, content and uses of data across countries and to ensure the individual's rights to privacy and to personal data protection, and promote financial and digital education to ensure that women's financial inclusion is informed and fair." It highlights the importance of preventing, addressing, punishing, and eradicating the various forms of gender-based violence and discrimination facilitated by technologies (ECLAC, 2020b).

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[9] Blackmail that is generally carried out through Internet messaging applications, with an image or video of a sexual nature of the threatened person.

V. RECOMMENDATIONS AND CONCLUSIONS

Latin America and the Caribbean urgently need to move towards a productive transformation with sustainability and equality that addresses the challenges for the fulfilment of the Regional Gender Agenda and the achievement of the SDGs. Although, digital technologies present a scenario of opportunities and challenges for economic and social development, it is essential that their design, development, and appropriation promote processes for building equality between men and women in all their diversity. This will prevent them from deepening pre-existing inequalities in society, focusing on the erosion of the structural challenges of gender inequality that condition their equal participation in different areas in the digital era.

Given the need to address gender inequality in this context and in the framework of the regional consultation prior to the 67th session of the United Nations Commission on the Status of Women, this document proposes a set of recommendations in eight priority areas:

A. Incorporate the gender perspective in the transformation of the productive matrix and the digital transformation of the economy's dynamic sectors

It has been pointed out that it is necessary to move towards more diversified and integrated productive systems that take advantage of the challenges of the digital transformation by promoting product and service innovation, improving capabilities, optimizing performance, and investing in research and development (R&D) to improve productivity and productive diversification. Digitalization can open up job opportunities through entrepreneurship or professional development associated with digital skills (ECLAC, 2020a, 2022b). At the same time, the gender approach must be mainstreamed to ensure that women benefit equally and take ownership of the results of these advances.

1. Develop inclusive digital ecosystems and transform the productive matrix of the countries of the region to ensure gender equality

In order to achieve sustainable and inclusive development in the region, progressive and incremental structural changes are required to diversify the productive and trade structure of the countries, strengthen regional integration and complementarity, and promote knowledge-intensive sectors; but at the same time it is essential to implement technological policies with a gender perspective as part of the efforts towards a new productive and technological paradigm that generates quality jobs and contributes to improving the living conditions of women (Vaca-Trigo and Valenzuela, 2022).

In other words, the idea is to build a digital ecosystem based on the strengthening of infrastructure and connectivity, the development of software and information services, regulation and the development of skills, competencies and capabilities of the entire population, where everyone can become an active participant without leaving anyone behind.

The development of an inclusive digital ecosystem that addresses digital divides and empowers women's economic autonomy in all its diversity requires the design and implementation of policies with the application of a systemic perspective that favours innovation through different tools to promote technological development and active policies to promote technology-based entrepreneurship led by women. In addition, women, as well as their communities, must be actively included in all policymaking, regulatory and governance processes to ensure more equitable outcomes.

It is also necessary to develop a space for articulation and regulation with a gender perspective that includes the participation of multiple actors: companies (of different sizes and characteristics), the educational system and in particular the higher education system, the scientific and technological system (with the promotion and development of start-ups, business incubators, spin-offs, etc.), investors, governments and other actors, within a framework of information exchange and collaborative production of knowledge. It is essential that these articulation spaces include the mechanisms for the advancement of women, in order to guarantee the gender perspective and specific support measures for women in the region.

In turn, the promotion and development of digital ecosystems requires the formulation of policies to promote digital industries, in particular to develop more knowledge-intensive and higher value-added sectors, normally linked to the field of STEM, and the consolidation of a regulatory framework that promotes them and includes a gender perspective. These promotion and incentive policies should take into account socioeconomic, geographic, age and gender criteria appropriate to the context of each country. Furthermore, policies aimed at reducing digital inequality must be transversal to consider the cross-sectional nature of digitization. In addition, these policies should be subject to gender impact assessments to ensure that they do not reinforce and perpetuate existing inequalities.

2. Leveraging digital transformation to build a digitally inclusive society

Building an inclusive digital society that is more dynamic, equitable and resilient requires, as a priority, promoting equality and inclusion, universalizing access to digital technologies and eroding the gaps and barriers that restrict their use.

The countries of the region should implement relevant and planned policies and investments to take advantage of the digital transformation for the benefit of the entire population, considering affirmative action measures in favour of women who are more vulnerable to the new digital ecosystem. For example, grants and training programmes in digital skills could target women-led microenterprises, providing possibilities for access to high-speed broadband for effective participation in the digital age, as well as access to and creation of relevant digital content and solutions. As indicated above, 4 out of 10 women in the region are not connected or cannot afford effective connectivity, so it is essential to close the gender gaps in terms of access, use, appropriation, and creation of technologies, ensuring infrastructure (Vaca-Trigo and Valenzuela, 2022).

This requires the development of policies that promote the construction of the necessary digital infrastructure (connectivity and infrastructure for data storage and processing) and guarantee access to the most disconnected households, including those headed by women, in order to reduce digital gaps in access, use and production, develop skills and articulate the participation of the different actors in the innovation system (ECLAC, 2022a). Many digital solutions can contribute to improving access and coverage of public services related to health, education, and government services, as well as sociability and citizen participation, and thus improve the quality of life and social inclusion (ECLAC, 2022g), which is why it is necessary for governments to promote equitable access to ICTs.

As proposed in the Report Regional Alliance for the Digitalization of Women in Latin America and the Caribbean approved at the 60th Meeting of the Presiding Officers of the Regional Conference on Women in Latin America and the Caribbean, in 2021, promoting inclusive digital transformation requires —in addition to access to digital technologies—, favoring access to resources and business opportunities, promoting the employment of women in the dynamic sectors of the economy and facilitating job training and education in technological areas.

B. Design comprehensive universal care systems that promote greater digital inclusion of women

Latin America and the Caribbean faces the challenge of building a future with a horizon of equality for all women. Target 5.4 of SDG 5 establishes the need to recognize both the rights of people who require care throughout their life cycle and those who provide it. To this end, it is a priority for governments to promote transformative processes that contribute to advancing towards a care society from a gender and human rights perspective that considers interculturality and intersectionality (ECLAC, 2020b; 2021g) with the aim of creating opportunities for participation and quality employment for women.

