Implementation Paper

DIGITALISATION IN LATIN AMERICA AND THE CARIBBEAN

INTERN

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TABLE OF ABBREVIATIONS

BCIE	Central American Bank for Economic Integration
BMZ	Federal Ministry of Economic Cooperation and Development
CAF	Development Bank of Latin America
CARICOM	Caribbean Community
ECLAC	United Nations Economic Commission for Latin America
eLAC	Digital agenda for Latin America and the Caribbean
GDPR	General Data Protection Regulation
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
ICT	Information and Communication Technologies
INDPA	International Partnerships
INPE	National Institute for Space Research
KfW	German Development Bank
LAC	Latin America and the Caribbean
OECD	Organisation for Economic Co-operation and Development
SICA	Central American Integration System

EXECUTIVE SUMMARY

This paper aims to answer the question, what role German development cooperation should take in supporting the LAC region's digital transformation and how development cooperation can contribute to the development of inclusive digital societies in the LAC region and in Europe?

As countries in Europe and the LAC region are currently developing regulatory and other frameworks to secure the future of their digital sovereignty and digital innovation abilities, development cooperation can help build regional and international bridges. Today, new approaches, mechanisms and mindsets are needed for future oriented, innovative development cooperation to be impactful and sustainable. These new approaches need to acknowledge the correlation between the digital transformation, climate change and social justice. The volatility of our systems and societies has been tested by the pandemic and conflicts as well as climate challenges. Building resilient, decentral, secure infrastructures that benefit populations as a whole needs to be a priority, rather than supporting individual projects or companies as has been the case in other regions, such as Africa in the past. This report provides a **framework with applicable pathways towards inclusive digital transformation in the LAC region, with a specific focus on Brazil, Colombia, Mexico, Ecuador, and Peru**.

A number of common challenges exist in the countries of the LAC region, despite their very different demographics, their social and political cultures and their digital ecosystems. Internet access has significantly increased in LAC countries over the last decade. According to OECD, 68% of the population used the Internet but stark digital divides remain between rural and urban as well as between the rich and poor. Many jobs are at risk from automation and low levels of digital skills are keeping low-income workers has become a dramatic factor in the pandemic, with the income gap and social scissor between those with access to digital information, devices and home office environments benefiting in comparison to those who did not have these privileges widening. (Chapter 3)

The sectoral focus of this paper lies on:

- Green development - climate and energy, the environment, and natural resources
- Peaceful and inclusive societies
- Training and sustainable growth for decent job

Green development and digitalisation are increasingly perceived as interlinked areas, as represented in the twin transition concept. In the LAC region stark unequal opportunities exist. These cause large parts of the population to be excluded from the benefits of digital innovation whilst they are more prone to suffer consequence of climate change. This paper demonstrates that Twin transition in the LAC region requires an inclusive, decentralised approach in order to prevent the replication of unequal power structures. As the study has shown, the creation, monitoring, and accessibility of data plays a central role in green development. However, the region faces a lack of publicly available and locally applicable data and data literacy. Therefore, there is a need to foster integrated approaches to securing digital rights, ownership, open data and open access to information, through the investments in locally owned, independent data repositories and respective capacity building.

Fostering peaceful and inclusive societies in the LAC region is challenging due to massive social and economic inequalities that trigger various forms of conflict, organised and unorganised crime. Reinforcing patterns of power distribution in digital transformation processes is a risk that requires attention in the region, including awareness for the power dynamics being reinforced through investments in digital infrastructure, services, training, and job opportunities. Putting the elimination of power inequalities at the centre of digital transformation programs and investments can have long-lasting effects in the region. At the centre of such an approach lies the clear distinction of digital availability and digital accessibility. As the pandemic has shown, tools such as the radio and SMS remained central communication providers in large parts of the region.

Technical and social barriers hinder the LAC region from playing a larger role in the global digital economy. During the pandemic, the gig economy has, however, been booming. Given the staggering inequalities in the region, accounting for power dynamics is also a central factor when investing in a digital economy growth. Closing the connectivity gap is one piece of the puzzle. Equal access to relevant education and trainings alongside the creation of a respective labour rights framework other central factors. Moreover, context-driven solutions are required as importing the exploitative nature of platform economy models has shown to reinforce and deepen existing divides. (Chapter 4)

These findings have been synthesised into an action framework for development cooperation. While all the examined countries are unique in their political, cultural, and social settings, specific patterns can serve as an interaction framework within the region. In most countries, the following **three factors determine the effects further digital transformation will have on economic and social development**:

1. **Further development of decentralised infrastructure:**
   Decentralized infrastructures include access to open digital resources, including data and data infrastructures, access to the infrastructure of sovereignty, educational and training infrastructures, open-access tools and content, and local market infrastructures respectful of tradition and cultures.
2. **A co-creative policy development process:**
   Co-creative policy development process engages relevant civil society actors in the actual policy making process. A co-creative policy development process requires decentralised processes on different political tiers, departing from the local municipal level.
3. **Sustainable funding mechanisms:**
   Sustainable funding frameworks enable of long-term funding availability that can be accessed and activated more flexibly than current instruments. Such mechanisms should align with local grassroots and public sector actors' agendas, rather than pre-assigned from the funding development organisations.

This **triangulation is applicable across different sectors, on the local, national, and regional level**. It is necessary to operate from the local to the national level in order to enable bottom-up scaling processes, built on local digital initiatives, and elevate these local efforts to become part of strategic national and regional development processes, with dedicated feedback loops to all stakeholders involved. In the tables below the core recommendations for further action areas based on the framework are outlined as per thematic area. (Chapter 5 lists the recommendations as per region, countries, and thematic area).

TABLE OVERVIEW OF KEY FINDINGS PER THEMATIC AREA

Key Findings Green Development

	Opportunities	Challenges	Recommended actions	Praxis examples
BRAZIL	• Advanced digital expertise in numerous green development areas • Existing attention on instrumental role of access to data for inclusive and safeguarding green development • Existing start-up scene, environmentally aware and active • Changing environmental awareness in younger generations	• Political situation is destabilising environmental programs and communities • Dangerous data biases resulting in/deepening drastic country inequalities • Staggering inequalities concerning access to education, training and local job opportunities • Unequal access to renewable energy supplies in rural areas	• Growth and diversification of data • Decentralised engagement and capacity building structures • Diversification of collaboration partners • Approaching green development through an entrepreneurial focus with solid attention on the creation and strengthening of a decentralised green energy start-up ecosystem • Bringing the local startup and private sector actors in to advise BMZ	• Work on data literacy by Escola de Dados • Guide on training programmes on technological autonomy for community promoters by Association for Progressive Communication • The tokenization of preserved forest promoted by moss.earth • Sustainable Pecuaria Transparente initiative. • Many existing seed banks from the campesino movement (MST) • Sustainable forest management promoted by Instituto Beraca • Startups promoting food autonomy, sustainable and local food production, like Fazenda Futuro, Fruta Imperfeita, A Tal Da Castanha, Hakkuna and SERTA • Waste collection and recycling startups involving communities in social vulnerability, like Cataki app, from the NGO PimpMyCarroça • Mini-hydro power stations, like Hidreo. • green energy distribution startups, like XPEnergy, Dispor and OneGrid. • Exceptional work done by Governmental agro research company Embrapa.

COLOMBIA	• Strong and growing startup scene • Government in favour of digitalisation • Lack of state presence	• Urban concentration of innovation scene creating divides • High level of informal labour and strong labour migration from the rural areas to the cities • Green development/twin transition still to be recognised by government • Considerable pollution from illegal mining and deforestation • High levels of corruption with the quasi absence of data registries and a malfunctioning and neglected cadastral system to monitor environmental circumstances	• Address green development through an entrepreneurial lens to foster attention and respective openness for supportive legislative frameworks on government agenda • Involve civil society groups to create an inclusive green development agenda, accounting for all regions, to counteract urban innovation centralism and labour migration • Structurally integrate Indigenous communities in the design and implementation of conservation plans through capacity building programs - empower them as stewards of the land • Collaborate with the vibrant startup scene, supporting growth incentives outside Bogota • Programmatically investment in independent data registries and diversification	• The Government sponsored program Innpulsa to improve digital entrepreneurship • The Former Illegal Miners Association that works on more ethical mining practices • Un Litro de Luz startup that connects rural communities to renewable power and internet • Suyo startup that democratizes access to land titles
MEXICO	• Ambitious government, keen to become a regional leader in digitalisation • Actively organised civil society striving to preserve natural reserves • Information gaps, low data quality, and missing access to open data • Mining industry limits environmental actions / conflicts between mining companies and local communities • Promising partnerships with the private sector and universities	• Collaborations with relevant ministries are difficult • Substantial national and subnational digital divide • Struggles with equal access to water and land • Mining legislation does not focus on protecting biodiversity and local communities	• Support amendment of mining legislation to incorporate focus on protecting biodiversity and local communities • Support sustainable, inclusive, and independent databases • Support creation of diverse and open databases accompanied by decentralised training provisions for capacity building • Support collaborations, bringing	• #CambiémoslaYa Project by Poder Latam on changing mining law • Open Data Initiative by the Government https://datos.gob.mx/ • Access to Government and Democracy NGO Controla Tu Gobierno • Public Private Partnerships like un Kilo de Ayuda • Telecomunicaciones Indígenas Comunitarias A.C., backed by Rhizomatica and Redes por la Diversidad, Equidad y Sustentabilidad A.C., organisations that help communities build and

PERU			private sectors, universities, and active civil society together • Engaging local communities, such as environmental activists and innovators as leading experts	manage their own low-cost, open-source communications infrastructure
	• Peruvian government is not prioritising an environmental agenda • Low investments in sustainable energy programs • Conflicts of interest between state entities and the private sector, and among private sector actors	• Young startup scene in the country is with using advanced technological means • Creation of open, inclusive, and independent databases of environmental data	• Invest in mechanisms to advocate for more vigorous attention to environmental protection on all ministerial agendas • Support multi-stakeholder process to create legislation framework, accounting for transparency and safeguarding when endeavouring into data and digital infrastructure building to support environmental protection strategies • Diversify methods and promote integration of less high-tech tools to engage other community stakeholders in data collection and monitoring processes • Support development of new collaborations with universities and independent research institutes	• Some initiatives already monitoring water and air quality, like PukkaSky and QairaDrones, • NGOs deal with sustainable activities, such as adventure and sustainable tourism and extractivist practices. PeruLab, from one seed innovation labs is an example on the ground. • NGOs direct dealing with preservation like Con-Ciencia Marina • Empower environmental governmental agencies of supervision and control, such as OEFA, SENAHMI or SERNAMP
ECUADOR	• Controversial digital legislation • Minimal internet user rate and digital literacy • Significant gender gap in internet use • Safety of local actors in Amazon region is under constant threat • Lack of knowledge about green energy in society	• Country demonstrates openness to engage in an ethical pathway to digital transformation • Active grassroots practitioners and social innovation startup scene • Communities in the Amazon region at constant risk	• Support multi-stakeholder approach to develop fair digital rights and digital innovation legislations, with local civil society actors in leading roles • Provide structural support mechanisms to local innovation scene to create independent data registries and	• The preservation work done by Proamazonia • Agrotech innovations proposed by AgroScan and Cricket Superfoods • The digital entrepreneurship initiative promoted by Hakhu Amazonia Design • LaLibre.net Tecnologías Comunitarias from Association of Progressive Communication Network - use and development

	• Obstacles for startup creation		related skills and mechanisms for environmental protection and green development • Support local civil society in strengthening safeguarding mechanisms for communities in the Amazon region • Support multi-stakeholder policy process to incorporate local protection mechanisms • Supporting capacity building through expansion of e.g., school curricula • Active engagement of civil society and civic innovation community in GIZ's digitalisation programs, deviating from strong focus on private sector actors	of technologies from a community perspective

Key Findings Peaceful and Inclusive Societies

	OPPORTUNITIES	CHALLENGES	RECOMMENDED ACTIONS	PRAXIS EXAMPLES
COLOMBIA	• Peace agreement and constitutional and practical efforts to provide democracy supportive tools • Existence of decentralised vocational training program	• High rates of violence and human rights abuses • High levels of corruption • Digital and educational divides between urban and rural areas are significant • Lack of available data, such as cadastral system	• Support appropriate land distribution through support of data system • Integrated approach to decentralised infrastructure creation, relevant digital entrepreneurship and business development • Development of regulations and legislative frameworks that make digital transformation less prone to infiltration • Engagement of multiple stakeholders	• The SENA education system focusing on more employability focused programs and recognizing empirical knowledge • Improving access to democracy projects by NGOs like Indepaz and Evolucion Caribe • The Government sponsored program Innpulsa to improve digital entrepreneurship • The Multipurpose cadastre project by the colombian state to improve access to land

			from the different regions to identify meaningful ways to strengthen other peaceful and inclusive transformation processes • Support SENA vocational training program to add digital education to decentralised curriculum and training of trainers	• Crowdsourced human rights violation data by NGO Temblores • Association for Progressive Communication member Colnodo's work on promotion and appropriation of low-cost, community communication networks that can be maintained and operated by organised communities
PERU	• Lacking supportive legislation	• Long-standing active civil society ecosystem promoting peacebuilding through digital literacy and training programs • Existing local digital innovation scene / makerspaces • Strong attention to collaboration with local governments is an essential mechanism	• Bring innovation communities into a leading role in developing decentralised inclusive national legislation • Provide structural funding schemes for innovation community to diversify across country • Equip youth and other citizens with crucial soft skills for peaceful togetherness as an integrated component in digital literacy programs • Supporting civil society actors in developing a context-driven teacher's training strategy / building on existing local/municipal activities and innovation education efforts • Support structural funding, and supportive legislative structure, such as fair tax rules	• The incubation and innovation ambience promoted by Mossaiqo Co-Work, Maker Lab Peru, Makerspace Peru and Lima FabLab. • The digital rights campaigns promoted by Hiperderechos • The eco-friendly loggistics initiative promote by Yau • Laboratoria is an outstanding actor promoting coding online courses. • active role of organisations such La Coordinadora Nacional de Derechos Humanos (CNDDHH), that historically promote knowledge for a peaceful and inclusive societies • programs connected to the National Plan of Digital Literacy on a national level, like Alfabetización Digital, promoted by Colegio de Ingenieros del Perú.
ECUADOR	• Bureaucratic hurdles and corruption slow down processes • Adequate employment is accessible mainly to highly educated citizens • Massive youth unemployment rate	• Country renewing its national educational curriculum to support new century job creation • Small but existing startup ecosystem • Municipalities and local governments offer great potential	• Engage decentralised actors, local civil society groups and local municipalities to enable inclusive training and education access - aiming at a curriculum involving technology,	• Set actions focused on technological and digital ventures, like Fonquito 3000 • Companies that focus on enabling other companies such as Bou Company • Events and publications such as Opportunity

		cooperation partners, often having own innovation offices	entrepreneurship, and the new sustainable economy in public schools • Support mechanisms to bring local innovation and startup scene together with respective curriculum development actors • Invest in non-formal education organisations and platforms to combat unequal access to formal education in remote areas • Actively engage local startup scene to develop decentralised digital entrepreneurship training scheme and accompanying multistakeholder approach to develop respective legal and incentive frameworks	Summit and El Radar Tech Startup can foster credibility and access to the ecosystem • Framework to foster investment in digital entrepreneurs and startups like Buentrip Ventures • LaLibre.net Tecnologías Comunitarias from Association of Progressive Communication Network - use and development of technologies from a community perspective

Key Findings Training and Sustainable Growth for Decent job

	OPPORTUNITIES	CHALLENGES	RECOMMENDED ACTIONS	PRAXIS EXAMPLES
BRAZIL	• Outperforming other countries regarding digital innovation • Rapidly growing and maturing start-up ecosystem • Growing demand for trained workers in the digital market • High number of women with tertiary education	• Gaps in educational standards alongside basic connectivity, financial infrastructure, and legal infrastructure • Innovation and relevant education means remain exclusively bundled in urban hubs • Insufficient training programs serving demand in job market • Women, alongside indigenous and original communities, afro-Brazilians and the LGBTQI+ population	• Address closing of gaps in connectivity, education, and job market opportunities in harmonized manner • Foster education and job creation tailored to specific regions' needs whilst simultaneously growing business framework enabling local employment • Support decentralised approach enabling innovation to grow directly within its respective contexts	• The innovation environment promoted by CESAR • The calls for innovative proposals promoted by Instituto Procomum • The manuals about diversity on the working environment created by Olabi • in-person training classes in coding and programming (like A Hora do Código and HappyCode School) and project-oriented training (like Robô Ciência, Naveavela or the FabLabs Ecosystem)

MEXICO		underrepresented in digital job market	• Close divides through specific attention on training women, alongside indigenous and original communities, afro-Brazilians and the LGBTQI+ population to play a central role in the digital economy's future	
	• Country is outperforming Latin America and the Caribbean (LAC) to shape an inclusive digital economy and society • Government has promoted the expansion of internet infrastructure to underserved areas	• Structural divides persist, be it internet use in urban versus rural areas or the massive disparity in internet use of indigenous communities • High level of informality • Estrategia Digital Nacional does cover the digital economy and education as two fields of attention alongside other legal frameworks to enable citizen participation	• Support training opportunities relevant to inclusive partaking in the development of an employment ecosystem • Harvest great potential on the subnational level through support of decentralised support mechanisms • Engage local actors, from indigenous groups to existing maker spaces, into policy development processes • Link the same actors to develop training to job market creation, increasing the digital economy from the grassroots upward • Create education and job access on local levels	• Startup Rutopia which connects organized tourism with learning experiences at indigenous areas • Startup Heru and Factil which help freelance and informal workers better access to financial tools • Initiative by Fundacion Digital Telefonica to decrease digital divide

1. INTRODUCTION: The Role of Development Cooperation in the digital transformation in Latin America and the Caribbean

The current Covid-19 pandemic has reinforced the necessity to tackle the topic of digital transformation in Latin America and the Caribbean (LAC) to recover from the crisis and to build a green, sustainable, and inclusive future. Prevalent socio-economic divergences in the region have led to a gap in access to digital tools and skills which limits the opportunities for marginalised groups in society. A collaborative report published by the OECD in 2020 deals with the impact that the Covid-19 pandemic has on the most vulnerable people in the region. The study points out that approximately 2.7 million microenterprises have been affected severely by the crisis and are about to collapse, taking 8.5 million jobs with them. During the peak of the crisis, 40% of the labour force in Latin America and the Caribbean did not have access to social protection and 60 % of them worked in the informal economy sector (OECD et al 2020). Alicia Bárcena (Executive Secretary of ECLAC) states:

> *"We expect more than 45 million additional people to fall into poverty. The socio-economic crisis makes a new development model more urgent than ever. Digitalisation could be a powerful tool to overcome the structural challenges of the region, only if it is considered as a comprehensive way to foster progressive structural change, through policies for the generation of new sectors, quality jobs, the development of capacities and innovation." (OECD et al 2020)*

Simultaneously, the pressing need for a more responsible attitude towards our environment and the protection of livelihoods play a central role in the LAC region, which is heavily affected by climate change and human driven environmental challenges, e.g., through deforestation.

If we consider the pandemic an accelerator for digital transformation, we need to carefully identify the right actions to implement it as green, inclusive, and sustainable as possible. Digital transformation offers different solutions to overcome the crisis. Digitalisation has shown to be a central driver of innovation, and advancing digitisation has the potential to improve the livelihoods of people in partner countries of German Development Cooperation, including Latin America and the Caribbean (LAC). Digitalisation in Latin America emerged slowly but has witnessed a rapid increase in recent years. The small digital footprint in the region bears a great opportunity to foster an environmentally responsible green development in the region. The gig economy has flourished, as a 2018 Forbes magazine article highlights (McCue 2018). Various recent reports, such as the Latin America Economic Outlook published by ECLAC, the OECD Development Centre, CAF and the European Union in 2020, or the OECD report Shaping Digital Transformation in Latin America from 2019, have emphasised the great potential digital transformation bears in Latin America and the Caribbean. Opportunities range from fostering business innovation and good governance, to monitoring processes for protecting the region from environmental disasters, to supporting better access to public services, e.g. in the health and education sectors. However, transformation, and its possible outcomes, are strongly interconnected with local and regional contexts. Latin America, when it comes to internet access, is far behind the OECD average and the digital divide between rich and poor segments of society remains extreme. Moreover, economic inequality in the LAC region is

severe. Latin America also lacks educational opportunities aligned with skills required to carry digital transformation processes. Steep inequalities do not only exist within the countries' societies, but also in between the countries in the region, frequently leading to disproportional investments of pilot initiatives in the advanced countries.

Harvesting the potential of digitalisation in an inclusive way that will leave no one behind and unleash the economic and social potentials of digital transformation requires a framework. Supporting and fostering dynamic and holistically relevant digitalisation dynamics in LAC regional contexts needs to account for vastly different realities and digital readiness. Capacity building for local, national, and regional public institutions needs to be systemic, including embedding STEM and 21st century skill building in formal and non-formal education programmes, and building research and innovation ecosystems that can practically respond to local needs. As countries are developing regulatory and other frameworks in order to secure the future of their digital sovereignty and digital innovation abilities, the role for development cooperation is to build bridges and share concepts and approaches between regions.

At the moment, a fragmentation of systems is driving the digital agenda in the LAC region, with only ECLAC and its Digital Agenda for Latin America and the Caribbean (eLAC 2022) addressing the entire region. However, stronger, and more structural mechanisms to bring diverse actor groups to the drawing board provide much room for improvement. Those broader coalitions should include “social movements, unions, education advocates, public health organisations, farmers and peasants’ communities, indigenous nations, consumer associations, academia, young entrepreneurs, and regional institutions” (Avila 2021). If the region does not succeed to strengthen those coalitions, it is at risk of delegating their digitalisation to non-democratic actors, including big tech companies with their own specific agendas and values, with considerable impact on decisions and processes in this field. In order to set up a critical infrastructure addressing digitalisation, civil society actors and communities need to be involved. The current pandemic has led to new approaches and creative solutions in the field of digitalisation, demonstrating multiple positive effects of democratising technology.

What role should development cooperation take in supporting the LAC region's digital transformation? How can partnerships be designed to enable inclusive digital societies development in the LAC region and in Europe, and how can development cooperation contribute?

Scope and Methodology

Aim of this study is to suggest a conceptual framework that can support the BMZ and its implementation institutions GIZ and KfW to align strategies and goals formulated in the BMZ’s Digitalisation Strategy with their existing collaboration structures on national, regional and EU level, according to the LAC region’s realities. The framework is dynamic and rooted in a holistic and context-sensitive approach.

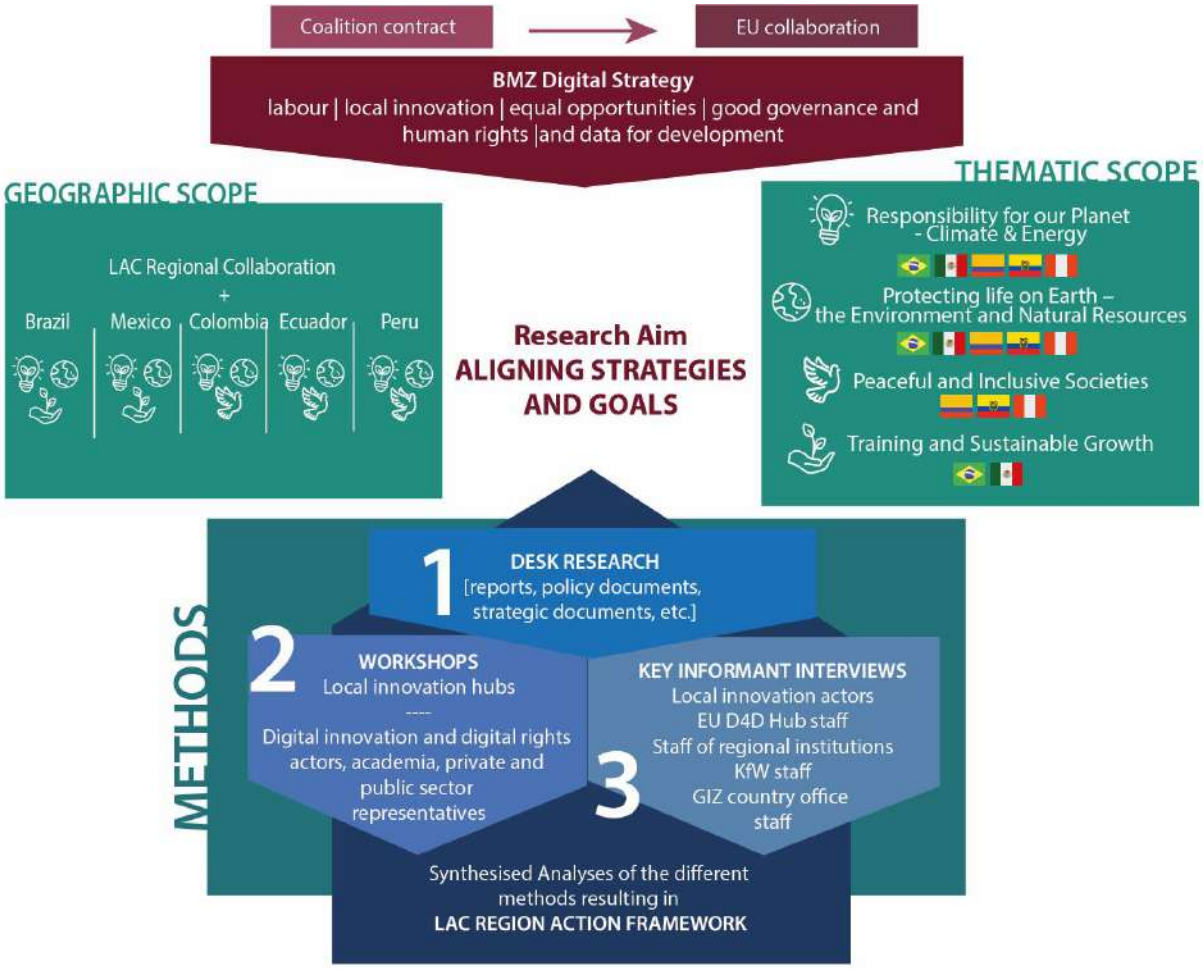


Figure 1: Visualisation of the research design

The research scope of this paper is focused on four of BMZs thematic action areas in the five selected countries. Two global partners and three bilateral partners of BMZ were selected for the scope of this study, Brazil, Mexico, and Peru as global partners, and Colombia and Ecuador as bilateral partners. Thus, this study examines “Responsibility for our Planet - Climate & Energy" (1) and “Protecting life on Earth – the Environment and Natural Resources'' (2), summarised under the heading of Green Development in this paper, for all of the selected partner countries, while it will additionally focus on “Peaceful and Inclusive Societies'' (4) in Colombia, Peru, and Ecuador and “Training and Sustainable Growth'' for Decent Jobs (3) in Brazil and Mexico. This selection was made based on the wishes of BMZ. These sector level perspectives will be complemented by an ecosystem analysis on the regional and country level, aligned with BMZ’s Digitalisation Strategy focus areas, namely labour, local innovation, equal opportunities, good governance and human rights, and data for development.

Methodologically, this study framework relies on a mixed-method approach, allowing to assess ecosystems through a context-driven lens, thus avoiding a tech-centric result. A desk research phase was used to compile relevant knowledge from previous projects alongside existing partner structures and their research, as well as other available relevant research. The research design incorporates local expertise of grassroots experts whilst including national and regional development perspectives. The desk research and national workshops have been

complemented by regional research in the form of key expert interviews. For the empirical research process, two local research leads were in the lead of engaging local innovation hubs in each country to host multi-stakeholder workshops bringing together actors from the local research and academia focused on digital topics, digital innovation and digital rights ecosystem to inform the focus on the grassroot perspectives on the BMZ action areas. Due to the ongoing Covid 19 pandemic, these workshops were held online, co-hosted by the local hubs. This approach enabled building connections with local grassroots actors engaged in current digital development trends. A series of semi-structured interviews with national and regional notable actors complemented the workshops to deepen and contextualise those findings.

The results of this methodological approach are synthesised in this paper. Chapter 2 sets the scenes by outlining the existing frameworks for cooperation, both from the point of view of the BMZ structures and its implementation agencies GIZ and KfW as well as from the point of view of the LAC region and its regional political entities. Chapter 3 deep dives into the digital ecosystems of the LAC region, beginning with a regional overview before examining the countries selected from this study, Brazil. Colombia, Ecuador, Mexico and Peru. The ecosystem analysis follows the structure of the BMZ Digitalisation Strategy focus areas. Chapter 4 zooms into the focal topics selected by BMZ as sectoral topics where digitization plays a crucial role as a cross-cutting issue and will continue to do so in the future. In this chapter the results of the local stakeholder workshops and national expert interviews are processed in order to provide local in-depth perspectives on the topics in focus. Chapter 5 is a synthesis of the previous chapter findings as well as the GIZ and regional interviews. It offers a conceptual framework for future engagement in the LAC region, incorporating the existing frameworks and policies. Chapter 6 is a summary of the recommendation and next steps to be taken derived from the paper's findings.

2. Development Cooperation Portfolios – BMZ, GIZ and KfW Regional Activities

This chapter aims to set the scenes by outlining existing cooperation, in particular multilateral engagement, of BMZ and its implementation agencies in the LAC region. Different strategies and frameworks exist which inform BMZs work in the LAC region’s ICT sector. These include the BMZ Digital Strategy, which incorporates external, value-based approaches and frameworks, such as the Principles for Digital Development. The new political framework for the BMZ is the 2021 Labour-Green-Liberal party coalition agreement. It states that digitalisation for development must continue in different regions, including the LAC region. Therefore, BMZ has a mandate anchored in the coalition agreement to strengthen this work at the European level in cooperation with other European partners. This chapter outlines the key coalitions and strategies that shape the BMZs current engagement in the LAC region. In addition, the chapter presents BMZ's collaboration system, its implementation agencies GIZ and KfW, including the structures on the German and European level, and the LAC region's perspective.

2.1. Existing Multilateral Frameworks and Structures in the LAC Region

Regional actors play an essential role in the LAC region and contribute substantial expertise in national and supranational digital strategy formulation. Execution of policies formulated at the regional level is primarily a national matter. The Sistema de la Integración Centroamericana (SICA) developed an extensive digital strategy (Estrategia Regional Digital para el desarrollo de la Sociedad de la información y el conocimiento en el SICA) with its member states in 2016. The Economic Commission for Latin America and the Caribbean (ECLAC), the only regional coalition body composed of all LAC member states, and a long-term trusted EU Directorate-General for International Partnerships (INDPA) and BMZ partner, also has long standing experiences in strategic approaches to digitalisation and has developed the Agenda digital para América Latina y el Caribe (eLAC 2022).

SICA's critical thematic areas are organised in executive secretariats composed of the respective ministers of all SICA member states. The general administration builds the roof of SICA, connecting and coordinating the executive secretariats. Currently, GIZ is collaborating with five executive secretariats. Some GIZ sector initiatives have staff directly seconded to the executive administrations, but also other solid collaborations exist, for instance, in the energy or environmental sector. Financial support is generally directed at thematic, sectoral, and regional integration and not reduced to staff costs. SICA actively supports strategic approaches to digitalisation in the different thematic areas, based on a benchmark study approach (here on the Central American energy sector), engaging multiple stakeholders from the region (Haid et al 2020). Working groups are established to advance identified thematic areas based on the results. Regional and national representatives compose these working groups, in this case, for instance, of different energy suppliers. These working groups focus on Blockchain, Advanced Analytics, Internet of Things, Cyber Security, and data protection regarding each program's implementation.

ECLAC is a long-standing INDPA partner, planned as an implementation partner for regional programming on digitalisation. In contrast to the newly launched LAC digitization efforts of the EU, ECLAC has solid experience in digitalisation. For example, the UN institution worked on topics such as industry 4.0, framework conditions for internet use, and brokering a policy network on the internet and jurisdiction. ECLAC has already set up a regional coalition body that has developed the region's digital agenda. At a regional level, it acts as a secretariat for the eLac process (Agenda digital para América Latina y el Caribe) and significantly co-determines the plan. eLAC is a core platform in LAC for institutions, ministries, and industry, dealing with the topic of digitalisation and the internet. It is updated every two years and has a dedicated process to support member states in operationalising the agenda on the ground. ECLAC is currently developing the 2022-2024 plan. This and the seconded GIZ staff to the ECLAC secretariat provides the BMZ with an excellent opportunity for exchange and influence. Practically all activities are based on the eLAC platform, creating framework conditions for internet use and regulations. The vision behind this is that of a regional digital market. The core focus of ECLAC is green and inclusive economic development.

2.2. BMZ engagement in the LAC region

BMZ's Digital Division and the Latin America Regional Division are jointly responsible for digitalisation-related programming activities in the LAC region. GIZ's Sector Programme advises

them on Sustainable Digitalisation for Development[1]. BMZ engages in multiple partnerships and programmatic and financial support mechanisms in the LAC region. Through its technical assistance programmes implemented by GIZ, BMZ provides long-standing support to regional actors, such as SICA or ECLAC. The BMZ stands for long-term experience in the Latin American context.

Additionally, its regional involvement via the EU level, mainly through LAC-related Team Europe Initiatives, creates a complex arrangement of programs, support levels, and agendas. Financial assistance and other support mechanisms provided by KfW on behalf of the BMZ holds a deep background in handling digitalisation and innovation cross-cutting elements in program development. Those programs strengthen collaboration with national and regional development banks such as the Development Bank of Latin America (CAF) or the Central American Bank for Economic Integration (BCIE), the financial institution of the SICA system, alongside federal and national governments, knowledge institutions, and civil society actors.

The D4D Hub Secretariat is the European Commission's implementation tool for digitalisation for development. Within the LAC branch of the D4D Hub member states are represented in a board and various working groups, including the Team Europe Initiative 'EU LAC Digital Alliance' which serves as the executing instrument. The D4D hub is an attempt to align the activities of different member states, private sector stakeholders, international financial institutions, and similar partners.

GIZ collaborates directly with the D4D Hub Secretariat via INTPA. Seconded staff of the GIZ Sector Programme for Digitalisation advises the D4D Hub Secretariat and its Team Europe Initiative 'EU LAC Digital Alliance', coordinated by the Department for International Partnerships (INTPA). INTPA plans to use this platform to identify opportunities in Latin America to develop further projects and financing schemes.

The LAC Branch mainly collaborates with the BMZ Digital Division and sporadically involves the Regional Division. In addition, GIZ's sector program for digitalisation has a central role in the D4D Hub Secretariat via seconded staff to INTPA, especially on the topics of private sector involvement and innovation. In preparation for the LAC D4D Hub activities, a working group of 12 representatives of EU member states, including the BMZ, have met and exchanged views on digitalisation in Latin America and specifically on the EU LAC Digital Alliance.

2.3. GIZ Multilateral and Regional Engagement

The GIZ has multi-level representations in the region. Besides its seconded staff to various multilateral institutions, such as ECLAC and SICA, GIZ has established country offices in all countries subject to this research (for an overview of country level activities led by GIZ see Annex 6). Through its long-standing collaborations with SICA and ECLAC, GIZ holds an influential position in those institutions and is closely involved in the shaping of various digital agendas. The existing collaboration model between GIZ and ECLAC, which exists since many decades, has been recognised as outstanding, as it is based on the actual seconding of staff into the institution, not for administrative or monitoring but actual programmatic collaboration,

[1] Whereas more entities are involved in these processes in different capacities, this study particularly focuses on the mentioned divisions and programs.

often in the form of expert consultants. It was highlighted in some interviews that this collaborative, embedded technical assistance is a true cultural shift which takes a long time and even the long-standing ECLAC/GIZ collaboration is still developing although trust and experience has been gained over time. Over the years, capacity building has become a core pillar of GIZ activities in its collaboration with ECLAC and constitutes an output in the current module. This can range from systemic approaches to the provision of software for systemic planning.

The GIZ country offices have vastly diverging digitalisation agendas, capacities and activities. Whilst some country offices, such as Ecuador, have 'Digital Partners' and in-house tech staff responsible for digitalisation processes in the country, other country offices, such as Colombia, are in the initial phase of creating a digital portfolio. Country offices in Mexico and Brazil already hold profound expertise which could be leveraged to ensure that the future agendas of the D4D Hub and the EU LAC Digital Alliance build on crucial lessons learned. The expertise can also play a leveraging role in engaging less digitalisation focused country offices, creating a strong network of expertise, mutual learning, and support across the region, thus harmonising existing gaps.

2.4. Financial Regional Collaboration – KfW and its regional integration

KfW's portfolio in the LAC region focuses on environmental support. KfW is the 'environmental bank' in the LAC region since it has been pushing respective agendas for many years. Digitalisation plays a role as a cross-cutting topic and crucial infrastructure underlying all fiscal processes of KfW and their national and regional partner banks. Financial Cooperation covers various sectors and priority areas of German Development Cooperation, such as energy, mobility, urban development, sustainable financing, infrastructure, and environment and natural resources. A wide range of programs are provided to the LAC region, which are executed in cooperation with multilateral and national development banks.

Aerial information is one of the driving attentions regarding KfWs work on digitalisation in the region. Large environmental databases are the best option for the KfW to monitor the situation and changes in the area over time and therefore collaboratively develop programmes based on verified information with their local collaborators. In its massive attention on data access for environmental protection, the KfW is, for instance, monitoring agreements with governments to reduce (illegal) deforestation through the evaluation and cross-validation of different data sources. Furthermore, access to satellite data through, e.g. the Brazilian National Institute for Space Research (INPE), alongside collaborations with independent government bodies, such as Global Forest Watch allows it to verify data vulnerable to political climates.

True Budget is an example of KfW's internal tool development that creates more efficient and transparent payment flows internally, with other banks, across the entire chain to the final recipient entities. It is an open source blockchain-based tool for flawless tracking of KfW's huge volume payment flows that pass through various instances. Piloted together with the Brazilian Development Bank, it will now be scaled across the region.

Digitalisation is an integrated component in KfW's work in the LAC region, strategically, as well as through the concrete development of tools, such as True Budget. However, despite its work on the BMZ portfolio, the Digital Strategy has not played a role in the bank's activities. Digitalisation is an iterative process within the KfW supported through superordinated support mechanisms, such as INDICOM, the DIGI Office, or KfW's Innovation Lab, an internal department

with high end digital facilities on the one hand, but also equipped with staff coming in from the IT private sector, IT experts, organisational developers etc. who accompany innovative processes from their first-hand expertise These mechanisms have a positive effect since KfW staff has a concrete contact person, regular exchange, and can learn from experiences of others. Through these mechanisms certain approaches spread and some gradually become mainstream without any conditioning through minimum requirements or the like.

KfW demonstrates its attention to the different capacities of their diverse partners' integration of digitalisation in its thematic work in the LAC region. KfW's partners range from space agencies to local indigenous associations or small local NGOs without internet access. Whilst some have the institutional capacity to develop digital approaches into an integrated part of their projects and an instrument for more impact, other partners do not have the same capabilities. They require a generally 'difficult to digitise' approach since it leans on creating trust and personal contact to build relations.

The KfW is also the most significant bank re-financier of the Development Bank of Latin America (CAF). CAF considers itself as the Latin American climate bank. The collaboration with CAF mainly centres on infrastructure projects, such as metro networks, hydropower plants or solar power plants, that KfW is refinancing at CAF with subsidised funds. Since these are all technologically sophisticated installations that always entail control systems, digitalisation is automatically an ever-present topic. However, in collaboration with CAF, KfW does not intend to push for digitalisation within the projects. Instead, all project approvals entail a state of the art evaluation, which mainly implies some sort of digitalisation by default. KfW is also working closely with The Central American Bank for Economic Integration (CABEI).