**1. To comprehensively contemplate the different components that make up
the integrated care system, taking advantage of the benefits of the digital era**

The creation of a comprehensive care system requires deploying actions around five components in a comprehensive manner (UN Women and ECLAC, 2021): (a) create and expand public, universal and quality services oriented to the different target populations; (b) establish regulations that ensure access to services; (c) develop training strategies for paid caregivers that enable them to guarantee quality care, certify competencies and strengthen their labour trajectories; (d) generate and manage data, information and knowledge for decision-making on the functioning of the system; and (e) develop a communication strategy aimed at promoting social and gender co-responsibility to deconstruct the idea that care tasks are essentially feminine.

Each of these components can be expanded or reconfigured in the digital era to strengthen the comprehensive care system. Digital technologies and devices can be used for the design of public care policies. It is important to support the digitization of services related to care and health, such as the development of applications with georeferencing of resources available to households for care strategies. At the same time, it is necessary to promote the development of digital skills by the population based on the opportunities provided by hybrid models for the development of capabilities and skills in the care sector, and to contribute to the professionalization of these activities. In this sense, the integration of digital technologies in educational systems can promote training systems with greater flexibility to adapt to the needs of both caregivers and care recipients. Likewise, digital applications should be promoted for labour intermediation in the framework of the care economy (ECLAC, 2022b). Digital technologies can provide, through *online* platforms, different services related to the care system, such as experiences, research and data related to care and care work. This is not without its challenges, as it is necessary to ensure that the labour relations established through digital platforms take place under decent working conditions, with social protection and safety in the workplace.

A particular aspect refers to women who migrate to perform care work in destination countries and, at the same time, assume the economic provision of their households of origin. To this end, it is important to strengthen policies that allow them to participate in the care networks in their homes at the place of origin (ECLAC, 2022b). To ensure community participation in territorial terms, public policy on care must be built on an approach that considers the needs and demands of the territories. In this sense, the territorial perspective refers not only to household characteristics but also to the particular characteristics of the environment that define a particular relationship with the care burden of households, time poverty and gender gaps, particularly in rural sectors where there is less penetration of digital technologies (Vaca-Trigo and Valenzuela, 2022).

Therefore, institutional spaces for dialogue between local actors are required to generate synergies and coordinate specific actions according to each context in relation to the components of the care system at the local level, which promote greater digital inclusion of women to achieve a better distribution of the fruits of progress and, thus, contribute to a fairer and more sustainable social reorganization of care (UN Women and ECLAC, 2022; 2021; ECLAC, 2021a).

2. Develop a governance model for the integrated care system that contemplates inter-institutional articulation supported by digitalization

At the national and territorial levels, it is necessary to involve all the institutions that implement actions aimed at the care of the different target populations of the comprehensive care system —children, dependent persons requiring care and care workers— (UN Women and ECLAC, 2022). Inter-institutional and intersectoral coordination is a key aspect for the management of a system integrated by various components and responsible agencies at different levels—national and subnational. The georeferencing of institutions and care services in the territory is a strategy to strengthen inter-institutional alliances and support territorial coordination processes. Care services in territorial terms provide relevant information for the development of care policies in the territory (ECLAC, 2022b).

Likewise, the construction of co-responsibility between the State, the private sector, families and the community requires the promotion of institutionalized spaces for dialogue between civil society organizations —women's and feminist organizations, organizations of people with disabilities, the elderly and children, trade union and business organizations, and the academic sector— so that all key actors can play a leading role and generate a basis for sustainability. At the territorial level, the construction of agreements with the academic sector can contribute to strengthen the production of knowledge on care in order to place the issue on the public agenda (UN Women and ECLAC, 2021; ECLAC, 2021a).

The implementation of a regulatory framework and the construction and strengthening of state capacities for the implementation of the comprehensive care system, in order to guarantee conditions of quality and equality in care tasks (UN Women and ECLAC, 2021), requires, on the one hand, the allocation of sufficient budgetary resources to ensure the financial sustainability of policies in the long term (UN Women and ECLAC, 2022; ECLAC, 2021a). On the other hand, accountability and monitoring strategies and impact studies are necessary. Likewise, it is necessary to transcend the perspective of the comprehensive care system as a mere expense and conceive it as a social investment that fosters present and future capabilities, contributes to the dynamism of a productive sector that is key to the sustainability of life, reverses discrimination in the labour market and creates jobs to generate women's economic autonomy (ECLAC, 2019; 2022d).

C. Bridging the gender digital divide to empower women's participation and autonomy

In the current context, effective connectivity —access to the Internet, availability of devices and basic skills for its use— is a determining factor in people's quality of life. It conditions people's participation and access to basic goods and services, the link with government institutions, businesses and society, and the possibility of carrying out work, education, and leisure activities (ECLAC, 2022g). Women in the region are in very different positions with respect to effective connectivity compared to men.

It is necessary to examine and address from an intersectional perspective the barriers that women experience in accessing and using ICTs, and their impact and, as established in the Regional Gender Agenda, the Santo Domingo Consensus[10] (ECLAC, 2013) and in SDG 5, it is the responsibility of the States

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[10] The Santo Domingo Consensus, within the framework of the XII Regional Conference on Women in Latin America and the Caribbean held in Santo Domingo in October 2013, places special emphasis on the role of information and communication technologies in achieving women's autonomy. It presents the scenario of opportunity and challenges behind the growth of the digital economy, innovation projects and access to and use of information and communication technologies to promote the processes of building equality and prevent them from creating a gap that deepens inequalities in the information and knowledge society, especially for rural women, indigenous women, women of African descent, displaced and migrant women, young women, older women, women living with HIV/AIDS and women with disabilities.

to make the necessary investments to make information and communication technologies accessible, favour the achievement of economic, political, physical and decision-making autonomy of women and girls (ECLAC, 2013; United Nations, 2015) within the framework of digital transformation and the development of the digital economy.

1. Implementing effective connectivity policies oriented to women

Effective connectivity access policies should be a priority for governments and guided by international principles, especially equality, non-discrimination, inclusion, participation, and the provision of effective resources (Vaca-Trigo and Valenzuela, 2022). The digital divide is determined, among others, by the affordability of broadband services at speeds that allow the use of data-intensive services and the possibility of acquiring appropriate devices.

Within this framework, it is a priority to incorporate the gender perspective in digital policies for the definition of specific interventions adapted to each context and aimed at groups that experience greater digital exclusion, such as women in vulnerable situations, as well as those facing multiple and interrelated forms of discrimination, such as indigenous and rural women, among others. These actions should not only focus on guaranteeing connectivity in terms of infrastructure, but also on addressing inclusion and equity based on structured and nuanced approaches that make it possible to eliminate the particular barriers of the different groups of non-user and less connected women.