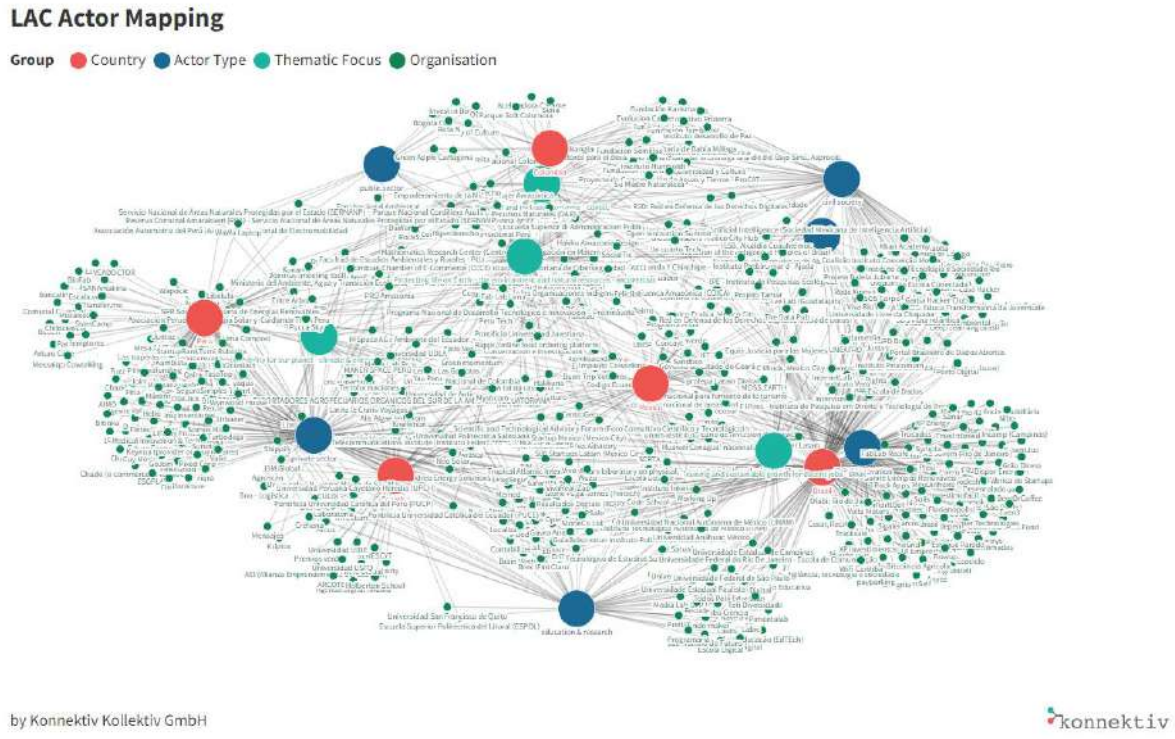
As mentioned in the introduction, when assessing how the BMZ can best contextualise its digital agenda to serve the Latin American people, many local, national, and regional inequalities need to be accounted for to amplify the ideal relations. The German Development cooperation has already gained expertise built through the above-elaborated actors. Therefore, the countries subject to this report will initially be assessed through the lenses the BMZ is applying in its digital strategy.

3. ECOSYSTEM ANALYSIS – REFLECTING COUNTRY AND REGIONAL LEVEL CONTEXTS

This chapter provides an ecosystem analysis for the LAC region and the five countries portrayed in this study. This overview will provide anchor points for the further assessment of the focal topics of this study and context for the development of recommendations. The lens of the five thematic focus areas of the BMZ Digital strategy assesses each country and the region:

- Economic context
- Labour situation, specific focus on the digital economy
- Equal opportunities
- Good governance and human rights
- Data for development

The ecosystem analysis also serves as an essential step to understanding the ICT sectors, existing regulations, and policy frameworks. This chapter provides an overview of the LAC region's digital transformation before analysing the ecosystems on the country levels. Each country section entails a stakeholder map, providing an overview of organisations divided by their specific thematic focus areas and actor types. A complete interactive stakeholder map is available **here** and can be used for interactive filtering and identification of actors for each country, thematic area, and actor type.



3.1. LAC Region

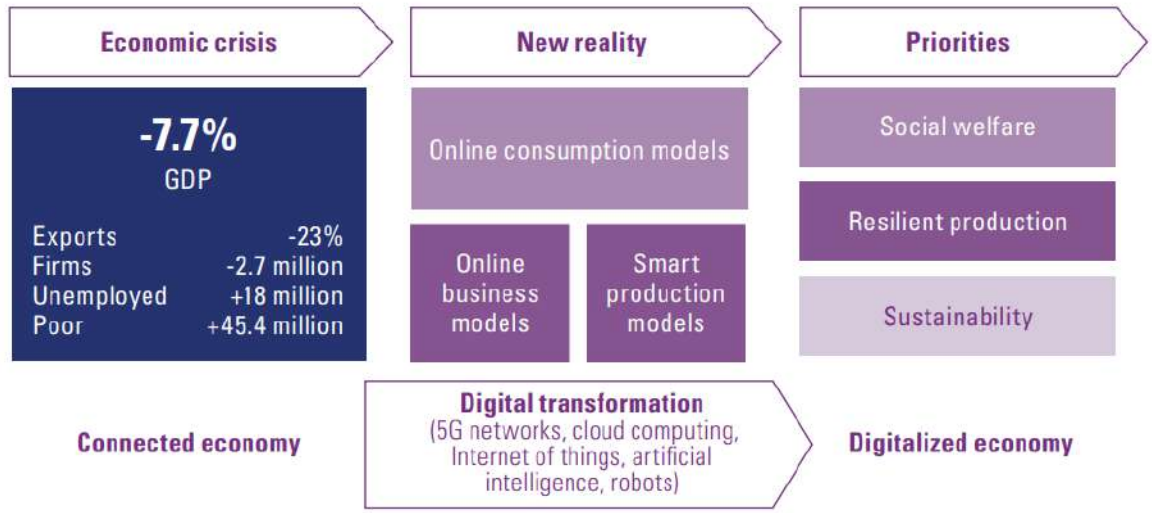
3.1.1. Economic Context

The Covid-19 pandemic has a profound economic and social impact in the LAC region. According to eLAC estimates, the region's Gross Domestic Product (GDP) decreased 7.7%, while the value of exports has fallen drastically by approximately 13% (eLAC 2022). It has subsequently led to a widespread collapse of businesses, followed by a steep unemployment surge (eLAC 2022). These recent events will affect the inequality in the countries and the number of people living in poverty in the country decisively. Digital technologies have played a key role in addressing the effects of the pandemic.

"However, the benefits from their use are limited by structural factors, such as limits on connectivity (access, use and speed), social inequalities, productive heterogeneity and low competitiveness, and restricted access to data and information management, among other factors. Thus, new opportunities and new challenges are opening up for the countries of Latin America and the Caribbean" (ECLAC 2021).

Nevertheless, digital transformation is seen as a pivotal solution to overcome the current crisis by accelerating the digitisation of the economy. The hope is for advanced technologies such as 5G, the Internet of things and artificial intelligence, and new consumption models like the product as a service to act as an economic stimulant whilst reducing carbon emissions. At present, digital transformation is creating such opportunities whilst simultaneously amplifying existing economic and social divides.

Diagram I.2
Latin America and the Caribbean: towards reactivation, 2020



Source: Economic Commission for Latin America and the Caribbean (ECLAC).

Internet access has significantly increased in LAC countries over the last decade. According to OECD, 68% of the population used the Internet, almost twice the share in 2010. It is interesting to note that the expansion of the Internet has generated a fairer distribution of opportunities than the expansion of other services in LAC (OECD 2020). For instance, these patterns exist in Bolivia, Honduras, Paraguay, and Peru, where Internet and computer access and use are more equally distributed than secondary education and pensions. In Chile and Uruguay, the distribution of Internet use is as equal as the distribution of access to essential public services, like sewerage and electricity. In some cases, as in Colombia, Ecuador and Mexico, Internet and computer access are fairer than access to education but more unequal than access to essential public services. However, in countries with significant inequality in access to essential services, including El Salvador and Honduras, access to ICT is also unequal.

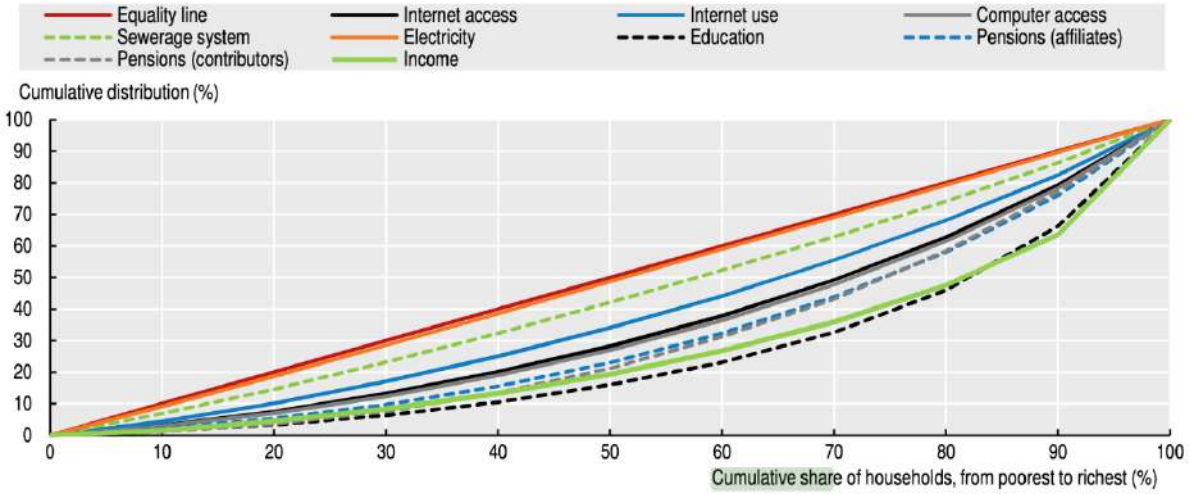


Figure 2: (OECD et al 2020) Distribution of Internet access, Internet use and other services by income decile

One of the starkest divides in access across LAC countries exists between large urban and rural areas. Urban Internet users exceeded rural users in both number and share, in some countries up to fourfold. Bridging this divide is challenging for LAC countries due to the strategic location of backbone networks closer to large, more densely populated cities (OECD 2018). Therefore, setting clear strategies to connect less populated areas and enabling access to the Internet for all citizens must prioritise national agendas and strategies. It is recommended by the OECD Latin American Economic Outlook 2020 and ECLAC's 2020 Regional Status Report on the Internet and Jurisdiction, that policies mitigate the digital divide by introducing actions that ensure the digital transformation creates more equality rather than more inequality. Such an approach cannot think of connectivity separately but requires providing the infrastructure needed to expand access; support digital skills and enable access for traditionally excluded groups through closing the existing gap to digital education (OECD 2020, ECLAC 2021).

The digital transformation is shifting global power dynamics, resulting in a reinforcement of a small number of corporations that are dominating the global platform economy. As a result, corporations based in only 2 or 3 countries dominate large parts of economic and political power (eLAC 2022). When looking at LAC's ecosystem, it is striking that 86% of the region's financial wealth concentrates in Brazil and Argentina. Brazil has the most significant digital enterprise scene with hundreds of startups, 16 locally founded tech companies worth over $1 billion, and 51% of the region's venture capital activity in 2019. Despite its economic challenges, Argentina is home to the second-largest concentration of tech companies worth over $1 billion founded by Latin Americans. It is the birthplace of the market leader MercadoLibre. Mexico, Colombia, Chile and Uruguay are gaining ground and have companies worth over $1 billion (Inter American Development Bank 2021).

3.1.2. Labour Market and Digital Economy

According to OECD task analysis estimates for Chile, Ecuador, Mexico, and Peru, some 25% of jobs are at high risk of automation in the LAC countries. Additionally, around a third of all jobs in these countries may undergo substantial changes in their performance (OECD, 2019). In comparison, estimations show that automation will replace 14% of jobs in the OECD in the

following years. Advanced digital and tech-related skills are in high demand, including data storage, software development life cycle, social media management, human-computer interaction and mobile app development. Many Latin American adults have very little or no computer experience, ranging from 43.6% in Peru to 25.2% in Chile. There is a direct correlation between the level of adults with no basic ICT skills or computer experience and countries' level of economic development and ICT penetration (OECD 2019). Further, according to OECD findings, few adults in the LAC region have either medium or strong computer use knowledge and problem-solving skills compared to the OECD average. Only a third of LAC workers use computers, smartphones, or other ICT tools at work once per week or more, compared with over half of European workers (OECD 2018).

Digitalisation is raising new challenges regarding job creation and stability. It is likely for labour market disparities to increase unless policy action ensures equal sharing of the costs of structural development in the labour market to the effects of digital transformation. (OECD 2019). It is assumed that the gig economy could offer a path to formalisation in countries with sizable informal workforces, which includes monitoring economic activities through digital transactions. However, governments must ensure that the platform economy contributes to the GDP through adequate taxation for societies to benefit from such changes. Moreover, regulatory frameworks to secure workers' rights and social security in the gig economy need to go hand in hand.

Despite LAC's progress in providing unrestricted Internet access, the benefits of digitisation exclude low-income and vulnerable workers. Different surveys in the region's countries have shown that even if their jobs could be performed remotely, only about one-fifth of people in employment could work from home during the pandemic. On average, only around 15% of low-income workers and 25% of vulnerable workers in the LAC region have access to an Internet-connected computer to enable working from home. By contrast, 50% of middle-class workers and 81% of the most affluent workers have the devices and infrastructure. It is estimated that an additional 18 million people will become unemployed in Latin America and the Caribbean due to COVID-19 (ECLAC 2020).

3.1.3. Equal opportunities and Digital Transformation

In all the countries in the region, severe differences between actor groups exist and should be taken into account. Countries in the LAC region face drastic inner-country divides, ranging from technological connectivity to illiteracy and accessibility of relevant educational services. Particularly in digitalization, areas with stark social differences and different local actor groups to involve, ranging from indigenous associations to start-up unicorns. They all have different needs and preconditions and therefore require different approaches and support mechanisms to consider their interests in their counties' digital transformation. The Covid-19 crisis has highlighted this equity aspect in regards to education as much as in regards to unequal access to public services. IT infrastructure creates this obstacle, and ICT-knowledgeable staff is lacking.

The pandemic has worsened the situation of women in a region where already one in three women are affected by gender-based violence. Regarding access to digital technologies, stark gender divides exist in rural areas. For instance, results from the analysis of the Gallup World Poll show that in the 23 Latin American countries, there is a digital gender gap in mobile-phone ownership whereby women are on average less likely to own a mobile phone than men (The World Bank 2020). Indigenous people also have not benefited equally from the exponential

growth of new technologies. Indigenous people own a cell phone half as often as non-indigenous Latin Americans. They also lag in Internet access and computer ownership. "The digital divide reinforces prior forms of exclusion insofar as access to technologies is becoming a key aspect of social capital in increasingly globalised Latin American societies", finds the World Bank report on Indigenous Latin America in the Twenty-First Century (The World Bank 2015). Divides are furthermore reinforced and deepened by inequalities in regard to education, thus literacy and digital literacy, economic means, etc.

However, gender gaps are closing regarding Latin America's formally employed workforce. Over the past thirty years, women participating in the region's workforce increased by 11%, according to the United Nations. In 2018, 18 countries in Latin America reported that over half of their female population was formally employed. Peru had the highest rate of female employment levels, citing 68.7 per cent. Although formal work opportunities are increasing for women in the region, a steep gender pay gap remains. ECLAC and the International Labour Organization concluded that women earn 17 per cent less than men in Latin America (Fleischmann 2019). On a positive note, the entrepreneurship boom is positively affecting female employment, with Latin America having the highest female entrepreneurship rates in the world (Statista 2022). For example, over 33 percent of working-age women work in Ecuador's early-stage business activities. Close behind is Chile, with 32.4 percent of women participating in early-stage business activities (The StartupVC Team 2020).

3.1.4. Good Governance and Human Rights

The key challenge in creating a regionally coordinated digital transformation process on an economic, political, and societal level, is that none of the regional institutions, except ECLAC, include all member states of the LAC region. Some mechanisms for a regional response to digitalisation have already been created, such as the eLac process (Agenda digital para América Latina y el Caribe) led by the ECLAC secretariat. eLac aims to serve as ‘a catalyst for regional cooperation on digital matters and a mechanism to promote policy design, capacity-building and political dialogue on the challenges and opportunities that the digital transformation creates for society and the economy’ (ECLAC 2020). The agenda proposes eight areas of action broken down into 39 specific goals for implementation. However, without a rapid move towards enacted collaboration mechanisms, the region risks delegating their digitalisation to private companies which have a considerable impact on decisions and processes in this field. In order to set up a critical infrastructure addressing digitalisation, civil society actors and communities need to be involved (Avila 2001).

As interviews on EU level revealed, INTPA has a critical stance towards supranational organisations in the LAC region. The main challenge is that other than in the African context, none of the LAC institutions, such as SICA, CARICOM, or the Pacifica Alliance, covers all countries of the region, except for CEPAL. The lack of a single digital market in the LAC region is considered a key obstacle for development. There is a consensus regarding the need to work on the harmonisation of regulatory environments to promote the digital economy. In the Digital Agenda for Latin America and the Caribbean aim 7 of the strategy lies out the two central goals (Aim 7, eLAC 2020):

> *‘Goal 27: Promote a regional digital market strategy, including in the framework of regional and subregional integration mechanisms, that facilitates cross-border e-commerce and digital trade through integration of digital*

infrastructure, regulatory harmonisation, free flow of data with trust, in accordance with domestic legislation; trade facilitation; improved postal and logistics services; and regulatory frameworks that encourage innovation in digital payment services.

Goal 28: Facilitate greater regional coordination through a digital integration plan that establishes a common vision and goals, with mechanisms for dialogue and coordination with existing regional and subregional organisations.'

This harmonised approach is considered particularly necessary in the areas of consumer protection, personal data protection, identity, digital payments and securities, transport and logistics standards, and tax regimes (ECLAC 2020). The Pacific Alliance, composed of Chile, Colombia, Mexico and Peru, is a driving force in the design of a regional digital market strategy. However, other efforts exist, such as the Mesoamerica Project, comprising only some LAC countries, or the digital component or the Caribbean Community (CARICOM) single market, to name just a few. Such parallel structures might hinder the pooling of interest and resources in or leadership of eLAC.

According to a study by Renata Avila the lack of an integrated digital market or a unified vision in the LAC region exposes the LAC countries to the risk of becoming overly dependent on the foreign private sector for digital transformation (2021).

Digital rights are also threatened by government surveillance practices in the LAC region. According to the Electronic Frontier Foundation "government surveillance and fighting for robust and effective legal safeguards and oversight is a continuous battle in Latin American countries" (Alimonti 2021, Rodriguez 2012). Challenges include the increase in intrusive surveillance capabilities and technologies and a growing culture of secrecy that pits security against privacy (Alimonti and Rodriguez 2020). Whilst government biometric surveillance capacities are being increased, unfettered communications surveillance persists.

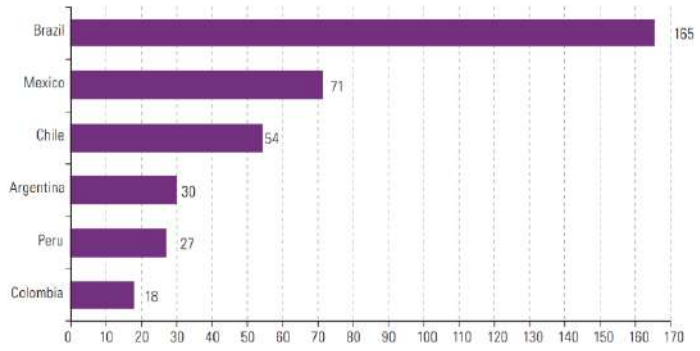
EFF has documented the connection between the two in attempts to compel individuals to give their biometric data in order to access mobile phone services in México and Paraguay in 2021 (Rodrigues 2021, SILpy 2021). These were met with fierce opposition from civil society (Saldaña 2021). The Supreme Court in Mexico indefinitely suspended the creation of the Padrón Nacional de Usuarios de Telefonía Móvil (PANAUT), a national registry of mobile users associated with their biometric data, after the federal agency assigned to implement the registry filed a constitutional complaint affirming its budgetary autonomy and its duty to ensure users' rights to privacy, data protection, and access to information (Fierro 2021, Suprema Corte de Justicia de la Nación 2021, R3D 2021). In Paraguay, the bill forcing users to register their biometrics to enable a mobile telephone service was rejected by a parliamentary commission and has been halted in Congress since then. Revelations around the Pegasus Papers and government use of Spyware showed the "widespread use of malicious software by Latin American governments generally occurs with no clear and precise legal authorization, much less strict necessity and proportionality standards or strong due process safeguards" (Rodríguez Pereda 2016, Alimonti & Rodeuguez 2021). The UN, and dozens of organisations across the globe, including EFF, have flagged the use of malware technology until states have adopted robust legal safeguards and effective controls to ensure the protection of human rights (UN 2021, Access Now 2021).

3.1.5. Data for Development

Key components of today's internet infrastructure include cloud services, internet exchange points and data centres. Governments and companies in the LAC region are moving to cloud based infrastructure. The uptake of services such as teleworking, telemedicine, tele-education, and e-banking has been accelerated by the pandemic. The region accounts for 8% of global cloud traffic, and this traffic is expected to grow by 22% on average per year up to 2023. There are 101 Internet Exchange Points (IXPs) in Latin America and the Caribbean, of which 60% are in Argentina and Brazil. The aggregated traffic in the region has increased significantly during lockdowns and averaged 9 terabits per second (Tbps) in February 2020. According to the Datacenter Technologies Cooling Market Map Thompson and Wentworth (2019), there are 151 data centres in the region, located in 24 countries: 118 in South America and 33 in Central America and the Caribbean. The region has invested very little in data centres in relation to its population (Thompson and Wentworth, 2019). For example, Argentina, with a population of 44 million people, has 30,000 square metres in operation, the same space as Austin, Texas, with 1.9 million. There are too few data centres in the region that are part of content distribution networks (CDNs). This affects the user's Internet quality and experience as content must get pulled from several thousand miles away generating more latency when around 90% of the content people search for is located two jumps or less (in topological terms) from the user's ISP and could be accessed from a local CDN. Underwater cables are still essential; however, it is important to support the growth of infrastructure that allows content to be stored close to the user in order to make access more efficient. In the future, more powerful data centres will be needed to meet the growing demands of providing more high-powered services.

Data centres also have another crucial role in the Latin American context. The collection, storage, and triangulation of data - open access to validated information - is the foundation for environmental monitoring and protection. The LAC region faces massive threats to biodiversity and enormous challenges regarding illegal deforestation, land grabbing and their effects on climate change. Therefore, access to high quality, up to date, and non-manipulated data is essential. A key provider of satellite imagery is the Brazilian Space Agency, but it is advisable to diversify independent data sources in the complex political situation. The development of data centres is going to be the foundation for the EU LAC Digital Alliance as the contribution from the EU side, providing Copernicus data for early detection of climate disasters. Simultaneously, the BMZ Digital division is planning to set up several digital centres in the LAC region, currently in Mexico, with the intention of expanding to Ecuador, though not primarily focusing on data collection.

Figure I.5
Latin America (6 countries): operational floor area of data centres, multiple operators, 2019
(Thousands of square metres)



Source: D. Thompson and E. Wentworth, "Buenos Aires: multitenant datacenter market", *Datacenter Technologies Cooling Market Map*, New York, 451 Research, 2019.

A key challenge in the region is to develop data governance formats designed to benefit societies and protect them from political exploitation. The critical question is how to equip the public sector with the necessary tools to enable data-driven decision-making within democratic frameworks whilst safeguarding citizens' privacy and allowing them to create checks and balances in the process. It is also relevant for cities engaged in Smart City activities on the municipal level. Many interview partners saw a need for independent access and operational independence of public data centres and creating oversight systems for government-owned data centres. Brazilian data specialists fear that given the political situation, it is possible to occur data manipulation on a federal level. As this is not a technical issue, usual development cooperation instruments are ineffective. Far beyond support, what is missing is collaboration and knowledge exchange, in this context grassroot initiatives supporting communities to establish decentral, open networks and create their own digital infrastructures such as the Association for Progressive Communication as well as in initiatives that enable citizens to do their own data gathering like data_labe play a critical, empowering role.

HIGHLIGHT: RELATED BMZ ACTIVITIES - Building Data Centres

Ecuador + Mexico

The development of data centres is going to be the foundation for the EU LAC Digital Alliance. The contribution from the EU side is to provide Copernicus data for early detection of climate disasters. Simultaneously, the BMZ Digital division is planning to set up several digital centres in the LAC region, currently in Mexico, and expand to Ecuador.

→ Massive attention on BMZ and EU sides in data centres should be coordinated and assured to align with existing regional and national activities. For BMZ, it should be examined to what extent the planning of the digital centres can be (re)thought in greater harmony with the Team Europe Initiative.

3.2 Brazil

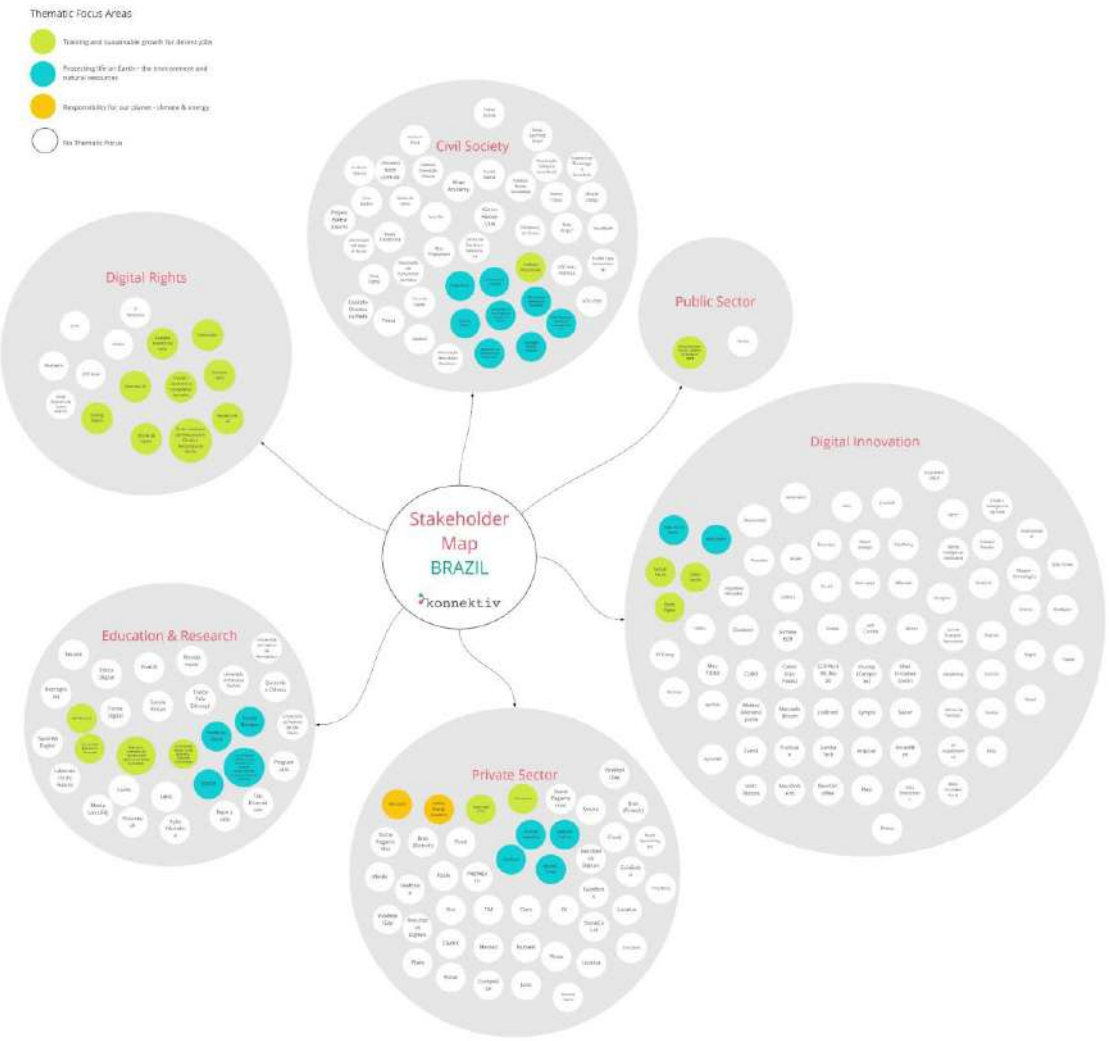


Figure 3: For detailed overview and search function consult: Actor Mapping LAC | Flourish

3.2.1. Economic Context

The annual GDP of Brazil declined from 1.4% (2019) to -4.1 in 2020. However, in 2021 it is expected to grow 4.5% (The World Bank 2022). Two major concerns are the low competitiveness of the local industry and Brazil's budget deficit, which has risen massively during the COVID-19 pandemic (BMZ 2020).

Brazil is one of the essential ICT and telecommunications markets in South America. The country's telecommunications sector accounts for around 4% of the national GDP (ITU 2018). Both, government and operators invest in telecommunications and ICT, with the private sector being the leading actor. Brazil relies on additional submarine cables and satellites to support the fibre optic infrastructure (ITU 2018, Deloitte 2019). The most significant market participants - Vivo, TIM, Claro and Oi, share the telecommunications demand. Additionally, the Brazilian government recently signed a memorandum of understanding with the European Union to develop 5G technology (European Commission 2016).

Around 96% of the population can access at least a 3G mobile network and 83% a 4G network. The country outperforms LAC in digital innovation metrics but remains below OECD averages. High-technology exports rose to 13% of total manufactured exports in 2018, which is above the LAC average (8.6%) but below the OECD (15.1%) (OECD et al 2020).

According to ABStartups, the number of startups in Brazil has doubled to 4,200 within five years, and the ecosystem is developing and undergoing an intensive process of maturation. Almost two-thirds of the startups have up to 5 employees. Nearly 28% employ between 6 and 15 people, and under 8% employ 16 and more. Brazilian startups concentrate on B2B and B2B2C business; only 20% seek contact with end customers (Rose 2022). Edtech, fintech and cleantech are the dominant sectors. The Global FinTech Index City 2020 Rankings show that Brazil (19th out of 65 countries) is among the three leading nations in the region (Gómez Mont et al. 2020). The association Anprotec lists 370 incubators, accelerators, technology parks, co-working spaces and other supporting structures. Special governmental support programs are Startup-Brasil, Conexão Startup Indústria and PIPE. Sao Paolo is a notable hub, holding 30% of Brazilians startups among its 23 million inhabitants. Transnational IT corporations concentrate in the city, such as Google or Facebook. As Brazil's financial centre, the metropolis also benefits from the strong commitment of banks. Sao Paolo's state rural areas are accountable for another 12% of the startups created. The second state on the startup rank is the Rio Grande do Sul (12%), followed by Rio de Janeiro (9%). With the startup community Vale do Dendê and the Porto Digital tax-exemption island, States like Bahia and Pernambuco are also home to innovation in the country (Rose 2022).

Innovation and relevant educational means are nearly exclusively bundled in urban hubs like Sao Paulo or Rio de Janeiro, with little ground to promote and foster innovation further inland. This gap relates to educational means alongside basic connectivity, financial infrastructure, and legal infrastructure. Access to knowledge, market access, networking opportunities is disproportionately accessible in densely urbanised areas. Digitalisation can undoubtedly play a driving role to reduce those gaps. However, given the multilevel divides in the country, exclusively providing for infrastructure or respective distance learning opportunities cannot be the only solution.

Brazil is among the leaders in the global energy transition, with over 46% of its energy mix coming from renewable resources (Jamison and Bocca 2021). In the Green Growth Index 2020, Brazil scores 55.18 (of 100) and ranks 4th of 20 in the Americas (Acosta 2020). The highest scores are reached in the growth dimension of Natural Capital Protection, while Green economic opportunities are the weakest. In the Global Cleantech Innovation Index 2017, Brazil ranks 30th of 40 countries (Sworder 2017). It scores below the average for all metrics. Brazil is one of the countries in the EU funded Low Carbon and Circular Economy Business Action initiative. It aims to facilitate the commercialisation of green low-carbon technologies of European small and medium-sized enterprises and companies in the country in sectors of high sustainable impact (European Commission 2022). Noteworthy is also Brazil's 2050 Energy Plan.

3.2.2. Labour Market and Digital Economy

The National Institute of Educational Studies and Research Anísio Teixeira (INEP) released the first survey on the impacts caused by the pandemic on the educational system. It shows Brazil recorded an average of 279 days of suspension of classroom activities during the 2020

school year, not without severe consequences. The study, also a partnership between Insper and Instituto Unibanco, estimates that, in remote learning, students learn, on average, only 17% of the mathematics content and 38% of the Portuguese language content, compared to what would occur in face-to-face classes (Ministério da Educação 2019).

A study by the House of Representatives shows that Brazilian education presents a picture of "generalised weakness", with "serious technical inconsistency" and "insufficient resources for public policies", going "against the real needs of immediate resumption of classroom teaching". The document evaluates school infrastructure, the financing of education networks and connectivity programs, and combat truancy. "The low budget payment in actions indicates that resources do not reach the educational base, compromising the actions for the improvement of school institutions". The report shows that more than half of the classrooms in municipal and state public schools are considered inadequate. In total, 28.4% of public schools do not have classrooms of adequate size; 57% do not have an uncovered patio; 69% do not have a green area. In addition, more than 4.3 thousand schools do not have bathrooms, and more than 3 thousand do not have a water supply (CAMARA, 2021).

In Brazil, 678 universities offer digital technologies training programs, and the country has 2851 formal training programmes in digital technologies (ECLAC 2018). According to a new report, Brazil's information technology and communications (ICT) sector has seen unprecedented job creation in the first three months of 2021. Organisations hired 52,743 professionals in the first quarter of 2021, a threefold increase concerning the same period in 2020, when companies from the sector created 17,067 jobs, according to data from Brasscom (2021). As a result, the ICT workforce at the end of 2020 (1.6 million professionals) has seen an increase of 3.3% compared to March 2021. The figures for the first quarter are particularly significant compared to Brazil's overall vacancies growth in other industries, which has reached 1.8% during the same period. However, the study indicates that companies struggle with a severe talent deficit. The document estimates that to meet the sector's needs, an average of 70,000 professionals would need to be hired every year between 2019 and 2024. This pent-up demand results from the lack of qualified professionals, Brasscom argued, although salaries in the sector are high for Brazilian standards.

3.2.3. Equal Opportunities and Digital Transformation

In Brazil, 74% of the total population use the Internet, one of the most dynamic markets for social apps worldwide (The World Bank 2022, ITU 2018). It performs well in E-participation, ranking 18th of 134 countries in the Networked Readiness Index. Nevertheless, socioeconomic gaps in digital technologies such as digital payments prevail (81st rank of 134). It performs better in the indicator "rural gap in use of digital payments" (30th of 134) Index (Bruno, Soumitra 2021). Women and rural and poorer sections of the population use the Internet less often for financial transactions or dealing with authorities. However, the same groups use the Internet for educational purposes equally or more often than men in cities and wealthier populations. Challenges exist regarding regional and social class differences in service use. Almost all wealthier households have access to the Internet, while for the poorest, the situation reverses, and the vast majority are not connected (ITU 2018).

Brazil ranks 84th of 189 countries in the Gender Inequality Index. The country ranks relatively strong in the indicator gender gap in Internet use of the Networked Readiness Index (30th of 134 countries) (Lanvin and Dutta 2021). Young women in Brazil are 42% more likely to have

attained tertiary education than men, although they are less likely to be employed (OECD 2019). For Brazil, there are no data concerning the percentage of women in the country scoring at Level 2 or 3 in problem-solving in technology-rich environments (LAC: 7.7, OECD: 27.7) (OECD 2020). Fewer women buy smartphones (81% men vs 71% women). However, mobile Internet awareness is high, especially among women (94% of women). Both genders cite affordability as an obstacle to owning a cell phone. Literacy and skills represent the second most significant hurdle to owning a cell phone.

Similarly, affordability is an obstacle to the use of mobile Internet, particularly regarding the costs of a device (35% men and 28% women) and data costs (28% men 16% women). However, the biggest hurdle here is literacy and skills because 40% of men and 30% of women state that they do not know how to access the Internet via a mobile phone. While 25% of men assess the Internet as irrelevant to them, only 10% of women do. On the other hand, women see not receiving enough support in learning to use the Internet as another barrier (Roundtree 2020).

Civil society organisations are on the quest for equity for the LGBTQIA+ community in the ICT labour market. A notable initiative is the app Dandarah, linked to Rainbow Resistance, a research project to map and develop digital tools to record and report violence against LGBTQIA+ people. Developed by the National School of Public Health at Fiocruz (ENSP) in partnership with ANTRA (National Association of Transvestites and Transsexuals) and ABGLT (Brazilian Association of Gays, Lesbians, Bisexuals, Transvestites, Transsexuals, and Intersex).

The Potências Negras Tec survey, conducted by the Potências Negras, focuses on the development of the black and mixed population interviewed 2,693 people (1,528 black people and 1,165 non-black people) between June and July 2021. The result shows that 59% of black people do not work in technology but are interested in working in it. Among the blacks who study technology, 41% work in the area. Furthermore, black youths are not interested in studying technologies because they do not see any opportunities (29%) and do not master English (21%) (Carvalho 2021).

3.2.4. Good Governance and Human Rights

Brazil is a democracy that holds competitive elections. The Freedom House Index 2021 assesses Brazil as "free" (74 of 100) concerning global freedom; however, the country's Internet freedom is only "partly free" (64/100) (Freedom House 2021). Furthermore, Brazil is going through an economic, political, and social crisis. The German government has been following the latest developments in Brazil (sharp increase in deforestation, the restrictions on the rights of indigenous people and the curbs on the participation rights of civil society) with a critical eye and noted concern (BMZ 2022).

Brazil rose its E-Government Development Index from 0.57 in 2008 to 0.73 in 2018, which is above the LAC average (0.65), but below OECD (0.82) (OECD 2020). The Global Cybersecurity Index demonstrates that Brazil is above the LAC average but below the OECD average. Performance in the 2019 OECD OURdata Index, which measures open government data policies, was above LAC and OECD averages (OECD 2020). Different digital strategies are in place, such as the Digital Governance Strategy, 2020-2022 or the National Strategy of Science, Technology and Innovation (ENCTI) 2016-2022.

Brazilian National Broadband Plan and the National AI Strategy draft E-Digital are the central policy documents for the digital transformation of Brazil (Gómez Mont et al. 2020). The strategy foresees three ICT sector action plans (OECD 2020). There are legal frameworks in place for Privacy and Personal Data Protection Protection of Personal Data Bill 2011, Internet Act (Law Nº 12.965, April 23rd 2014). Articles 7 and 8.,General Data Privacy Law, consumer protection: Decreto n 7.962, 15.03.2013, on electronic commerce contracts (in Portuguese) Law Nº 8.078, Consumer Protection Act, and cybercrime: Codigo Penal Brasil, Lei No. 12.965, de 23 de Abril de 2014, Law 11.829/2008.

Brazil is historically facing severe levels of inequality, not differently when addressing the country's pressing topics, such as green development and sustainable training and job creation mechanisms. Whereas Brazil is highly advanced in relevant expertise, e.g. in hydropower infrastructure and aerial information collection and processing, an equal distribution of actors involved is lacking. As a result, it can bear the creation of dangerous data biases and the ignorance of central needs, leading to an increase in the country's already drastic inequalities.

3.2.5. Data for Development

Brazil's General Data Protection Law (LGPD) entered into force on September 18th, 2020, although its enforcement provisions came into effect on August 1st, 2021. The LGPD is a comprehensive data protection law that covers the activities of data controllers and processors and creates novel requirements on the processing of information of data subjects. In addition, it includes provisions on various issues such as data protection officer appointments, Data Protection Impact Assessments, data transfers, and data breaches. The Brazilian Data Protection Authority ('ANPD'), when established, is expected to provide necessary guidance and clarity on the provisions of the LGPD. The LGPD has many similarities to the EU's General Data Protection Regulation (GDPR), granting certain data privacy rights to data subjects in Brazil and requiring organisations that process personal data to meet specific data protection obligations. OneTrust DataGuidance and Baptista Luz Advogados have produced a free report comparing LGPD and GDPR which assists organisations in understanding and comparing critical provisions of the two regulations (Kateifides et al. 2021).

Brazil has 195 data centres owned by 142 organisations (Data Center Journal 2022). Ascenty DataCenters and Telecom have the most extensive presence with 17 facilities, and other institutions include Commcorp Telecom, Equinix, and Level 3 Communications. Cities in Brazil with data centre facilities include Sao Paolo, Belo Horizonte, and Duque de Caxias. Five of Brazil's facilities are carrier-neutral, twelve offer hosting of individual servers, none have rack cabinets, and ten offer remote hands services.