The Economic Commission for Latin America and the Caribbean's (ECLAC) proposal for a basic digital basket —composed of a laptop, a smartphone, a tablet, and monthly connectivity plans— aims to facilitate access to effective connectivity for vulnerable segments of the population (ECLAC, 2020a). The proposal is aimed at households, and not only at individuals, and can be adjusted to different contexts and needs. Thus, it is proposed to prioritize women in households where there is no connectivity and whose income does not allow them to afford Internet access and the necessary devices (ECLAC, 2022b). The basic digital basket can be a central tool in a policy of demand-side subsidies to improve effective connectivity. According to ECLAC estimates, the cost associated with the basket can represent a significant percentage of household income, especially in the poorest households. In some cases, this cost reaches 44% of monthly income) (ECLAC, 2022g). To make progress in the essential elements of effective connectivity, ECLAC estimates that on average the countries of the region should make an investment of around 1% of GDP per year, although with large differences among them. This would benefit millions of low-income women in the region. To implement this initiative, ECLAC recommends using demand-side subsidies to help lower-income households finance the purchase of telecommunications services and the basket of access devices, as well as taking temporary measures to encourage local production or low-cost imports of devices (ECLAC, 2020c).

Other proposals to finance the universalization of effective connectivity for women and girls include programmes that facilitate access to affordable and subsidized devices and incentive policies for operators to establish reduced tariff agreements or differentiated prices that favour connectivity for women in their diversity.

Finally, governments need to promote the development of inclusive digital solutions (applications and content) to carry out procedures and facilitate access to information, health, and education, among others, that are easy to use and available in the different local languages of each country. This implies regulatory flexibility measures, for example, that encourage the use of these services by means of the application of zero tariffs, which allow access to these services at no cost to the user. In addition, the development of mobile applications for accessing these services should be considered (ECLAC, 2022f).

2. Increase network coverage and quality, especially in underserved areas, to reduce the gender digital divide

The current context has shown that full participation in the digital era, in activities such as tele-education, telemedicine or teleworking, requires high-speed Internet connections and the development of digital skills. Therefore, it is necessary to increase coverage in the provision of services and improve their quality to reduce the existing gaps, which particularly affect some groups of women, especially those living in poverty, indigenous, Afro-descendant and rural women (Vaca-Trigo and Valenzuela, 2022).

In order to reduce the connectivity gap, actions are required to expand the provision of services in areas with low commercial profitability. Therefore, it is a priority to develop public policies and updated regulation that promote innovative solutions based on the combination of different access technologies, such as mobile, satellite or fibre optic networks, and innovative business models that enable the deployment of infrastructure and the provision of services among various stakeholders from the State, the digital industry and other sectors (ECLAC, 2022g). In this sense, it is necessary that governments design and implement digital policies at different levels: federal, local and municipal, integrating at all times the gender perspective and intersectionality, so that these policies contribute to closing gaps and not to deepen existing inequalities (ECLAC and CAF, 2020).

D. Promoting digital confidence and safety for women and girls and ensuring digital human rights

The digitization and development of the Internet provides unprecedented opportunities for women and girls to communicate, learn, access multiple resources and information, and express their opinions, with a high impact on their lives and the life of their communities. However, the network also presents risks: women are the majority of victims of cyberbullying, data trafficking, use of images without consent, identity theft, scams, abuse and sexual exploitation online, and other forms of violence in digital media (Bercovich and Muñoz, 2022; OAS, 2021).

It is necessary to ensure that participation in digital spaces takes place in protected environments and to increase the response to generate an environment of zero tolerance to all discrimination and violence in the digital space. Governments have an obligation to generate policies and a culture of digital security (cybersecurity) with a gender focus that ensures the safety and well-being of girls and women and the exercise of their rights online and offline.

1. Develop regulatory frameworks and build a national strategy for the protection of women and girls in the digital world

The countries of the region must advance in the construction of specific regulatory and normative frameworks that incorporate gender equality and the prevention of violence faced by women and girls in the digital world, in the educational system and in the workplace. In this regard, it is necessary to develop national strategies to mobilize the collective action of different actors— different branches of government and levels of government, women's and feminist organizations and other civil society organizations, such as Academia and the private sector, among others—to minimize risks and threats, and take advantage of the opportunities offered by digital technologies in contexts free of all forms of violence.

The provisions of international digital human rights instruments and data privacy protection practices should be integrated into these regulatory frameworks: protecting privacy rights, adopting identity-related safeguards, protecting individuals from network surveillance, addressing illicit, illegal and

harmful online content, guaranteeing safe online spaces that safeguard freedom of expression, avoiding excessively restrictive practices and protecting women and girls from online violence. Therefore, it is not only necessary to develop adequate regulatory support, but also to strengthen management aspects related to the prevention of digital crimes, containment of victims of rights violations and the promotion of digital human rights, including support and assistance mechanisms in situations of rights violations. On the other hand, considering the transnational nature of digital ecosystems, progress must be made in regulatory instruments that allow the prosecution of crime in different jurisdictions, ensuring at all times the protection of women and girls.

The strategy must ensure the normative and procedural means to prevent, detect, respond, act and redress any type of online abuse, including clear, communicable and appropriate protocols and procedures for reporting, rapid mechanisms for the removal of non-consensual content, civil and administrative alternatives for victims to access legal avenues and helplines. This implies, on the part of governments, providing ongoing training for justice agents specialized in addressing online violence with a human rights and gender approach (UN Women, 2021b).

It is also necessary for governments to implement permanent monitoring systems for security policies in the digital ecosystem that include a gender and intersectionality perspective to review compliance and ensure that women and girls are adequately protected.

2. Promote training programmes on digital citizenship for safer access to technology and its use

Actions to be implemented should address the discriminatory behaviours that underpin online gender-based violence. It is a priority to establish awareness and education campaigns, adapted to the local context, to eliminate harmful attitudes and behaviours, and to deploy strategies that contribute to developing digital skills for men and women throughout the life cycle and that address the responsibility of generating violence-free spaces.

In these awareness campaigns, the focus should be on those who perpetrate violence, aiming to transform patterns of violence and promote safe spaces for women and girls in all their diversity. It is also necessary for women and girls to be informed about protocols, where to report cases of violence and how to access essential services online (UN Women, 2021b).