3.3. Colombia

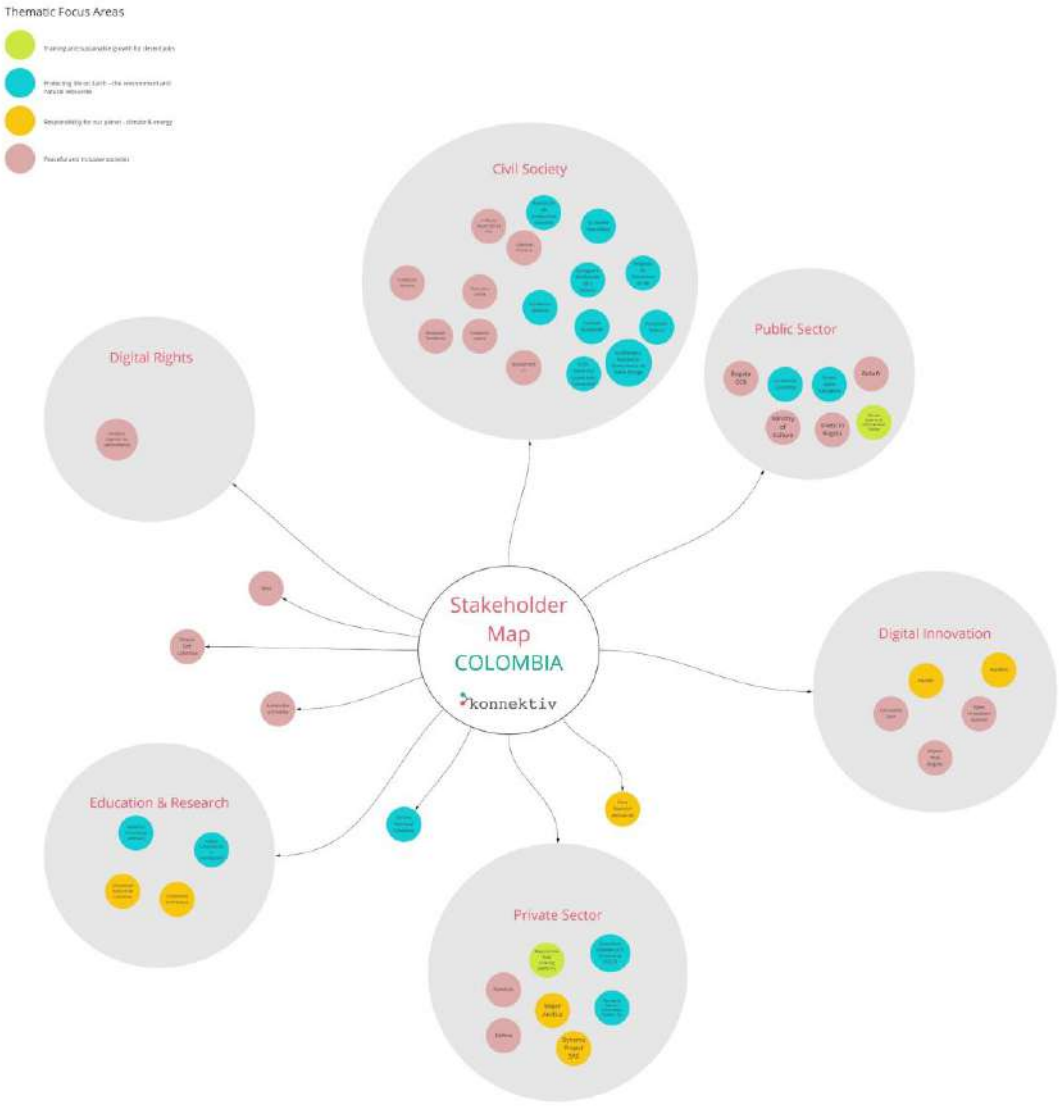


Figure 4: For detailed overview and search function consult: Actor Mapping LAC | Flourish

3.3.1. Economic Context

Colombia's economy registered 10,8% growth in the last quarter of 2021, one year after the biggest recession in half a century in 2020 due to the pandemic. The growth has resulted in a recovery of the GDP close to pre-pandemic levels. In 2021, the GDP jumped 10.3 per cent (Trading Economics 2022). Poverty levels in 2021 rose to 42.5% and the GINI Coefficient has risen to 54 placing the country the eleventh of the countries with the highest levels of inequality (DANE). Colombia is heavily dependent on commodities such as oil and coal, accounting for over half of total exports, making the economy very vulnerable to fluctuations (The World Bank 2022). The agricultural sector exports include coffee, cut flowers and bananas, which account for around 10% of exports. From Agricultural production 35.1% of 8.5 million hectares are agro-industrial crops; 22.3% are tubers and bananas; 16% cereals; 14.6% fruits; 6.8% forest

plantations; 4.2% vegetables, greens and pulses; 0.8% for aromatic plants and medicines; and 0.2% in flowers and foliage.

Around 90% of Colombia's telecommunication market is shared by three providers Claro (America Movil), Movistar (Telefonica) and Tigo (Millicom), where Claro dominates fixed services. The wireless segment is competitive now, including mobile virtual network operators (ITU 2018). In Colombia, 65% of the population uses the internet (The World Bank 2022). 100% of the population can connect to at least one 3G mobile network. Colombia scores 65th out of 130 economies overall and 9th within the Americas. Its most vital scoring indicators are population covered by at least a 3G mobile network and E-commerce legislation where it both scores at 1st. The weakest indicators are Income inequality, the rural gap in digital payments, and R&D expenditure by governments on higher education, where it scores 99th out of 130 or lower (Lanvin und Dutta 2921). Colombia's digital divide between rural and urban areas is still considerable.

3.3.2. Labour Market and Digital Economy

Colombia has a very high level of informal labour, with the latest statistics showing 48,5% of the total workforce. Colombia's labour force has shifted from the countryside to the city. In 2019 a study from the DANE found 2 million fewer farmers in the country than expected, as they have migrated to cities. Colombia's unemployment levels are 11,1%, down two percentage points from 2020, but 1-2% higher than in 2019.

The ICT sector only accounts for 2% of the total labour force in Colombia. But confidence in the digital economy and online payments has risen by 10% in pandemic times. Colombia showcases companies such as Rappi, now active in 9 countries in Latin America and the only digital company valued at above 1 billion USD - called Unicorn - with over 8000 employees. It has grown beyond delivery into financial services (Contxto 2022). The top 100 startups in Colombia include many in the delivery sphere and several fintech startups like Bold and property tech startups such as La Haus and EdTech. Bogota has attracted foreign venture capital, and its local seed and growth level funding and accelerators are steadily growing, becoming the third city in terms of investment and ecosystem performance in South America (Startup Genome 2022).

3.3.3. Equal Opportunities and Digital Transformation

The current government led by Ivan Duque had presented a very ambitious 4-year plan, "El Futuro Digital es de todos", to be implemented through his Ministry of ICT. It aims to increase access to and use of ICT and increase transparency and efficiency for digital society and industry. This ICT plan is its main instrument for development strategy and digital transformation to connect more than 500.000 homes and 1000 rural towns (GOV.CO 2019). The Ministry of ICT (MinTIC) has unfortunately gone through a series of corruption scandals regarding connectivity infrastructure projects (DW 2021) in the last year. Around 52% of Colombians have access to mobile Internet, which is at the bottom of OECD countries. Only about 6% have broadband internet (OECD 2022).

Government efforts by the Comisión de Regulación de Comunicaciones have made great efforts to understand dynamics and business models in the ICT sector and provide recommendations to other government entities. Additionally, it has generated a pro-investment regulatory

environment to encourage further infrastructure deployments and further the Digital Economy in Colombia. Colombia is among the Latin American countries to have achieved remarkable progress in access and use of ICTs, thanks to the efforts of both the public and private sectors (ITU 2018). In 2020, Colombia was found to be one of the Latin American countries with the highest female early-stage entrepreneurship activity (TEA). Among the five countries from the region included in the study, Colombia had the highest share of women starting up or running their own business: up to 30.2 per cent of Colombian women were in the first 3.5 years of founding their own company (Statista 2021).

3.3.4. Good Governance and Human Rights

Since the 1991 Constitution, there has been an increase in tools to access democracy for Colombians. Since the 2016 peace process, these have been strengthened to create the conditions for lasting peace. As part of the peace agreements, the demobilised parties have been given political access in the form of seats in congress for a limited time and financial access by receiving a one-time fee and a monthly stipend. It has helped get ex-combatants started, but unfortunately, resentment and violence persist in other forms.

Human Rights abuses are still a daily occurrence by several actors. In 2021 there were over 5000 cases of Police Violence registered, most of them as part of the national strike (Paro Nacional) (Temblores Fundación 2021). In 2020 there were 91 massacres, including 381 victims; in 2021, 96 massacres, including 338 victims and this ongoing 2022, there have been 19 massacres including 82 victims. Violence is considered endemic in Colombia. Of the victims, many include social and environmental leaders as well as former guerrilla fighters (indepaz 2022).

The unique Special Jurisdiction of Peace (JEP) is the special organ of the judicial system for truth, justice, reparation, and non-repetition. It is quite unique as it may hear crimes committed by former FARC-EP combatants, members of the security forces, other agents of the State and civilian third parties with the aim to have lasting peace. It’s incentive for truth and handing over of assets that would then go to reparations is at times lowering usual legal consequences to perpetrators. Unfortunately, this also incentivizes criminals like Narcos that didn't belong to the conflict to try to get the same benefits through misrepresentation.

Cocaine production in Colombia has risen and is now under much more fragmented control, with farmers, labs and transport working more independently than in Cartel times (Pardo 2021). Unfortunately, there has been a return to violence from former FARC leaders and former paramilitary groups in the form of criminal gangs like El Clan del Golfo (Tomás 2019, Escobar 2022). So even though there has been a peace agreement, it is far from being violence and crime-free.

The Colombian Government is trying to digitise the Government alongside giving more Colombians access to IT services. As a result, the E-Government Development Index (EGDI) was 0.69 in 2018, above the LAC Average but below OECD Levels.

3.3.5. Data for Development

Colombia's IV National Plan for Open Government states that efforts have been of a normative, regulatory and public policy nature, such as the issuance of Law 1712 of 2014 on Transparency and Access to Public Information, Law 1757 of 2015 on Citizen Participation; and

more recently, Law 2016 of 2020 that creates the National Public Integrity System and Law 1955 of 2019 of the National Development Plan that, for the first time, includes the Open Government approach and describes actions to strengthen its principles throughout the national and territorial public institutions. Looking at public policies, the first policy on Transparency, Integrity and Legality towards an Open State, in order to bring the agenda to the highest institutional level and consolidate it in the three branches of government is in building. Open Government Partnership. However, the crisis of distrust of citizens towards public institutions continues to be a challenge to be solved, as well as the challenges brought about by the COVID-19 pan- demy, which demand a greater and committed effort from the State as a whole, with the different actors of society (Márquez et al. 2020).

Colombia's Data Policy has become more open. Most of the standing ministries provide datasets; however, many are not prepared due to a lack of internal data scientists or prioritisation. Nevertheless, the National Statistical Service of Colombia (DANE) brings out regular and reliable statistics on the most significant indicators of the country. Colombia has ten data centres run by eight organisations. Internexa Colombia has the most extensive presence with three facilities, and other organisations include Red Nacional Academica de Tecnologia Avanzada RENATA, EdgeUno, and Equinix. Cities in Colombia with data centre facilities include Bogota, Medellin, and Cartagena. None of Colombia's facilities is carrier-neutral. None offer a host of individual servers, have rack cabinets, or offer remote hands services (Data Center Journal, 2021).

3.4. Mexico

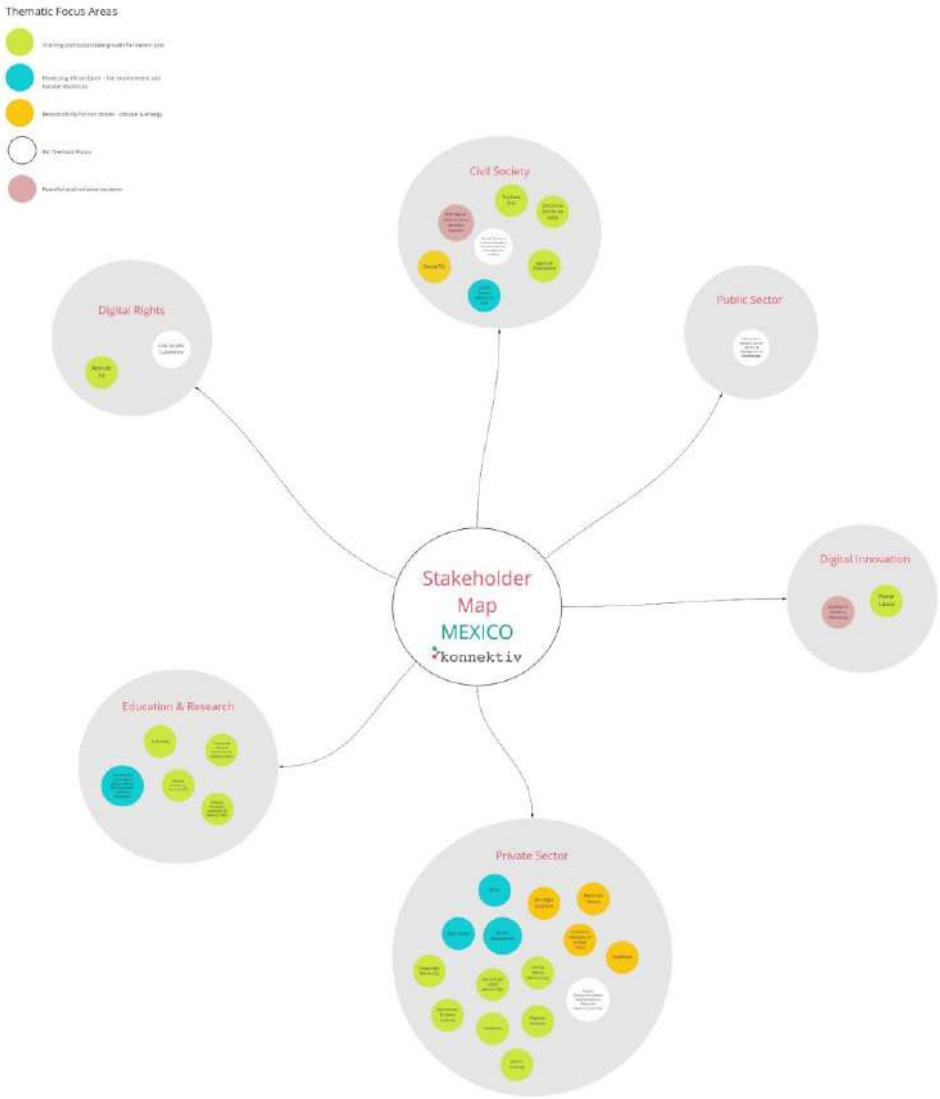


Figure 5: For detailed overview and search function consult: [Actor Mapping LAC | Flourish]

3.4.1. Economic Context

Mexico's GDP decreased by 8% in 2020, increasing poverty by 9% and extreme poverty by 8%. In 2018 more than 90% of Mexicans thought that their country was ruled by a few people's interests which beats the already high proportion in LAC (82%). The GDP fell -8,2% in 2020 and recovered 5,1% in 2021, and 3% in 2022, projected to keep growing 2,2 % to 2023, also powered by United States recovery and through infrastructure projects, agriculture, industry and tourism (OECD 2021).

In the Green Growth Index (2020), Mexico scores 61,64 (of 100) and ranks 1st in the Americas. The highest scores are reached in the growth dimension of Natural Capital Protection and Social Inclusion and lowest in Efficient and Sustainable Resource Use and Green Economic Opportunities. Mexico, USA, and Canada signed the T-MEC replacing NAFTA in 2020,

creating more reciprocal conditions between the three countries and increasing transparency, especially in automotive, agriculture, fintech and digital economy (Acosta 2020).

Three operators control the Telco market with infrastructure Telcel, AT&T and Movistar and seven virtual operators that run on other companies' infrastructure. However, a reform in 2013 changed the landscape, opening up to new providers and dimming the previous dominance of America Movil and its daughter company Telmex. In addition, the government of Mexico has promoted the deployment of Red Compartida, a countrywide infrastructure 4.5G network built for shared wholesale-only use to cover 92% of Mexican territory by 2024 to expand accessibility in underserved areas, support competition and increase quality.

In Mexico, 60,6% of all households have internet access, ranking 59th out of 130 in the Networked Readiness Index. With 93,4 cellular subscriptions per 100 people, there is a high penetration that is lower than the LAC Average (Lanvin and Dutta 2021).

Mexico's Estrategia Digital Nacional which was first introduced in 2013 but has continued in the following government through the government's aims to 1. transform the government by digitising e 2. digital economy 3. education 4. universal health 5. civic participation and not only catch up in digitalisation but become a regional leader.

The idea behind it is to build on 5 enablers 1. Open Data - to innovate public services and provide opportunities to innovation and entrepreneurship by converting government-held data into an added value that society can use. 2. Legal framework - to create a trustworthy environment for ICT to be adopted by everyone, including citizens, civil society, and business. 3. Interoperability and digital identity - to achieve a complete transformation of the government using interoperable technology simultaneously as developing digital ID 4. Inclusion and digital skills - so people can use and benefit from ICT by creating inclusivity centres that teach skills in all federal entities 5. Connectivity - connecting as many people as possible that had not had the chance through community connectivity in rural areas. There has been progress in Mexico on connectivity, and the 'Estrategia Digital Nacional' is very ambitious yet poses challenges implementation.

3.4.2. Labour Market and Digital Economy

Mexico has a high level of informality, with 56,1% of people not being part of the social system. The unemployment level is at 4%, comfortably below the LAC average (10%). Online commerce has increased to 5% of GDP in Mexico as of 2018. High tech exports outperform LAC twofold at 21% of all manufactured exports, but patent applications are still deficient compared to OECD averages. (OECD) Mexico's number of unicorns - companies that are valued at above 1 billion USD - is one of the biggest in the region, although mainly in the fintech space. They include Bitso, a Mexican cryptocurrency exchange that serves as El Salvador's government-backed crypto wallet that has over 4 million users; Clara, a corporate credit card service; clip a payments service provider; Kavak an online used car financing marketplace; Konfio a financial solutions company for SMEs and Incode, a biometric ID company and Marama, an eCommerce company (contxto stadf 2022).

3.4.3. Equal Opportunities and Digital Transformation

Mexico spent around 17% of the government budget on education in 2019 and about 0.4% of its GDP on Research and Development (UNESCO). There are 71,3 million Internet users,

representing almost 64% of the population. However, the digital divide is considerable; 71,2% of urban residents consider themselves internet users compared to only 39,2% in rural areas. The states with the lowest gaps between rural and urban are Baja California and Morelos. In terms of gender, the overall number of Internet users, 50,8% identified as women and 49,2% as men suggesting balanced access (INEGI 2021). However, in 2019 59,2% of women didn't use a computer laptop or tablet inside or outside, compared to 54,6% of men. In rural areas, 41% of women do not have smartphones compared to 39,1% (Inmujeres 2021).

71.9% of the indigenous population (8.3 million people) were in poverty as of 2016. In addition, 85.1 per cent of indigenous women in rural areas are in poverty, 56.5 per cent of indigenous youth (12-29 years old) in rural areas and 40.6 per cent in urban areas. Regarding social deprivation, 31.6% of the indigenous population lags in education, 15.1% lack access to health services, and 77.6% lack social security. In addition, 23.2% of indigenous language speakers are illiterate; this percentage rises to 29.5% if they are women (del Rosario Cárdenas Elizalde et al. 2018).

There is still room to boost women's labour market participation, with around 45% participating in the workforce and reducing educational inequalities (OECD 2022). Indigenous groups have 90% coverage. Access is distributed on these protocols 3G (82%) and 4G (40%), which shows a gap in access compared to other parts. Only 53.9% of households that speak indigenous languages have a mobile phone, and only 9,8% have internet, compared to 78,6% and 32,9% (Bravo 2022).