In education, both families and teachers have an important role to play in teaching appropriate behaviour for digital interactions and how to respond to and protect themselves from acts of online violence. Therefore, updated and permanent teacher training programmes are required in relation to this issue.

3. Produce and disseminate knowledge for understanding and tracking patterns of violence and for decision making

Governments need to fund lines of research to understand and track patterns of violence against women and girls and, at the same time, to identify and disseminate experiences of promising good practices that effectively address violence against women and girls in the digital world. Likewise, it is important to support the development of applications that are at the service of the analysis of violence against women and girls in the territories, in terms of care mapping, to identify centres of care and attention to violence, and to build a map of organizations that address these situations.

Country strategies must include the collection of available data on violence experienced by women and girls in the digital world —disaggregated by sex, age, ethnicity and race, where possible— in order to design evidence-based measures. It is an inescapable commitment on the part of governments to collect this information and publish the data openly for others to use.

Universities, including research centres, as well as industry should conduct ethical reviews of ongoing research and new technologies that include a gender and intersectionality perspective. Similarly, agencies that award grants to conduct research should require among the requirements a component that includes how that research integrates gender and intersectionality analysis.

E. Driving the transformation of education for inclusive recovery and improving the situation of girls and women

1. Promote and finance inclusive digital transformation processes in education systems to renew education in the region

The years that have elapsed since the pandemic, in addition to accelerating previous advances, have highlighted the need to promote a strategy for the digital transformation of the region's education systems. This implies considering the lessons learned from the current crisis and making progress in the different dimensions.

In the first place, it is essential to propose a curricular revision with a gender perspective on the competencies and skills approach and on study plans. The early incorporation of computer science or computational thinking in study plans, particularly in primary education because it is practically universalized, can contribute to the development of digital skills with gender equality, eroding the stereotypes and biases associated with the fact that these skills are mostly in the male domain (ECLAC, 2022g).

It is also a priority to promote the renewal of teaching and learning within the framework of education in the digital era. In this sense, the emergence of hybrid pedagogical models that combine face-to-face and virtual instances present a powerful and innovative alternative for the development of inclusive digital transformation processes. This requires budgetary policies that pay special attention to the difficulties of access and digital appropriation of the most vulnerable people, especially women and girls who face multiple and interrelated forms of discrimination. In addition, it is necessary to pay attention to the accessibility of digital education in rural contexts, as well as the specific needs of women and girls with disabilities, and cultural relevance.

Teacher training (both initial and ongoing) to take advantage of digital technologies, together with connectivity, digital equipment and innovative educational technology solutions aligned with curricular priorities, can enhance new teaching and learning practices. In this sense, it is important to approach digital education not as a substitute for face-to-face education, but as an opportunity to develop new types of teaching and learning, through renewed pedagogical methodologies and tools.

It is necessary to promote quality educational trajectories for girls and women that enhance access to digital technologies and favour the development of skills to use and appropriate them regardless of the diversity of territories, socioeconomic strata, places of origin, ethnic and racial descent, among others. The design and implementation of policies that guide this transformation must consider gender inequalities from an intersectional perspective.

2. Promote comprehensive and intersectoral public policies to encourage the participation, permanence and graduation from education of girls, adolescents and women in STEM and their promotion in labour trajectories

To promote gender equality in the field of STEM, it is necessary to apply comprehensive public policies involving various strategies and based on the intersection of gender with other factors of inequality.

In the education sector, it is essential to promote the vocation of girls and young women in STEM from the earliest stages. This requires sustained initiatives and public policies that guarantee their inclusion from the earliest educational levels. Training in STEM skills is a priority from an early age and, therefore, it is crucial that gender equality plans incorporate actions that articulate education, science and technology in accordance with the provisions of SDGs 4 and 5. In particular, as noted above, the incorporation of computer science in curricula is a key aspect for strengthening and fostering STEM vocations among girls and young women (ECLAC, 2022g; Telecom Advisory Services, 2022a, 2022b). At the higher education level, flexible study plans should be promoted with the possibility of adapting curricula, content and training in competencies to respond to the demand for updated knowledge (ECLAC, 2022g).

It is also necessary to erode gender stereotypes that function as a barrier for girls and young women with respect to STEM areas. This requires interventions that target all socializing agents that are part of the process of constructing the interests and choices of girls and young women. This implies the implementation of strategies to identify and address forms of discrimination linked to gender stereotypes that exist in institutional culture, in study materials and in the school infrastructure.

On the other hand, it is necessary to combine affirmative actions for the access, permanence and graduation of women in STEM careers with processes of legislative reform, equal opportunities and dissemination and communication to promote greater participation of women in these areas. It is necessary to strengthen the links between educational policies and employment in these fields in order to guarantee a transition from education to work that will allow them to advance in their professional careers, and to define affirmative actions and incentives for educational institutions and companies linked to these areas, as well as to promote and publicize their achievements through campaigns to change the perception of women in STEM areas.

The new dynamic sectors of the economy based on innovation and technology can become the platform from which to promote labour trajectories with broad representation of women (ECLAC, 2022d).

Technological advances, process automation, more knowledge-intensive sectors such as the digital revolution have spurred the demand for skills in STEM fields, while offering the possibility of creating more productive and better-paying jobs.

The design of TVE programmes linked to technologies and engineering is conducive to fostering labour market insertion and continuity towards higher studies that allow deepening the skills and competencies required by the digital era and increasing the degree of specialization of professionals. Therefore, promoting and strengthening the participation and permanence of women in TVE to boost their labour and educational trajectories is considered fundamental for the generation of economic autonomy and their insertion in sectors with higher added value.

It is necessary to transform TVE training systems from a gender perspective, in order to promote the educational and labour trajectories of women in areas considered traditionally male, so as to advance in the process of adoption of digital technologies and thus enhance the development of digital skills in women through the implementation of technical education plans and vocational training in digital skills (ECLAC, 2022g).

This implies eradicating the gender stereotypes that are expressed in this educational modality and that hinder women's scientific-technological vocations, access to TVE careers and programmes, and their permanence. To this end, it is necessary to review aspects of the educational environment, such as linguistic and extra-linguistic practices, communication policies and visual language that reinforce barriers; detect hostile environments for women, particularly in masculinized careers where there are ratios of female under-representation; update the regulatory frameworks for gender equality in teaching and management roles; and design concrete policies as a response to prevent women from dropping out. On the other hand, it is suggested to have information systems on the educational and labour trajectory of students and graduates, in order to eliminate gender labour segregation and promote the insertion of women in high productivity sectors, strengthening strategies in technical education and vocational training, particularly through proposals linked to STEM areas.

In line with the Santo Domingo Consensus (2013) and the Santiago Commitment (2020), these actions consist of promoting the labour participation of women in STEM areas, eliminating job segregation, and guaranteeing decent work and equal pay, particularly in emerging sectors, including the digital economy, as well as adopting legislative and educational measures to eradicate sexist, stereotyped, discriminatory and racist content in the media, software and electronic games.

It is necessary to overcome gender stereotypes in the use of technology and to support the training of women in technological skills and higher education in STEM, in order to achieve a higher percentage of women employed as ICT specialists, an area with higher employment expectations in the digital economy (Vaca-Trigo and Valenzuela, 2022).

This requires the creation of plans focused specifically on the intersection between gender and STEM, as has been done in Costa Rica, Chile and Argentina. Such policies highlight some key issues, such as the gender digital divide (ECLAC, 2022d).

3. Support the creation, access, reuse, repurposing, adaptation and redistribution of inclusive and equitable quality Open Educational Resources (OER) for all stakeholders

Open Educational Resources (OER) are learning, teaching and research materials, in any format and support, in the public domain or protected by copyright and that have been published with an open license that allows access to them, as well as their reuse, reconversion, adaptation and redistribution at no cost by third parties. Open license means a license that respects the intellectual property rights of the copyright holder and provides permissions that grant the public rights to access, reuse, repurpose, adapt and redistribute educational materials.

These resources should be available to all people in the education system, both in formal and non-formal educational settings, regardless of age, gender or socioeconomic status, indigenous peoples, people in remote rural areas (including nomadic populations), those living in areas affected by conflict and natural disasters, ethnic minorities, migrants, refugees, displaced persons or asylum seekers. In all cases, gender equality and intersectionality must be ensured, and special attention must be paid to measures to promote equality and inclusion of all students, particularly those facing multiple and intersecting forms of discrimination.

The General Conference of the United Nations Educational, Scientific and Cultural Organization (UNESCO), meeting in Paris in 2019, refers to a number of strategic approaches to achieving SDG 4 and thus ensuring inclusive and equitable quality education that promotes lifelong learning opportunities for all. The Conference recognizes in particular that the development of ICTs, including artificial intelligence,

provides opportunities to enhance the free flow of ideas by word, sound and image, but also poses challenges in terms of ensuring the participation of all people in the knowledge society. It is in this framework that UNESCO incorporates Open Educational Resources (OER) to help Member States build inclusive knowledge societies and meet the 2030 Agenda.[11]

It is recommended that Member States consider the possibility of:

(a)   ensuring access to OER in a manner that most appropriately meets the needs and material circumstances of the target learners and the educational objectives of the courses or subjects for which they are intended; this would include modalities for offline access (including print material) to the resources, as needed;

(b)   supporting OER stakeholders to develop these resources in a gender-sensitive and culturally and linguistically relevant manner, and to create resources in local languages, particularly in lesser-used, endangered, and under-incentivized indigenous languages;

(c)   ensuring that the principles of gender equality, non-discrimination, accessibility and inclusion are reflected in strategies and programmes aimed at the creation, access, reuse, adaptation and redistribution of OER;

(d)   enacting regulatory frameworks that support the development of OER products and related services consistent with national and international standards, as well as the interests and values of OER stakeholders;

(e)   promoting the faithful linguistic translation of open licenses.

4. Promote lifelong learning opportunities for women, mainly with a view to jobs in the digital economy and occupations that respond to the demands of new realities and that make it possible to generate innovations

The field of learning and teaching with young people and adults in the region has the capacity to favour the development of plans, programmes and inter-institutional and intersectoral actions that affect the lives of women in key dimensions linked to work, health and well-being, the promotion of a culture of peace, the reduction of social inequalities and the eradication of extreme poverty, the protection and sustainable use of the environment, and the promotion of good living (UNESCO, ECLAC and UNICEF, 2022).

The development of more flexible hybrid teaching modalities is favourable for broadening the scope and enabling diverse educational trajectories, provided that access to digital connections and devices is guaranteed (UNESCO, ECLAC and UNICEF, 2022) and the availability of digital skills is a condition for taking advantage of them. Online education provides different alternatives for training and job retraining and improves productive, commercial and entrepreneurial opportunities for women (Bercovich and Muñoz, 2022).

Therefore, it is relevant to create educational and labour insertion strategies with a gender perspective that contribute to provide the fundamental skills in the new scenario, with priority on the development of digital skills to ensure that women keep up with the advances (Vaca-Trigo, 2021), and reduce the digital gaps.

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[11]   Specifically, SDG 4 (quality education), SDG 5 (gender equality), SDG 9 (industry, innovation and infrastructure), SDG 10 (reducing inequality within and between countries), SDG 16 (peace, justice and strong institutions) and SDG 17 (partnerships to achieve the goals).

In turn, the Santiago Commitment (ECLAC, 2020b), in synergy with other employment and co-responsibility policies, stated the importance of promoting strategies for financial and digital education, entrepreneurship and trade, especially for indigenous, Afro-descendant, rural and grassroots women, and women in vulnerable situations, to improve employment opportunities for women (Bercovich and Muñoz, 2022).

Guaranteeing the right to education with gender equality implies providing training proposals for lifelong education so that people are prepared to adequately face the demands and challenges of the digital era. This requires affirmative and transformational actions that include girls and women by providing possibilities for training and education throughout the life cycle, which are articulated with the world of work and the productive sectors, in a context of accelerated technological change. The highly dynamic nature of the current context requires that girls and women have multiple opportunities to acquire new skills demanded by digitalization to complement those they already possess (ECLAC, 2022d). To achieve these goals, education systems must identify and eliminate the gender stereotypes still present in educational institutions in order to address the current persistent inequalities.

F. Ensure women's rights to work and at work, particularly in digital and platform employment

Digital transformations have immense potential to improve the economic and social conditions of the countries of the region, and of women in particular. However, the future of the labour market is still uncertain and will depend, among other factors, on the policies implemented to promote women's employment and protect labour rights, in accordance with SDG 8, which aims to "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all."