The government created a National System of Researchers, managed by the National Council of Science and Technology (CONACYT) and stipulated in the General Education Act. According to Article 25, 8% of GDP must go into education, of which 1% should go into scientific research by public higher education institutions. However, this goal has not been achieved in the last ten years (García-Bullé 2020).

3.4.4. Good Governance and Human Rights

Mexico continues to outperform Latin America and the Caribbean (LAC) to shape an inclusive digital economy and society. The country has made efforts to enhance digital access and use for all. As a result, Internet users, active mobile broadband and fixed broadband subscriptions increased in the last decade. In this way, Mexico rose in the E-Government Development Index from 0.59 in 2008 to 0.68 in 2018, above the LAC average and below the OECD average (OECD 2021).

Mexico’s high-technology exports as a share of total manufactured exports have been above LAC and OECD averages in the last decade. In terms of promoting an inclusive digital society, the number of students per computer rose from 2.2 in 2015 to 2.4 in 2018, above LAC (1.6) and OECD averages (1.1). The Global Cybersecurity Index (0.63) shows improved and consistently higher results than the LAC average (0.43) but below the OECD average (0.79). Mexico had higher foreign direct investment restrictions than LAC and the OECD in the 2018 OECD FDI Regulatory Restrictiveness Index.

Human Rights in Mexico are problematic, including abuses by criminal groups and by police, prosecutors, and the military. Torture, abuses against migrants, attacks on journalists and human rights defenders happen regularly. Since the mid-2000s, the armed forces have expanded their rule along with human rights abuses (Human Rights Watch).

3.4.5. Data for Development

Mexico is a founding member of the OpenGov Partnership and has several goals they set out including Implement a pilot project in five social programs of the Federal Government that allows through citizen participation mechanisms: 1) identify the traceability of public spending 2) detect areas of risk for compliance of objectives and goals, as well as probable acts of corruption and; 3) initiate complaint procedures in case of irregularities to fight corruption with partner organizations Fundar and Transparencia Mexicana. They also want to Implement the recommendations from the Transparency Index in Natural Resources, as well as constitute transparency monitoring groups in the water, forestry and fisheries sectors to improve resource management with CausaCritica and Reforestamos Mexico amongst others. There are 13 points in total which are being implement with relevant civil society actors (Mexico's Open Government Partnership Steering Committee 2019).

One of Mexico's Digital Agendas enablers is Open Data. The goal is to create more opportunities for innovation in public and private services and entrepreneurship. There is a dedicated website https://datos.gob.mx/ that gives access to over 40.000 datasets from 280 institutions. Unfortunately, most of the datasets on this platform are not prepared and require at least basic data science skills.

Mexico has 14 data centres run by six organisations. KIO Networks has the most considerable presence with seven facilities, and other organisations include ATC Holding Fibra Mexico, Equinix, and HostDime.com. Cities in Mexico with data centre facilities include Mexico City, Guadalajara, and Monterrey. One of Mexico's facilities are carrier-neutral, two offer a host of individual servers, none have rack cabinets, and one offer remote hands services (Data Center Journal 2022).

3.5. Peru

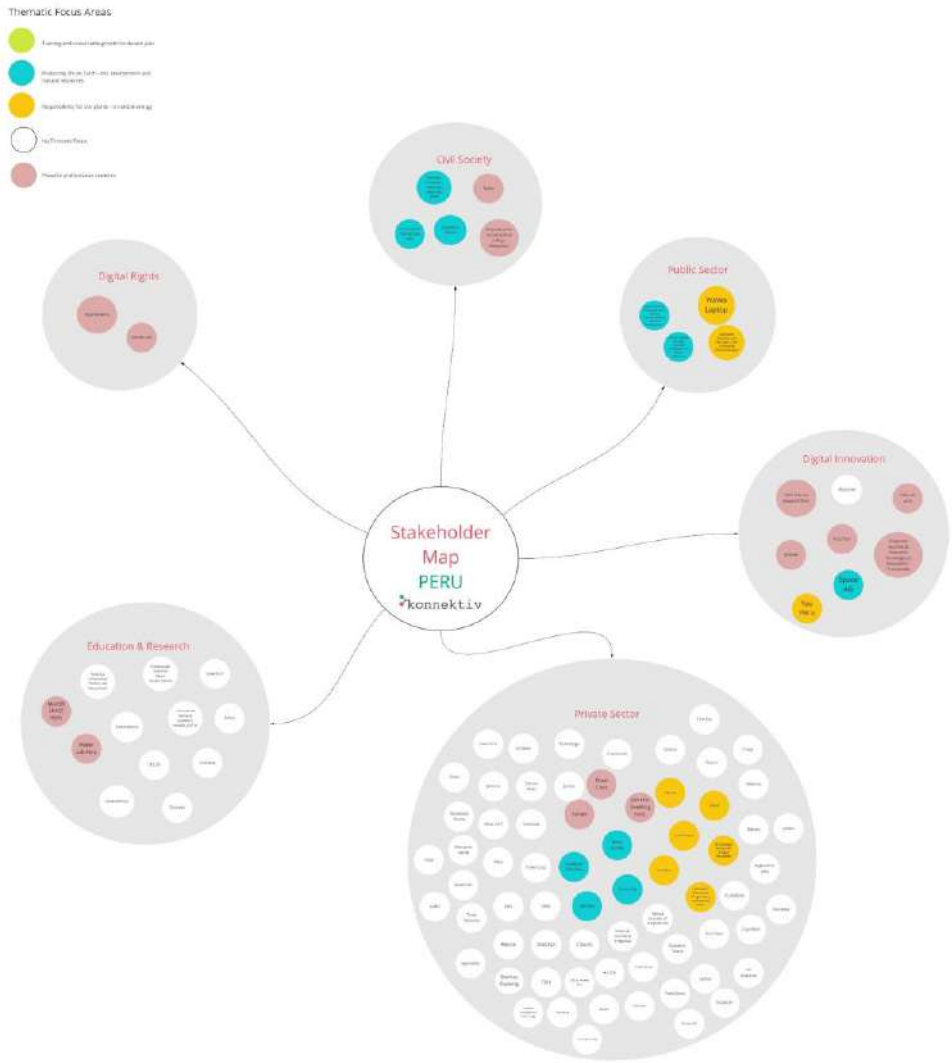


Figure 6: For detailed overview and search function consult: Actor Mapping LAC | Flourish

3.5.1. Economic Context

Like in other countries in the region, the COVID-19 pandemic led Peru to a deep recession, with the annual GDP growth declining from 2.2% (2019) to -11.1% in 2020 (World Bank). However, in 2021, Peru's economy advanced 11.4 per cent year-on-year in the third quarter of 2021, easing from the series record of 41.9 per cent in the previous period as effects from the pandemic begin to fade. Still, the economy noticed an increase in activity and demand as it continued to recover from the recession brought by the pandemic (Trading Economics 2022).

In Peru, 65% of the total population use the Internet (World Bank). Therefore, E-participation seems reasonable, ranking 54th of 134 countries in the Networked Readiness Index (Lanvin and Dutta 2021). Peruvian society appears to be very active in virtual social networks as the country ranks 17th out of 134 countries in virtual social networks. Despite penetration rates in line with the regional levels, there is a clear divide within the population, with one-fifth of Peruvians not owning a mobile phone. Furthermore, socioeconomic gaps in access and use of

digital technologies are emphasised in terms of expenses, as more than 50% of households with Internet limit its use because of data costs in 2017 (ITU 2018).

Four mobile network operators compete for the mobile market with virtual network operators. Despite the high rates of smartphones per capita - 117 for every 100 inhabitants - most communication is made using text messages (SMS) or free-of-rates messenger apps. Fixed-broadband is mainly available via DSL and cable-modem technologies, but its penetration rates are well below the regional and global levels (ITU 2018). Peru's challenging topography for ICT infrastructure deployment poses an advantage to the mobile sector over its fixed alternative (ITU 2018). Peru has made efforts to enhance digital access and use with increased Internet users, active mobile broadband and fixed broadband subscriptions (OECD 2020). But outside its four cities with more than 500 thousand inhabitants, connectivity and education access are still scarce. Today, around 79% of Peruvians live in cities, and almost a third of the population, about ten million inhabitants, lives in the greater Lima region (BMZ).

Peru's Internet para Todos (Internet for all) aims to bring 4G mobile Internet access to 6 million people in more than 30 000 rural areas by the end of 2021. This partnership between Telefónica, Facebook, IDB (Inter-American Development Bank) Invest and CAF – Development Bank of Latin America – enables operators to use communication infrastructure to expand coverage in rural areas. Telefónica has 3 130 towers across Peru; Internet para Todos aims to install 866 by 2021. This programme also constitutes a growth opportunity for Telefónica by offering to test new business models and technologies in recent locations and potentially expand the customer base in new markets (MAEUEC, 2020). The long-term goal is to replicate the approach in other LAC countries, where some 100 million still have no Internet access (OECD 2020).

Plan Nacional de Competitividad y Productividad 2019-2030 (National Plan for Competitiveness and Productivity 2019-2030) and the Law of Digital Government of 2018 are the primary reference documents for Peru's development and digital transformation. The national plan focuses on eight main objectives to increase international competitiveness and put Peru on a stable growth path to raise well-being. Almost half the measures relate to digital transformation, indicating the importance of digital innovation for competitiveness and productivity. The law, approved by Legislative Decree No. 1 412 of 2018, regulates the digital transformation, focusing on government entities. It establishes the framework for managing digital identity, digital services, interoperable systems, digital and data security, and the transversal implementation of information and communications technology (ICT) across the public administration (OECD 2020).

The Peruvian startup ecosystem is in an initial growth stage. The country's government has implemented funds and training initiatives to support startups and local entrepreneurs. One example is Fondecyt - the National Fund for Scientific, Technological and Technological Innovation Development, an enterprise responsible for capturing, managing and channelling resources in co-financing the formation of highly specialised human resources and to the development of scientific research, the technological application of knowledge and its introduction to the market, and to the attention of social needs. Another example is StartUp Perú, an initiative of the National Innovation Program for Competitiveness and Productivity - INNÓVATE PERÚ, of the Ministry of Production, which includes seed capital and scaling contests for innovative, dynamic, and high-impact ventures. However, a significant challenge is the low

levels of innovation among Peruvian startups and the low impact on the country's development (Guerrero et al. 2017).

In terms of international cooperation, Peru established the Better than Cash Alliance through multilateral cooperation with Colombia, Mexico, Paraguay and other countries worldwide. The partnership aims to accelerate the transition from cash to digital payment to reduce poverty and drive inclusive growth. In addition, Brazil and Germany assisted in creating an Environmental Technology Centre, allowing Peru to host international environmental technology experts to comply with new legislation and criteria imposed on exporters by global markets. Peru also coordinated with the European Union on the Building Europe Link to Latin America project to establish ultra-high-speed cable connectivity, both submarine and terrestrial, between the regions by 2021. It includes 11 European and Latin American research and education networks. It is led by RedCLARA, an international organisation aiming to connect Latin America's computer networks, and GEANT, a pan-European research education network.

In the Green Growth Index, Peru scores 52.76 of 100 and ranks 8th of 20 in the Americas. The highest scores are reached in the growth dimension of Natural Capital Protection, while Green economic opportunities are the weakest. Peru has the fourth biggest area of tropical forests worldwide and is one of the world's most biodiverse countries. However, its rapid economic development also contributes to the destruction of these natural assets. Logging, slash-and-burn cultivation, and illegal mining are threatening to destroy parts of the Amazon rainforest (Acosta 2020). The German government coordinates activities within the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, which is also extensively involved in Peru within the International Climate Initiative framework.

3.5.2. Labour Market and Digital Economy

The Peruvian government's expenditure on education was 3.85% of the GDP (2019) (UNESCO). During the last 11 years, education has been the sector to which the most significant proportion of the Peruvian public budget has been allocated. However, local governments executed just two-thirds of the budget, said the Peruvian Institute of Economy (IPE). R&D expenditures of 0.1% of the GDP (UNESCO R&D) were below the LAC average (OECD 2020). Peru's ICT patent applications filed under the Patent Cooperation Treaty (per million people) is only 0.09 (2016). Here, the country underperforms in the region (LAC: 0.34) and compares to OECD (38.2) (OECD 2020). In the sub-index "ICT skills" of the Networked Readiness Index 2020, Peru ranks 119th of 134 countries, suggesting a lack of ICT skills. Until 2019, there were more than 130 universities in Peru. About half of which were created in the last 20 years due to the liberalisation of Higher Education and a decrease in public investment in the tertiary education system. The current Peruvian university offer comprises public, private non-profit (associative) and private for-profit (business) universities.

There are more than 1.3 million students in Higher Education. Nearly 40% of this student population studies in for-profit universities. Poor regulation and the decline in public investment have accompanied this rapid growth of Higher Education institutions (HEIs). As a result, universities characterise themselves as heterogeneous and mainly of low quality, especially those for lower-income groups. Studies have found that the main factors for poor education quality are the rapid increase in supply, its misalignment to the needs of the labour market, the low student selectivity, the low teacher/student ratio, and the degree of dedication of university teachers. One hundred eleven universities offer digital technologies training programs.

Only 1.3% of employment was in the ICT sector in 2016 (World Bank 2016). A lack of competitive salaries and career opportunities for data scientists is a frequently cited barrier to more excellent institutional performance and the capacity of data producers, for instance, in Peru (World Bank 2021). A recent study by the Inter-American Development bank show that although the adoption of new technologies by firms is still incipient, it increases the labour demand of higher-skilled workers (Novella et al. 2019).

3.5.3. Equal Opportunities and Digital Transformation

The gender gap in Internet use of the Networked Readiness Index Peru ranks 73rd of 134 countries suggesting inequalities. The number of researchers is unequal in Peru as 68% are male researchers compared to 32% female researchers (UNESCO Inatitute for Statistics 2022). The distribution of mobile money account holders is also unequal between women and men, indicated by a gender gap of 2% (OECD 2018). Peru performs below the LAC average (7.7%) and OECD average (27.7%) in terms of the percentage of women scoring at Level 2 or 3 in problem-solving in technology-rich environments with 6.3% (2018) (OECD 2020).

Women make up a significant percentage of lower-income groups. One of every three women in Peru still have no income of their own. Their presence in the digital economy is characterised by the same discriminatory biases faced in other areas of their private and social lives (Montaño Virreira 2013). Gender awareness is missing from policies and programs that promote innovation and productivity, which reinforces women's concentration in economic activities requiring limited innovation. Women are under-represented in science, technology, engineering, and mathematics fields. Data on what prevents women from entering, advancing, and remaining in these careers is lacking (Nathan Associates Inc. 2016).

3.5.4. Good Governance and Human Rights

The Personal Data Protection Law N° 29733 (PDPL) was enacted in June 2011. In March 2013, the Supreme Decree N° 003-2013-JUS-Regulation of the PDLP (Regulation) was published to develop, clarify, and expand on the requirements of the PDPL and set forth specific rules, terms and provisions regarding data protection. Together, the PDLP and its regulation are Peru's primary data protection laws.

Further, the law regulating private risk centres and protecting the owner of the information is Law Nº 27489, enacted in 2001 and later amended several times. This law establishes the applicable provisions for activities related to risk centres and companies that handle:

- Information posing higher risks to individuals (e.g., related to financial, commercial, tax, employment or insurance obligations or background of a natural or legal person that allows evaluating its economic solvency), and
- Sensitive personal data (according to the PDPL)

Peru has improved regulatory and institutional frameworks for public-private partnerships. For instance, in the past six years, it achieved more effective private participation in infrastructure through enhanced regulations. Bur for many SMEs, implementing it is the hard part (OECD 2020).

3.5.5. Data for Development

Peru has 13 data centres run by 13 organisations. Telxius Cable IPTP Networks, CenturyLink, and InterNexa Peru operate facilities in Lima and Trujillo. However, none of Peru's facilities is carrier-neutral. None offer a host of individual servers, have rack cabinets, nor provide remote hands services (Data Center Journal 2022).

The National Open Data Platform (PNDA) is the digital platform for finding, exploring and reusing government data provided by 60 different public institutions. Among the datasets published are rural education indicators, intercultural bilingual education, statistics on occupational diseases in mining, traffic variables in airports, among others. The population can download them in two different formats: CSV and PDF format. The datasets in the PNDA are divided into these categories: Transport, Water and Sanitation, Health, Governance, Education, Prosperity, Environment and Natural Resources, Food and Nutrition, Information Society, Social Development, Urban Development and Energy. In addition, state bodies can use a manual to open data they produce in a standard way using the Quick Guide to Opening Government Data. State bodies can also ask for specific public management software using a governmental platform. To use the Open Data Portal, the government provides Instructions for the Registration of Datasets and the Metadata Structure Guidelines. Even though many datasets are available, they are hardly understandable to the vast majority of the population. Therefore, the available data still needs different private and public organisations to develop helpful information for Peruvian society.

In 2020, a group of researchers analysing data on the pandemic created the community dataset called OpenCovid-Perú to inform and advise the population. Unfortunately, the project is halted, but many datasets, videos and analyses are still available.

3.6. Ecuador

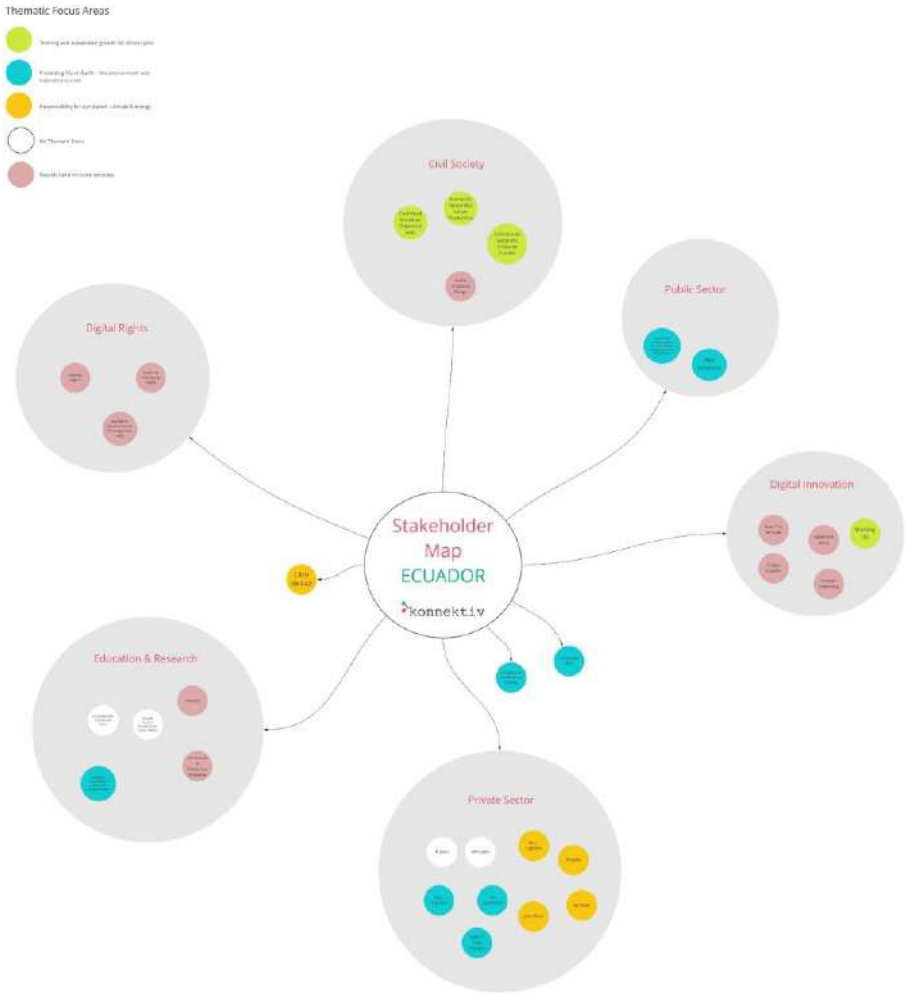


Figure 7: For detailed overview and search function consult: Actor Mapping LAC | Flourish

3.6.1. Economic Context

The annual GDP growth of Ecuador declined from 0.1% (2019) to -7.8 in 2020. According to the Worldbank, "the COVID-19 health crisis triggered a deep recession that led to a rebound in poverty" and has further emphasised structural deficits of Ecuador's development model. The prognosis for 2021 sees an increase in the GDP growth rate of 3.4% and an increase of 1.3% in 2020 (World Bank). Agriculture represents more than 10 % of GDP in Ecuador.

Ecuador's mobile service coverage is around 94% at the population level and that the geographical coverage of fixed internet is 83% (Rivera Zapata et al. 2020). The telecommunication sector in Ecuador is relatively concentrated in the hands of a few dominant operators (mobile: onecel, Otecel and Corporación Nacional de Telecomunicaciones/CNT E.P.; fixed: CNT). However, fixed services provision is dominated mainly by CNT, the State-owned operator (more than 53.49 % of the fixed-broadband subscriptions) (ITU 2018). However, Ecuador still has a long way to go in strengthening its digital connectivity sector. The penetration of fixed

and mobile Broadband (BA) services is only 10% and 53%, respectively, below the rest of LAC countries (13% and 65%) and far behind the Organisation for Economic Co-operation and Development (OECD) (33% and 96%). Only 62% of the population is covered by high-speed mobile BA networks (vs. 67% in LAC and 98% in the OECD) (Rivera Zapata et al 2020).

Ecuador's performance in enabling digital innovation showed mixed results in the last decade. High-technology exports as a share of total manufactured exports increased from 5.0% in 2008 to 5.3% in 2018 but remained below averages in LAC (8.6%) and the OECD (15.1%) (OECD 2020). Also, 93% of the population in Ecuador access at least a 3G mobile network; 71% with a 4G network. The country shows a decrease in fixed broadband speed (-19.6%) and an increase in latency in the same technology (11.8%) (CAF 2020).

Only 54% of the total population in Ecuador use the Internet (The World Bank). And nearly 50 per cent of those who do not use the Internet are held back by deficiencies in digital literacy (World Development Report 2021). Hence, Ecuador must develop the necessary structural capacities and access. Social networks are frequently used and the availability of local online content and a socioeconomic gap in digital payments pose challenges for Ecuadorian society (Lanvin and Dutta 2021). The digital economy in 2018 accounted for $1.286 billion of Ecuador's GDP (1.2 per cent), which doubled that of 2017. However, even with such a significant increase in digital services, Ecuador still lags well behind stronger digital economies in South America. Up to June 2020, only sixty-nine per cent of the Ecuadorian population has purchased something on the Internet. This trend is partly due to low (but increasing) internet penetration rates but also due to the high cost of computers, cell phones, and devices and especially the low penetration of banking services.

3.6.2. Labour Market and Digital Economy

Ecuador counts 278 Startups active in 2021 of which 77 operate across borders. Most startups are in FinTech, eCommerce, Business Solutions, EdTech, PropTech and Healthtech that employ around 2200 people (BuenTrip Hub 2021).

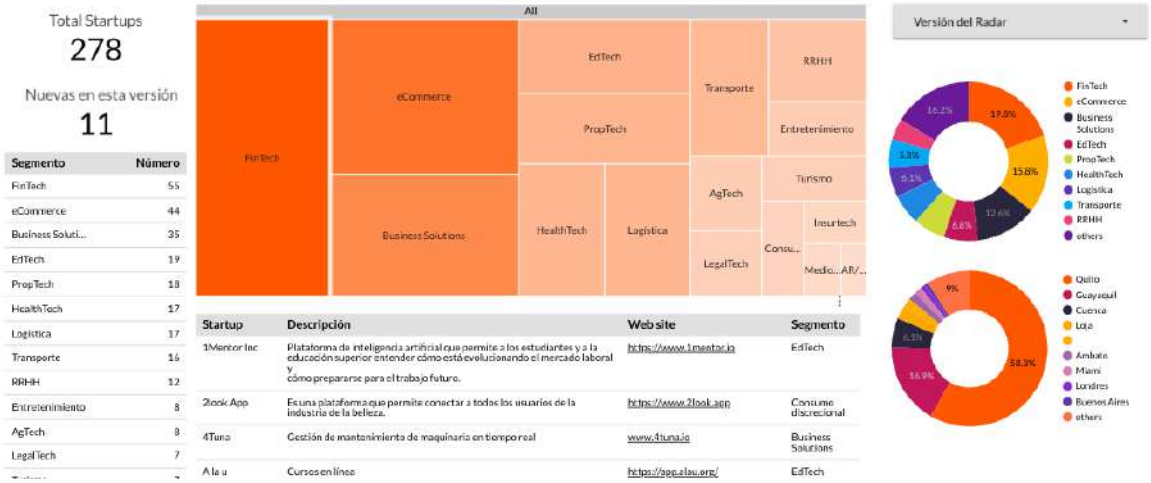


Figure 8: Data Tech Startup 13.0 (https://www.buentriphub.com/startups-ecuatorianas)

The Government expenditure on education in Ecuador was 5% of the GDP in 2015. R&D expenditures amount to 0.4% of the GDP (UNESCO 2022). Ecuador's ICT patent applications filed under the Patent Cooperation Treaty (per million people) is only 0.07 (2016). Here, the

country underperforms in the region (LAC: 0.34) and comparison to OECD (38.2) (OECD 2020). The skilled labour force of Ecuador is estimated to be 46.6% (Kovacevic et al. 2018).

While Ecuador has significantly increased spending on education in recent years, it has done so inequitably and with few quality outcomes. Increases in education spending in recent years have disproportionately favoured higher education. As a result, Ecuador is the only country in Latin America that allocates more than half of its investment in education (almost 3 % of GDP) to higher education, thus privileging a limited group of upper-middle-class students. However, this increased investment has not improved access, graduation, labour market insertion, research and scientific production of state universities, or their international rankings positions. While spending on higher education increases, spending on primary education is well below regional levels (The World Bank 2021).

Adequate employment is accessible only to a small segment of the labour force, including those with high education and the wealthiest 60% of households. Moreover, there are marked differences in the opportunities for access to suitable employment. Educational level, age and gender are among the factors that most influence differences in access.

The youth unemployment rate is 9.3%, three times higher than the national unemployment rate. More than half of young workers are at risk of youth disengagement from the labour market. In 2020, youth disengagement increased by 4.7 percentage points from 51.7 percent in 2019 (pre-pandemic) to 56.4 per cent in 2020. The institutional setting with rigid labour market regulations constrains young workers from accessing formal private-sector jobs and makes them more vulnerable during unrestrained and inflexible contracts, short probation periods, binding minimum wages, and a prohibitive dismissal cost. The existing Active Labour Market Programs (ALMPs) in Ecuador do not respond to the needs of the productive sector, and their coverage is low. The current public ALMPs provide vocational training, wage subsidies, and job-search assistance. Yet, the number of training courses offered has decreased significantly due to the lack of financial resources. Moreover, most of the training courses provided have a low practical component, and the quality of vocational training courses has fallen in recent years (The World Bank 2021). COVID-19 has exacerbated the precariousness of employment in Ecuador. During confinement (March to June 2020), around 400,000 formal jobs and 300,000 informal jobs were lost.

As of September 2019, Ecuador has received an estimated 1.15 million Venezuelans since 2015. Most have continued their journey to countries further to the south, although around 400,000 have chosen to settle in Ecuador. Despite the rights and legal protections afforded by Ecuador to migrants and refugees, Venezuelans who have settled in the country experience vulnerability in various ways. Such exposure is exacerbated by their legal status, which is irregular in over half (54%) of all cases. Lack of documentation and other bureaucratic hurdles represent the primary causes for this irregularity, which means that Venezuelan migrants struggle to enter the formal workforce. Many are therefore employed informally or on temporary contracts. On average, public sector workers receive higher wages and enjoy better employment protection than private-sector workers. For example, in 2011, the average salary in the public sector (including public enterprises) was 72% higher than a private sector wage for a worker with the same characteristics. This gap is several times larger than the Latin American average (Oviedo et al. 2021).

3.6.3. Equal Opportunities and Digital Transformation

Gender continues to make a difference: for every dollar an employed man earns, a woman earns on average 82 cents. This gap widens in the poorest 40% of households, where 40% of the most impoverished families, where women earn on average 40 cents. In 2015, a labour law reform made it illegal for employers to discriminate against people due to their sexual orientation (Asamblea Nacional - República del Ecuador 2020). In June 2018, the Justice Ministry approved a new policy concerning the rights of LGBT people. The policy aims to guarantee and strengthen the population's rights concerning health, education, work, security, social protection and justice (Vicepresidencia de la República del Ecuador 2022).

In the Gender Inequality Index, Ecuador ranks 86th of 178 countries, whilst the gender gap in Internet use is low in Ecuador (34th out of 134 countries (Lanvin and Dutta 2021). The number of researchers in Ecuador is 59% male researchers compared to 41% female researchers (UNESCO R & R&D). The percentage of women scoring at Level 2 or 3 in problem-solving in technology-rich environments, however, is 4.4 in Ecuador, now underperforming in comparison to LAC (7.7%) and OECD (27.7) (OECD 2020). Likewise, women have limited access to decent and paid work, which causes an economic dependence on their partners or male relatives. The region also stands out for having the highest female entrepreneurship rates in the world, most notably Ecuador, where over one third of working-age women are involved in early-stage business activities (Statista Research Department 2020). Gender-based violence (GBV) is widespread in Ecuador, and indigenous women and girls are most affected. As an example of mitigation programs, The World Bank is financing an operation in Ecuador to improve livelihoods and support COVID-19 recovery for targeted Indigenous, Afro-Ecuadorians, and Montubian Peoples (IPAMs) to their vision and priorities for development. The Territorial Economic Empowerment for the Indigenous, Afro-Ecuadorians, and Montubian Peoples and Nationalities project plans to implement in early 2022.

3.6.4. Good governance and human rights

Ecuador is a presidential democracy with a unicameral parliament (Asamblea Nacional). The Freedom House Index 2021 assesses Ecuador as "partly free" (67/100) concerning global freedom, similar to the country's "partly free" Internet freedom (57/100). About e-government, Ecuador ranks below LAC and OECD averages in the E-Government Development Index (EGDI). Moreover, the country is among the underperformers in LAC for open government data policies in the OECD OURdata Index (OECD 2020). Ecuador is, however, developing its own Open Data Portal. An AI strategy has not yet been developed (Gómez Mont 2020). The primary strategy for digital transformation is:

- 2017-21 Toda Una Vida (A lifetime) national development plan (NDP) (OECD 2020)
- Política Ecuador Digital (Digital Ecuador Policy) (OECD 2020)
- Plan Nacional de Telecomunicaciones y Tecnologías de Información y Comunicación 2016–2021 (ITU 2018).
- Políticas Públicas del sector de las Telecomunicaciones y de la Sociedad de la Información 2017–2021 (ITU 2018).
- Plan de la Sociedad de la Información y del Conocimiento 2018-2021

The data of the Networked Readiness Index Ecuador suggest a high performance of Ecuador in the "ICT regulatory environment" (57th of 134 countries). In comparison, the regulatory

quality seems to be lagging (122nd of 134 countries). Ecuador has excellent E-commerce legislation - compared to the LAC region and worldwide (Networked Readiness Index Ecuador). Similarly, the perceived e-commerce safety and trust in online privacy are above LAC and OECD average.

The National Development Plan 2017-21 'Plan Nacional de Desarrollo 2017-2021-Toda una Vida' and Política Ecuador Digital (Digital Ecuador Policy) are the primary references for the development and digital transformation of the country. The NDP focuses on three main objectives: universal rights, economy at the service of society, and better institutions.

The Digital Ecuador Policy has three axes: connectivity, efficiency and security of information, and innovation and competitiveness. The first axis expands telecommunications service coverage and migrates to higher-speed networks. The second aims to guarantee citizen participation, democratic public services, simplified transactions, efficient public management, access to and use of open data and information and data security. The third aims to turn Ecuador into a model of innovation and competitiveness in the region through the development of smart cities, the digital transformation of firms, and a National Strategy for E-Commerce (OECD 2020).

On June 23rd, 2021, Ecuador published its first National Cybersecurity Policy. The Cybersecurity Policy "understands cybersecurity as the capacity of the State to protect people, their information assets and essential services against risks and hazards identified in cyberspace" (Politica de Ciberseguridad). This policy frames within the strategy of Ecuador Digital, which seeks to use information and communication technologies for the productive and social development of Ecuador.

The Cybersecurity Policy is built on seven pillars including Governance of cybersecurity: Protection of critical digital infrastructure and essential services, sovereignty and defence and culture and education of cybersecurity. Three Ministries, Telecommunications, Government and Foreign Relationships are directly responsible for developing the policies and objectives of the Cybersecurity Policy. A framework of action until the year 2023 exists in which the entities mentioned above must establish and fulfil the different goals.

The Ministry of Telecommunications and Information Society is developing strategic projects related to the three axes:

1. Cheaper Internet will increase telecommunications coverage and benefit poor households with preferential tariffs.
2. Digital Social Fingerprint will improve public services by providing information on an integrated digital platform. Ecuador is also working on a National Cybersecurity Strategy.
3. Including ICT in education curricula will help develop the computational thinking and digital skills needed to achieve innovation and competitiveness.

To mitigate the economic impact of the coronavirus (Covid-19), the government agreed with the telecommunications industry to increase the data provided to mobile service users and expand landline bandwidth at no extra cost to meet the growing demand for networks. In addition, the Ministry of Telecommunications also assigned a phone number for up-to-date pandemic information, including testing locations and telemedicine information (CAF (2020), The GovTech Index 2020: Unlocking the Potential of GovTech Ecosystems in Latin America, Spain and Portugal, Development Bank of Latin America, Caracas).

In terms of international cooperation, Ecuador received bilateral technical support from Brazil to implement terrestrial digital television, following the Japanese-Brazilian model. Ecuador and Germany shared their e-government experiences with El Salvador as a triangular cooperation project (OECD 2020). Ecuador also participated in the European Union-backed MAGIC project (2015-17) to streamline global scientific and academic collaboration. Programmes to boost knowledge sharing, training and access to e-infrastructure were among its main achievements. The country also forms part of the Cyber Resilience for Development, a European Union project designed to promote cyber-resilience and digital security to protect public and private enterprises across the globe. Ecuador places to position 119 out of 182 in the Global Cybersecurity Index (ITU 2021).

3.6.5. Data for Development

Ecuador's new data protection law establishes a national data protection authority, regulates cross-border data transfers, and provides citizens with the rights including the right to request access to, amend and delete their data.

This new regulation is Ecuador's first dedicated data protection law, and some of the critical areas outline as below:

- Data protection principles: The draft law recognises many familiar data protection principles, including transparency, purpose limitation, confidentiality, limited retention, accountability and data accuracy, and processor and controller obligations.
- Extraterritorial scope: Processors and controllers located outside Ecuador must comply with the new law if they offer goods and services to Ecuadorian residents. Nevertheless, it does not oblige processors and controllers to have any representative in the country that will comply with the different obligations recognised in the law.
- Data subject rights: The law brings with it new data subject requests, including the right to access, to rectification, to deletion, of cancellation, to portability, to object, not to be subject to a decision based solely on automated processing, and then to be forgotten.
- DPO requirements: Establishes controller and processor obligations for appointing a data protection officer, depending on the processed data, and requires all public authorities to have a DPO. The DPO will work with the data protection authority and be the point of contact for data subjects.
- Penalties: The law distinguishes minor and significant infringements, with sanctions ranging from 3% to 17% of an organisation's annual revenue from the previous year. The DPA decides on sanctions based on infringement severity and the relevant party's intention.

Ecuador has six data centres run by four organisations. Telconet has the most prominent presence with two facilities, and other organisations include Transnexa Ecuador, EdgeUno, and Telxius Cable. Cities in Ecuador with data centre facilities include Guayaquil, Quito, and Manta. None of Ecuador's facilities is carrier-neutral. None offer a host of individual servers, rack cabinets, and remote hands services (Data Center Journal 2022).

4. THEMATIC ACTION AREAS

After reviewing the state of digital transformation in each of the target countries of this study and the region, Chapter 4 will focus on the BMZ strategic action areas:

- Green development - climate and energy, the environment, and natural resources
- Peaceful and inclusive societies
- Training and sustainable growth for decent job

The objective of this chapter is to provide an in-depth assessment of the national contexts in the three core thematic areas subject to this study. It aligns desk research findings with insights gained from the multi-stakeholder workshops, interviews with national digital innovation and digital rights experts, as well as GIZ country office representatives. A general evaluation of each thematic focus area is followed by more in-depth assessments of each thematic focus area per country. The findings of the workshops and interviews are condensed in the country sections. A detailed assessment of activities, challenges and opportunities as identified by GIZ country staff can also be found in appendix 5.

4.1. Green Development - Climate and Energy, the Environment and Natural Resources

Digitalisation plays an increasingly central role in green development. On the one hand, there is the potential to digitalise energy supply processes or monitor huge areas for anything from erosion to land grabbing or illegal deforestation to soil humidity. On the other hand, there are challenges around digital technologies' resource-exhausting intensity, leading to staggering power consumption and increased demand for minerals. Unfortunately, the LAC context holds a **massive gap between who benefits from and those remaining out of digital transformation potential for green development**. In addition, the effects of climate change and human-driven harm disproportionately affects vulnerable and poor parts of the population.

The fact that the digital infrastructure in many LAC countries is at an early stage can also be considered an **opportunity to 'focus on environmental and sustainability criteria in the upcoming development of digital systems right from the start**. Supporting the sharing economy and the circular economy is one example of smart resource use' (GIZ 2021). However, in no other region is the topic of green development so intrinsically linked to human rights violations than in some LAC countries. Vigilance and life threats against environmental activists, journalists, and democratic institutions are omnipresent. They require **green growth and the support and protection of respective structures and civil society actors to be approached in one cast**.

Green Development, especially climate change and sustainable energy-related topics, play a central role in the LAC context. It is also of major attention for the BMZ and KfW. With the European Green Deal, the BMZ, together with other European member states, the European Commission and European Development banks, in various Team Europe Initiatives, is striving for a green development agenda with a global reach. The European commission has put forward a clear direction which prioritizes green and digital development as two of the most influential developments in Europe (Digitaleurope, 2021). The crucial interconnection between the

two areas has increasingly been recognised under the umbrella of twin transition. However, as unequal opportunities can pose a risk in the context of future twin transitioning. neglecting huge parts of society. Putting a decentralised and inclusive approach to twin transition will therefore be of central relevance, especially in the LAC context with its stark inequalities.

The GIZ is supporting many of these initiatives on behalf of the BMZ. Various actors, be it GIZ regional engagements via SICA and ECLAC or KfW programming on a local, national, and regional scale, are already deeply involved in various programmatic activities, from massive investments in creating and securing independent databases to dialogue with indigenous communities to large-scale power plant infrastructure projects. The study *Indigenous Lands in the Brazilian Amazon: carbon reserves and barriers to deforestation*, suggest that GIZ-supported indigenous lands in Brazil suffered a 2% average deforestation rate, while its surrounding areas reached up to 19% (Crisostomo et al. 2015). In Peru, around 2 million people plus 6,200 social institutions and 15,530 small and micro enterprises have gained access to energy services through EnDev/GIZ. The programme cooperated with five ministries, eight regional governments, 88 local governments and 15 companies (Moreno 2019).

The KfW has massively supported the Brazilian government in creating an already accessible Rural Properties National Land Registry, providing additional funds for analysis activities. Moreover, the KfW, in the framework of its agreement with the Brazilian government to reduce (illegal) deforestation, accesses and evaluates satellite data of the Brazilian National Institute for Space Research (INPE) alongside third party databases, such as data provided by Global Forest Watch, for data validation. The Brazilian Space Agency emerges as a central actor, alongside many private and non-profit actors. Within the EU LAC Digital Alliance framework, data centres providing Copernicus data are to be established in the region, starting with Panama. In Colombia, the national open data network of biodiversity SiB Colombia has been grown as part of creating the National Environmental System (Sina). Many databases exist, providing crucial information of and for the region. However, **data governance is a major topic to tackle to secure multiple data authorship as an essential foundation for trustable data**.