Countries must consider changes in socioeconomic processes to promote and guarantee rights, at the risk of perpetuating the structural challenges of inequality if they do not adopt comprehensive public policies that mainstream the gender perspective in the labour sphere.

1. Guaranteeing the right to work and at work

In this context, it is vitally important to take measures to promote women's right to work and full employment. In 2019, women accounted for an average of 56.7% of informal employment in the region (ECLAC, 2022h), and many of these jobs have a high probability of destruction due to the automation processes that will deepen in the future, which would expose them to higher levels of job uncertainty and unemployment.

In order to anticipate this situation, it is important to develop actions to improve employability with a gender perspective, correct the effects of job segregation and ensure greater digital inclusion. It is necessary to develop active employment policies aimed at promoting the employment of women in areas of the digital economy such as STEM fields, addressing gender biases in these professional areas. Countries should consider employment policies with sectoral approaches with special attention to people at greater risk of losing their jobs or not accessing new jobs (e.g., young women, indigenous women, women with disabilities, women living in rural areas, among other groups) in order to minimize the negative employment impacts of digitalization.

In this regard, policies should consider broad training processes and the development or improvement of competencies and digital skills for the changing labour market aimed at women in their diversity to facilitate the transition to new occupations and jobs. Digital transformation is creating new jobs, it is necessary to expand the insertion of women in the sectors of the future and revitalizers of the economy.

However, compliance with this right implies the promotion of quality employment and women's rights in the workplace. In this sense, the transformations that are occurring in the labour market in the digital era demand adequate regulations for new employment modalities to avoid risks associated with socio-labour unprotection, new hiring conditions, job instability, unpaid hours and other labour rights that are being violated (Vaca-Trigo, 2019; ECLAC 2019a).

2. Prevent the precariousness of atypical and emerging forms of employment

The digital revolution has driven the development of the platform economy, which has made it possible to connect groups of people and companies, sharing access to their assets, resources, time and skills on a previously unthinkable scale. The digital platform economy can bring benefits to consumers through new services, wider choice and lower prices (ECLAC, 2019).

At the same time, the emergence of new online and platform-based jobs is generating new forms and modalities of employment relationships that pose challenges to national legislations as they are outside these regulations and in precarious working conditions. In most cases, these people are not protected by labour rights such as the right to union organization and collective bargaining, nor do they have paid vacations, sick leave, health insurance, maternity protection or unemployment insurance. Also, in many cases, these types of jobs do not ensure a fixed income, nor the possibilities of training or career advancement (Vaca-Trigo, 2019). In this way, the platform economy has given rise to a series of atypical forms of work, including new definitions of workspaces and working hours (Novick, 2018; ECLAC, 2019a), where jobs through platforms weaken the ability of women workers to organize through a union or carry out collective bargaining processes.

In this sense, it is key to have dialogue mechanisms in which workers, unions, companies, and the State participate (Vaca-Trigo, 2019) and these national-level policies should be complemented with regional and international cooperation agreements on labour standards and women's human rights (ECLAC, 2019a).

Although the platform economy could represent an opportunity to promote the insertion of women into the labour market and generate their own income, gender gaps in this type of employment are evident in the region. In addition, women's choice of these jobs could be linked to the need to combine them with unpaid domestic and care tasks, an aspect that reflects the maintenance of the discrimination to which they are subjected and that could contribute to reinforcing traditional gender roles, in addition to outsourcing part of the production costs to women workers. According to available studies, on average, women are more likely to leave jobs in the platform economy and earn lower incomes than men (Hunt and Samman, 2019; Berg and others, 2018).

Thus, this new form of self-employment could translate into a new precarious, unstable and low-quality insertion for women (ECLAC, 2019a). Therefore, labour policies that contribute to rethinking these new forms of employment are required to ensure socio-labour protection. It is necessary to have spaces for regional exchange to define guidelines and cooperation mechanisms that avoid the precariousness of work and the reproduction of gender inequality (Vaca-Trigo, 2019; ECLAC, 2019a), overburdening women more, subjecting them to greater pressure and leaving them less time to devote to other activities (OECD, 2017), as well as ensuring digital human rights, for example, the right to privacy.

3. Promote a fiscal and financial policy with a gender approach to promote the participation of women in the digital economy and ensure their autonomy

The 2030 Agenda, the Montevideo Strategy and, recently, the Buenos Aires Commitment urge governments to design, implement and evaluate countercyclical macroeconomic and fiscal policies with a gender perspective that contribute to mitigating the effects of the crisis and the economic downturn that the region is experiencing. Fiscal policy is key because of its redistributive effect and, therefore, as an instrument that can contribute to gender equality based on an equitable distribution of resources, the provision of public goods and services, progressive revenue collection and the distributive effect of investment incentives in strategic areas for diversification and the reduction of inequalities. Technologies can be great allies to improve the tax collection capacity of States, and to fight tax evasion, giving greater space to the development of progressive fiscal policies (ECLAC, 2020c).

In the same sense, financial systems play a key role in boosting technological innovation. Historically, women have been excluded from formal financial systems and strategies aimed at them have focused on microfinance, with small amounts and at high cost (ECLAC, 2019). At the same time, women's lower access to the Internet reinforces the difficulties in taking advantage of financing, perpetuating the disadvantage (ECLAC, 2020a). A trend that can increase the process of financial inclusion of women in the region has to do with the increase in the levels of access through digital platforms and the use of *Fintech*.[12] The crisis resulting from the COVID-19 pandemic has led to the acceleration of this process, but it has also highlighted, first of all, the significant gap in women's access and digital skills to take advantage of financial services, the scarce financial autonomy and the lack of use of *Fintech* platforms.

Access to and use of technology continues to have a gap between formality and informality that should and could be reduced by public-private agreements in order to generate greater incentives to improve the supply of financial services with a gender perspective (UN Women, 2021c). It is necessary to move towards financial systems that incorporate inclusion and non-discrimination criteria with instruments that are affordable for women, incorporating the facilities of digital financial technologies (*Fintech*), for which it is necessary to strengthen regulatory mechanisms and protect women in the use of digital platforms.

In the framework of the digital ecosystem and entrepreneurship in the digital economy, women face multiple limitations when starting up, related to their limited access to and use of digitalization elements and their limited technological sovereignty. Given the opportunities that digitization and access to new technologies represent for business development, innovations and businesses led by women should be considered and promoted, generating tax benefit programmes, including grants, counselling, training programmes to improve access to and use of digital tools and services. With the aim of building a digital ecosystem that advances towards gender equality by strengthening the digital talent of women entrepreneurs. Moreover, to the extent that major transnational platform companies benefit from big data, and due to the transnational nature of their financial flows, it is necessary to boost regional tax cooperation, to reverse the race to the bottom and harmful tax competition between countries (ECLAC, 2022d). In the context of the digital economy, tax cooperation is essential to agree on standards that determine how to tax different goods and services, considering the way in which income is generated and the jurisdiction in which the digital enterprise resides (ECLAC, 2022d). On the other hand, strengthening regional cooperation is necessary to combat tax evasion, tax avoidance and illicit financial flows in order to have more resources for gender equality policies (ECLAC, 2022b). It is also necessary

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[12] The term *Fintech* has its origin in the English words *Finance and Technology* and refers to those activities that involve innovation and technological development for the design, supply, and provision of financial services (whether from financial institutions or companies in the financial sector).

to develop financing instruments for initiatives of women's organizations, particularly those related to the promotion of educational and professional programmes to facilitate the transition to new occupations or jobs linked to the digital economy.

G. Strengthen governance and multisectoral partnerships, reorganize institutional conditions and reaffirm social pacts to ensure the achievement of the Sustainable Development Goals

In Latin America and the Caribbean, many of the conditions are in place to move towards advanced and inclusive digital models. In 2019, nearly 70% of the region's population was an Internet user, mobile broadband penetration reached 73% of the population, 95% were covered by a 3G mobile network and 88%, by a 4G network (ECLAC, 2021e). However, as mentioned, 4 out of 10 women in the region are not connected or cannot afford connectivity (Vaca-Trigo and Valenzuela, 2022), which places women at a clear disadvantage. In this scenario, moving towards advanced and inclusive digital models requires improving aspects of horizontal and vertical coordination, ensuring equal representation of women in the collegiate bodies of governance and consultation, as well as aligning regulatory aspects to strengthen synergies between the different actors.

1. Strengthen the governance of the digital ecosystem and data with a gender perspective

A central element in harnessing the benefits of digital transformation is the construction of a digital ecosystem governance system as an inescapable aspect of public policy. The key dimensions of governance are the regulatory frameworks and institutional architectures (of planning, execution, and leadership of digital transformation within governments) that must be strengthened to harness the benefits of digital transformation. This system of governance of the digital and data ecosystem must incorporate a gender perspective in both its structure and operation, so that its initiatives contribute to closing gaps and to the autonomy and empowerment of all women and girls.

Both regulatory frameworks and institutions must address the emerging challenges of the new context, such as the concentration of the market for services, telecommunications and digital infrastructure, cybersecurity, new employment dynamics arising from new business models based on the use of data, *platformization* and automation of processes, privacy, personal data security and digital taxation. Without strong governance based on a systemic perspective of digitalization, with criteria of gender mainstreaming, intersectionality and interculturality, the benefits of digital transformation could be transformed into adverse factors in terms of concentration, exclusion, and inequality (ECLAC, 2022a). It is, therefore, necessary to develop institutions and regulations to ensure progress towards a fair and equitable model of digital transformation.

One of the key aspects of digital ecosystem governance is directly linked to the development of regulatory frameworks to regulate the use of platforms and data, considering digital security (cybersecurity and online violence), personal data protection and anonymity. It is necessary to update the regulatory frameworks for the protection of users, especially groups in situations of greater vulnerability to violence, such as women and girls, considering the business model of digital platforms of global reach, which connects provider entities with those who consume, develops its economic power on the benefit of the exchange of data and its subsequent use, either by commercializing them or providing new services based on personal data, where users remain unprotected (ECLAC, 2022a). The new business models based on data, with transnational characteristics, as well as the new forms of labour relations, require the development of regulatory frameworks that contemplate the guarantee of rights.

One measure for a governance system to consider is to leverage digital public goods, in the form of open-source software, open data, open AI models, open standards and open content to help achieve the SDGs, while adhering to privacy and other applicable laws and best practices. This undertaking should consider the gender perspective and digital human rights (United Nations, 2020), or at least adopt a regime of mixed ownership of the data economy, which would require a review and update of regional and international agreements on the matter. In addition, it would be a requirement to include aspects related to labour protection that consider the new forms of contracting, avoiding labour precariousness and the overrepresentation of women in precarious sectors.

Given the profound impact that AI will have on societies, certain specific recommendations need to be put in place to ensure that all people benefit from its use. Potential risks of AI include the deepening of discriminatory gender biases, surveillance, and loss of privacy, so it is critical to design systems and regulatory frameworks to determine responsibility and accountability when AI decision-making is erroneous, biased, or discriminatory, and to establish redress mechanisms (Smith and others, 2018). Relevant policies may include measures stipulating transparency in automated decision making, assessment procedures to determine AI competence, and certification of AI systems that perform tasks that require a degree of skill or training (Smith and others, 2018). At this point it is important to add that, while the experiences of countries on the frontier of digital development can be useful guides for policy design in this area, it is critical to develop regulatory approaches that are in line with the institutional and cultural contexts of the region (Smith and others, 2018).

2. Strengthening multisectoral alliances and regional cooperation

Latin America and the Caribbean, as already mentioned, is one of the most unequal regions in the world, and these inequalities are produced and reproduced in a highly unequal and segmented socioeconomic system. One of the main problems is the lack of coordination of policies and strategies that contribute to the achievement of the SDG targets of the 2030 Agenda and, therefore, it is urgent to strengthen governance with multisectoral alliances.

Given the cross-border dimension of the digital economy in a context of significant technological, productive, social, commercial, fiscal and financial asymmetries, it is necessary to strengthen the governance of the digital ecosystem at the regional level, promote digital cooperation and generate multisectoral alliances to cooperatively respond to the challenges imposed by digitalization in order to achieve gender equality.

Regional and global coordination and the construction of common agendas, such as the initiative of the Alliance for the Digitalization of Women in Latin America and the Caribbean —approved at the 60th Meeting of the Presiding Officers of the Regional Conference on Women in Latin America and the Caribbean (2021)— should contribute to reducing gender gaps. It is considered essential to promote multilateralism and regional and international cooperation to define common principles and priorities, such as their management within the framework of globalization for gender equality, in order to generate coherence and synergies between regulatory policies, mainly technological, labour, fiscal and trade policies, as well as the recognition of digital human rights, with a focus on women in their diversity.

At the national level, it is necessary to generate the appropriate regulatory and institutional conditions to promote greater coordination and articulation between sectors, taking into account spaces for regional dialogue, to strengthen innovation and digitalization with the inclusion of the gender perspective through measures such as the expansion of public social spending in critical areas for women, as in the case of social protection; actions to prevent the precariousness of women's employment, and speculation with food prices in the situation of small producers and women in poverty with an intersectional approach (ECLAC, 2019a).

**H. Produce information to make visible the situation of women in their diversity
within the framework of innovation and digital transformation processes**

A critical aspect of the exclusion and economic, political and social inequality of women has been the statistical invisibility of inequalities, insofar as it hides the reality of the structural challenges of gender inequality. Statistical systems in the region have made progress in the generation of information with a gender perspective, seeking to break the statistical silence, visualizing the magnitude and intensity of the inequitable distribution of power, time and wealth, resources and work between men and women (ECLAC, 2022i).

Different actors, such as ECLAC and UN Women, among others, have stressed the importance of generating disaggregated data and facilitating their analysis considering gender, intersectionality and interculturality approaches, which can account for inequalities in the face of ongoing technological, economic and political transformations and show the progress and challenges in this area. As established by the Montevideo Strategy, it is key to have information systems transform data into information, information into knowledge and knowledge into policy decisions (ECLAC, 2017). The great technological progress and the possibilities offered by digital technologies are tools that could facilitate the production and analysis of data, make it possible to monitor the situation of women and make it possible to measure the digital divide from an intersectional perspective.

To this end, it is necessary to strengthen information systems and statistical and administrative records that make it possible to have disaggregated data to quantify these inequalities and monitor progress towards greater equality. It is essential to strengthen institutional capacities, beyond the generation of data, for the production of data analysis with a gender, intersectionality and intercultural approach.

It is also essential to study the impact of AI on human rights and gender equality, as these technologies can perpetuate and deepen cultural practices and perceptions to the detriment of women and their full autonomy. First, there is a need to conduct baseline research on the prevalence of AI applications and policies in our region, as to date there are no systematic descriptions of the level of activities in this area (Smith and others, 2018). The collection of baseline data should include existing AI policies, regulations, open datasets, and skill levels; and should be updated on a regular basis (Smith and others, 2018). These inputs would help determine whether potential risks (such as discriminatory gender bias, surveillance, and loss of privacy) of AI applications are being adequately addressed by existing regulation, or whether new regulations relevant to countries in the region need to be developed.

Secondly, there is a need to tailor impact assessments to the risks of AI, which would encourage development programmes to incorporate this technology in ways that respect and promote human rights (Smith and others, 2018). Impact assessments are particularly urgent in the case of decision-making systems that affect people's well-being or freedom. Here, research is critical to discover and document which accountability and redress systems are effective and in which contexts (Smith and others, 2018).

In the context of the digital era, monitoring the participation and impact of digital transformation for women is a central issue. There are several conditions for leveraging the impact of innovation and digital technologies to achieve gender equality, which should be focused on and made visible, given the challenges that could lead to greater segmentation and a deepening of the gaps.

It is imperative that governments commit to collecting gender data on the technology sector on a regular basis and publishing it openly. It is a priority to have data disaggregated by sex and other relevant variables (such as age, education, ethnic and racial origin, territory) on women's access, connectivity, and

use of the Internet, in order to understand the magnitude of the digital gender gaps, analyse their causes, provide information for policy design, the formulation of goals and their monitoring, reflect on territorial needs and failed initiatives in local contexts.

It is also necessary to have data on digital infrastructure, connectivity, and telephony, in relation to the territory. Other relevant aspects are linked to the development of the digital ecosystem and the areas affected by the digital economy, such as the development of the labour market in these sectors with data on the participation of women, with disaggregated data that account for the complexity of the phenomenon in all its dimensions.

Information on aspects such as unpaid work overload and time use, participation in the labour market —specifically in jobs linked to the digital economy—, make it possible to make the gaps visible, measure them, provide evidence for policy formulation, establish goals and monitor the progress of the actions taken (Vaca-Trigo and Valenzuela, 2022) and finally evaluate whether policies have had any effect in reducing these gaps.

A central aspect refers to having information on high-level digital skills, in an intersectional manner, as well as the levels of access to digital technologies (to a basic digital basket), disaggregated by sex and other relevant variables (such as age, education, ethnic and racial origin, territory). This information is essential to understand the characteristics and magnitude of the digital gender gaps and to analyse their causes.

At the level of the education system, although gender parity has been achieved in relation to the participation of women in the different levels of education, gender gaps persist in relation to STEM areas (ECLAC, 2022d). The choice of disciplines as well as their progress in STEM education express inequalities between female and male students at all levels of education. Given that progress in these areas is related to a better position in the digital economy, it is essential to have statistics on women's participation at different levels of the education system, especially in STEM areas and in TVE. It is necessary to have information that analyzes vertical segregation in the educational system and also data on women in science, on scientific production, and above all, in relation to participation in the development of patents and in technology transfer processes.

As mentioned in a previous section, statistics on the different types of gender-based violence against women, and in particular on cyber-violence, digital harassment, complaints and victim care are central to the development of online safety policies. It is a priority to periodically map the situation of women in their diversity in order to understand their needs and support their effective participation in different spheres, particularly in public and community spheres in the digital era. This information should be the basis for digital policy initiatives that expand coverage and improve quality according to the possibilities of different contexts and on the basis of different articulation schemes (Telecom Advisory Services, 2022a, 2022b).

Therefore, for the formulation of policies aimed at reducing structural gaps and addressing the challenges of the Regional Gender Agenda, it is necessary to have timely and relevant data, statistics and indicators that show how technological, economic, demographic and climate changes affect women, with an intersectional approach (ECLAC, 2019).

The countries have statistical systems with varying degrees of development. Digital technologies have facilitated statistical work based on the production of data from authentic sources, for which reason it is recommended that production coordination bodies be strengthened with various stakeholders, with an intersectoral approach that guarantees the mainstreaming of the gender perspective throughout the

production of the statistical system, and the generation of partnerships for the production, analysis and use of statistical information, guaranteeing the necessary budget. The capacity of statistical offices and other information-producing areas needs to be strengthened, mainly to analyse and disseminate data disaggregated by sex and other variables relevant to gender and intersectional analysis. This information provides evidence for the design, implementation, monitoring and evaluation of gender policies.

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