However, a central concern expressed in the civil society multi-stakeholder consultations was the **lack of data and information publicly available** to visualise environmental and climate change data, particularly in rural areas. Many actors express that the mere absence or non-accessibility of land registers, such as cadastres, restrict local actors from monitoring activities, as is the case in Colombia. Providing access to data is the foundation to creating more inclusive societies. Many NGOs are acting in data collection processes and visualisation, like Eco-Data/Instituto Igaraé or Tierra de Resistentes platforms, mapping environmental crimes in the Amazon and Human Rights Violations against indigenous people, respectively. Identifying and supporting these crucial local activities and providing mechanisms to **streamline the different data sources into one independent database**, accessible to all actors, can provide crucial value. Access to information from diverse data, ranging from the number of environmental activists murdered to pollution can create a spin-off effect of civil society actors and SME/s engaging in the creation of **needs-driven platforms to visualise and use data for locally relevant processes**. Furthermore, these data sources should be openly available to the public. Creating a **meaningful underlying financial support system** can provide the required means for local actors to engage in **trusted local partnerships** to ensure awareness of the existence of those data.

The LAC context requires maximum attention to grant a holistic green development process, due to geological challenges to deploying telecommunications infrastructure and its staggering inequalities in access to connectivity, training, and basic needs. Further combined with militarization, para-militarization, and a weak financial system. Different stakeholders can think about green development on diverse levels and through the lens of central capacities. **Working on sub-national levels, directly supporting local legislations and communities** proved centrally relevant, ranging from local empowerment for installing, creating, and maintaining renewable energy structures to promoting recycling and waste management in peripheries. But also, not all national governments consider green development equally high on their political agendas. Countries such as Colombia or Peru are lagging behind. This risks disproportional investments in countries that are already frontrunners on the topic, such as Brazil or Panama. The research also revealed a **mismatch between government policies and business needs.** Engaging in **legislation co-creation processes on local, national, and supranational levels** can be a massive opportunity for BMZ, given the already existing networks its executive partners hold and are involved.

It is essential to **foster strategic alliances and collaboration mechanisms in all the nation's regions** and move from there to a supranational level, guiding potential digitalisation responses to climate change. Whilst ECLAC and SICA already hold mechanisms for respective regional coordination. Direct attention is required to **foster an inclusive approach, connecting multiple stakeholders, especially the inclusion of indigenous communities and the local innovation scene**, with specific attention to existing divides and the need to integrate geographically remote actors. Building on already existing networks can play a central role.

This requires pushing for respective legislations on all levels that ensure further investments in data and digital transformation processes in the context of green development, **securing digital rights, ownership, open data and open access to information**. Better legislation must be seen as an integral element and not thought of in a vacuum. Leveraging on above-elaborated communities for an inclusive and thus sustainable policy framework would be fundamental.

4.1.1. Brazil

The GIZ already holds a significant project portfolio in the context of green development in Brazil. Examples are the project Climate Policy Brazil ("POMUC") in collaboration with the Ministry of the Environment (MMA), commissioned by BMU. The project also carries out individual activities in cooperation with the Ministério da Ciência, Tecnologia e Inovações (MCTI)), such as the development of a cadastre for payments of environmental services (PSA). Overall, the project portfolio comprises of various project activities related to the monitoring and increasing transparency of land distribution and land protection mechanisms.

Stakeholder workshops were conducted to learn about the focal topics from a grassroot stakeholder perspective. In the energy sector, workshop participants see **key opportunities in fostering green energy distribution startups**, like XPEnergy, Dispor and OneGrid. Attendants also stressed the importance of **giving local communities access to renewable energy equipment** of effortless usage and uncomplicated maintenance - photovoltaic cell, compact eolic generators, or mini-hydro power stations, like Hidreo. Workshop attendants also suggested **supporting waste collection and recycling startups,** involving communities in social

vulnerability, like Cataki, from the NGO PimpMyCarroça. At the same time, to promote these initiatives the technologies and best practices to optimise work, logistics and resources might be of extreme importance. Workshop attendants also suggested as an opportunity the **investment in startups promoting food autonomy**, sustainable and local food production, like Fazenda Futuro, Fruta Imperfeita, A Tal Da Castanha, Hakkuna and SERTA. At the same time, **support these initiatives to be trained** in specific benefits of technology to their business.

During an interview, Fernanda Castilho, general manager of the climate tech start-up Moss.Earth, advocated that **digitalisation plays a central role in the CO_2 compensation market**. “Blockchain technology can avoid fraud and corruption in the entire chain operation, making it more effective, secure, and faster while increasing the population's access to sustainable-related financial assets.” A successful initiative with easy support and financial engagement is the CO_2 compensation token Moss.earth, helping preserve forests in Brazil, Mexico, and Peru. Additionally, it creates incentives for landowners to protect rather than deforest while influencing the process of digitisation and monetising the environment. It further boosts private digital monitoring of each tokenized region's environmental health. The CO_2 compensation market develops an economic chain that transposes the rural and urban. Once implemented, blockchain-based technology can expand to the surrounding business and startup ecosystem. It can foster product traceability and delivery logistics for agribusiness, agroecological, and small farming (Ceulemans et al. 2020). Ongoing initiatives exist and can be fostered in the private sector, like the Paripassu or the traceability system for agro-industrial products and processes in the sugar and ethanol production chain project, under development by the governmental agro research company Embrapa. Local communities needing to collect preservation effort data will magnify the search for solutions (like the Pecuaria Transparente initiative) while supporting the regional economy, co-hosting populations making their living from sustainable extractivism (like Instituto Beraca) or eco-tourism activities. Furthermore, when **combined with AI systems, blockchain can create or foster the many existing seed banks to protect, preserve, manage, and distribute species**. Blockchain-based technology may considerably impact the planet's life preservation, contributing to conservation and reforestation while having a positive economic and social impact on local contexts. Whilst secure information and knowledge exchange networks have also been identified as trend topics by GIZ country staff, aligning those opportunities with a concrete green development agenda would be an important next step. Whilst currently 6, and soon 8, research centres on the topic of AI are funded by government, a focus on diversification to strive for data autonomy and open, inclusive access to data would be of importance. As interviews with local GIZ staff highlighted, biggest challenges in leveraging those innovation potentials are rooted in the current government. However, increasing concentration on federal state collaborations has been highlighted as great potential.

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS (Climate and Energy)** • Decreasing costs for personal solar energy production and storage equipment • Growing demand for available environmental and energy management data sources to support the decision-making process and public information • Data about energy production, consumption, and carbon emissions are available but not easily reachable **STRENGTHS (Environment and Natural Resources)** • Growing public demand for available environmental data management systems • Millennials (49%) and Z generation (26.1%) groups are more concerned about protecting the environment.	**WEAKNESSES (Climate and Energy)** • The deforestation pace is growing to a 30 years historical high, and it is accountable for the acceleration in the carbon emission rates. • The investment chain in Brazil is precarious. National funds that foster innovation in tech and renewable energy are waning. • There are substantial economic inequalities between metropolitan areas and small towns in central Brazil and the countryside, which lessen opportunities for smaller cities. • The current government is sacking those who monitor deforestation in the Amazon rainforest. It also spreads misinformation about climate change while supporting illegal mining and deforestation. **WEAKNESSES (Environment and Natural Resources)** • The federal government is disassembling environmental and pro-indigenous policies, decreasing investment in ecological monitoring tools, amplifying the absence of governmental supervision while supporting deforestation. • Threats against activists and murdering of environmental activists (Position 4 in a Global Witness global index), life threats to territory defenders, journalists, democratic institutions • The monumental distance between most cities and the forests and natural areas creates a detachment between the population and the natural resources, resulting in very little awareness about the environmental issue, and a lack of social control over the topic. • There are few data sources for environmental monitoring and a lack of public platforms to visualise collected data. With reliable information missing, subjective opinions drive public and private debate about climate change and the environment. • High rates of deforestation due to agribusiness, illegal wood commerce and illegal mining creates immense territorial pressure on indigenous communities, small producers and extractive reserves.
External origin [attributes of the	**OPPORTUNITIES (Climate and Energy)** • Small but growing investments in biogas production from waste powered biomass • Digitalisation brings transparency and security to the carbon market - bruised by past frauds.	**THREATS (Climate and Energy)** • Investments formerly directed to eolic and photovoltaic energetic systems moved to oil extraction

	For instance, blockchain adds an extra layer of protection to the carbon credit while fractionating the asset, democratising it. As a result, the voluntary carbon asset market will exceed 1 billion dollars traded in 2021, and the market can grow up to 15 times by 2030. **OPPORTUNITIES (Environment and Natural Resources)** • Use the available data on waste management, pollution, and deforestation (like the Panorama de Resíduos Sólidos or Instituto Nacional de Pesquisas Espaciais-INEPE) to create accessible data visualisation platforms. • Legislative instruments that enable local support for the maintenance of the forest already exist in the country. • There are no investments in the private sector for monitoring environmental data.	• Increasing oil and coal imports in the last three years **THREATS (Environment and Natural Resources)** • The federal government is disassembling environmental and pro-indigenous policies, decreasing existing environmental protection framework both in the supreme court and senate of Brazil • Brazil recorded the most deforestation ever in the Amazon rainforest by January 2021, with rising tendencies

4.1.2. Colombia

Colombia is privileged to be one of the world's most biodiverse countries, home to 63,000 species, second only to neighbouring Brazil. The governments of Colombia have acted on this privilege by creating 59 protected natural parks across the country. However, the historical lack of state presence coupled with armed actors in Colombia makes environmental resources management exceptionally challenging. In addition, most of the renewable energy produced is exported or used for green hydrogen production than for Colombians themselves, growing the dependence on coal and petrol. A malfunctioning and neglected cadastral system allow bad actors that can be landowners like cattle ranchers and agribusiness owners to occupy land (Ministerio Medio Ambiente) that is sometimes part of protected areas because there is clear way to state where a protected area or state owned area begins and private one ends like is happening for example de Cienaga Grande in Santa Marta (Redacción ELHERALDO.CO).

2015). Workshop participants suggested involving indigenous communities in the design and implementation of conservation plans, also training these communities in control and monitoring through crowdsourced means, empowering the de facto stewards of the land to improve monitoring and management of natural resources. By involving people with aligned interests, one can bridge the absence of the state and have more effective conservation and monitoring efforts against original population displacement. Organisations that could be supported to achieve this goal include conservation and indigenous focused SiB Colombia, Cuidadoras de la Amazonia, OPIAC.

Despite an overall progressive legal framework in Colombia since 1991, that includes the state's and private citizens' duty to protect the environment and inalienable rights of natural parks (UPME), there are missing incentives. Workshop participants have suggested an introduction of "green stamps" or "conservation credits" to benefit those participating in desirable outcomes through fiscal or societal perks. Additionally, legislation that encourages regenerative development would be an extra step needed to enable proper behaviour rather than having largely impunity for wrong conduct. In her interview, Margarita Pacheco of Fundacion

Natura agrees with this approach.Examples of projects to support include BIOFIN, EcoPatnersBank, Instituto Humboldt. Due to corruption and lack of state presence Colombia's environment suffers from illegal mining and deforestation pollution. Workshop participants suggested the need for technological transfer and training in sustainable mining and farming practices, while Margarita Pacheco, during the interview suggested a project by Fica Amazonia organisations such as Asociación de Ex-mineros de Tradición con Conciencia Ambiental and Fundación Natura.

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS (Climate and Energy)** • Small but growing investments in Wind Energy and Green Hydrogen • Increase in investment in PCH and photovoltaic systems additional to massive Hydropower stations like Hidroituango and El Quimbo • Progressive legislation (Law No. 2099 of 2021) establishes green and blue hydrogen as part of their non-conventional renewable energy sources NCRS **STRENGTHS (Environment and Natural Resources)** • Strong legislation on nature conservation and protection with partners as the Instituto Humboldt • Developed digital monitoring tools and crowdsourcing with help of civil society for biodiversity management with a good overview - SiB Colombia and Sia Colombia • Top Universities Los Andes running National Environmental Forum	**WEAKNESSES (Climate and Energy)** • Persistent attempts into introducing fracking to increase petrol production despite promises by president to stand against this • Large dependence on petrol, renewable energy and coal as export commodities • Enduring and growing of deforestation mainly in the South of the Country • Large hydropower projects in Caquetá region, which threaten a variety of ecosystems and its inhabitants **WEAKNESSES (Environment and Natural Resources** • Lack of inspection, monitoring, and state control over natural parks • Uncontrolled and growing deforestation (70 percent concentrated in five departments (Meta, Caquetá, Guaviare, Putumayo and Antioquia) Increased because of land grabbing for pasture and agricultural activities in prohibited area, illegal mining, illicit roads, and timber traffic • Incompleteness of the national cadastral system with more than half of Colombia's area not being registered or updated allows environmental crime, illegal land appropriation, and displacement
External origin [attributes of the environment]	**OPPORTUNITIES (Climate and Energy)** • Increased focus on decarbonization in elections for next government • Legislation for blue and green hydrogen production (Law 2099 2021) can increase production and investment in the field **OPPORTUNITIES (Environment and Natural Resources)** • Multi-purpose cadastre project by. president Duque has expanded information which can take important steps towards land reform, helping farmers with opportunities and conservationists with more information • Increased access to open Biodiversity data can open opportunities for conscious travel, product development and conservation	**THREATS (Climate and Energy)** • Armed conflict escalating in a growing number of rural areas, Competition between armed groups, criminals and the military in certain areas seems likely to worsen in 2022 • Localised violence in enclaves found along the Pacific coast, near Colombia's borders with Venezuela and Ecuador and close to the Atlantic **THREATS (Environment and Natural Resources)** • Land grabbing of government owned land is widespread practice by landowners and armed groups· • Threats against activists and murdering killing of environmental activists (Position 1 in a Global Witness global index)

4.1.3. Mexico

In Mexico, only 14% of e-waste is recycled, requiring increasing awareness on the negative impact. As the workshop revealed, lacking awareness creation is one shortcoming leading to a lack of attention on the subject matter, and needs to be addressed through respective advocacy activities. **Developing a circular economy process** can foster local tech companies, providing access to reusable devices for low-income populations. In addition, due to Mexico's many different climatic zones, workshop attendants suggested **locating specific industries in the most beneficial climatic zones** to save on cooling and heating. E-waste solutions and EWaste Groups could be partners for such initiatives.

Participants also suggested **investing in IoT, machine learning and monitoring sensors to increase transparency and information access on conservation and climate change**, sharing data between national biodiversity services and the agriculture industry. It would enable an efficient transition into agroecological farming and transparency to the public. The Mexican Government and UAEMEX University are building a pilot program, and SGS provides related services for farming. While Ecosur and UNAM focus on sustainability, Huawei Conagua proposed new requirements for the modernization of Mexico's water conservancy efforts, with five particular areas of emphasis: Water conservancy construction, The sustainable development of water resources, Flood and drought responses, Hydrological service improvement, The improvement of water governance. In collaboration with SMN, CONAGUA also launched a suite of digital service applications, such as the Conagua Clima app, which informs about local weather conditions and forecasts. Participants also proposed support to open seeds programs such as Bioleft, focusing on farmers' food security and financial opportunities.

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS (Climate and Energy)** • Government efforts in having intelligent water management systems - Huawei Conagua • Several projects increasing nonmotorized transport plans and access to clean public transport such as government sponsored Programa Transporte Limpio (PTL) **STRENGTHS (Environment and Natural Resources)** • Development since 2010 of different efforts in building payment for ecosystem services by agencies and programs like Pago por Servicios Ambientales (PSA), ProArbol, CONAFOR • Availability of Governmental Environmental Data (https://datos.gob.mx/) • Protected Natural Areas network in Mexico aims to preserve roughly 70% of representative natural habitats across the country. Mexican conservationists aimed to protect vulnerable habitats and preserve the integrity of biodiversity through increasing the number of	**WEAKNESSES (Climate and Energy)** • Open Data on Bioindicators for Climate Change is missing or is of low quality • In 2022, like previous years, Mexico is likely to experience Power Outages due to lack of energy supply and dependence on US natural gas production **WEAKNESSES (Environment and Natural Resources** • Ongoing violence against environmental activists • Mining legislation does not focus on protection of biodiversity and communities • No equative access to water

External origin [attributes of the environment]	natural reserves, namely terrestrial priority regions, terrestrial priority sites, and priority restoration	
	OPPORTUNITIES (Climate and Energy) • Diverse natural climatic zones can help save energy e.g., for server farms • Energy nationalism program can improve grid health • Climate Change Law states that Mexico should reach 35% renewable energy by 2024. It is likely to reach 31%, thanks to the 2013 law liberalising energy markets **OPPORTUNITIES (Environment and Natural Resources)** • First pilot programmes to foster agroecological farming exist alongside services that can be promoted further • Private expert companies have put forward priority areas for resource conservation	**THREATS (Climate and Energy)** • Mexican law does not obligate mining companies to submit and approve environmental audits, leaving them without supervision and surveillance programs for mining operations, and leads to human rights violations between companies and local communities • Energy nationalism program promoted by actual government can alienate many private investors and companies and foster inequalities by hiking energy prices, curtailing investment, and limiting future manufacturing and exports jobs **THREATS (Environment and Natural Resources)** • Seed privatisation and dependency • Organised crime has embraced illegal mining as an additional source of income with around 9% of gold coming from illegal production. • Threats against activists and killing of environmental activists (rank 2 in Global Witness Index)

4.1.4. Peru

Workshop attendants believe all political parties should put caring for the environment high on their agenda's, having the ecological theme as a flag. They believe in **creating alliances between public and private sectors,** including relevant international stakeholders, to develop a holistic national strategic plan. The state should have an active and preventive role for the care of nature, committed to protect the environment, **guaranteeing transparency and citizen participation in all processes**. This plan would support companies that implement **digital environmental monitoring systems**. Such a plan, workshop participants argued, could empower environmental governmental agencies of supervision and control, such as OEFA, SENAHMI or SERNAMP, through a **public-private partnership**, and promote the development of an Integrated Environmental Information Real-Time Data System to guide decision-making processes. Workshop attendants suggested that constant measurement of the environment results in the improvement of the ecosystem, helping generate future models based on the information collected to better protect the environment. Some initiatives already monitor water and air quality, like PukkaSkay and QairaDrones, and offer **training on environmental monitoring**, like DigitalTraining in Peru. Such initiatives could be fostered to lead such action plans together with governmental entities. Daniel Caballero reinforced this during his interview: "A way to take care of the water is to monitor the quality, without that we will not be able to create policies, to find the exact problems and be aware that the protection is working. And protecting the water, you protect all the ecosystems around, the animals and the plants."

Workshop participants believe the government should also **support sustainable ways of exploring instead of exploiting natural resources**, i.e. adventure or ecological tourism or

sustainable extractivism. Such a holistic approach should include universities and institutes **adding care for the environment and sustainability into the national curricula**, as well as other forms of training and raising awareness about environmental care. Environmental training should go **from passive to active learning** based on **digital technologies projects focused on local solutions**. University courses, workshop participants believe, could create the basis to **include environmental technological care in the primary school curriculum**. With this, in the near future, families may also have their own tools to measure and publicly share environmental data. Participants also stressed the **need for international exchange learning programs** on the topic, with joint activities between Latin American countries to promote environmental rights and legislation training. Participants also believe this plan may support NGOs dealing with sustainable activities, such as adventure and sustainable tourism and extractivist practices. PeruLab, from oneseed innovation labs is an example on the ground. When implemented, successful models can be replicated in other country regions. Workshop participants also believe Peru shall have **better environmental p**olicies with **sanctions against pollution and environmental crimes**.

In the energy sector, participants believe GIZ could **support technology exchange programs between German enterprises in Peru** to improve the country's telecommunication systems and electric power grid. In their opinion, this can boost renewable energy sources for citizens. **Gender equality in the energy sector** is another topic that requires attention: "There are many environmental companies in Peru which are male-only. Some parts of the government are trying to bring equality to the table. Still, the political crises made it hard for women to participate in the professional market.", said Daniel Caballero during an interview.

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS (Climate and Energy)** • The increasing annual rate in energy production capacity exceeds the rate of growth of maximum demand • Growing societal awareness on clean energy advantages and acceptance of renewable energy projects • Policymakers are exploring promising methods of securing capital to develop renewable energy projects. For instance, in May 2019, Peru's Development Finance Corporation (COFIDE) issued a $30.3m green bond on the Lima Stock Exchange, which carried a three-year maturity and an interest rate of 5.1% **STRENGTHS (Environment and Natural Resources)** • a young scene of startups measuring the quality of the air and the waters with AI • Most of population understand the value and importance of local culture for the maintenance of the environment	**WEAKNESSES (Climate and Energy)** • The growth of wind and solar capabilities has slowed down significantly, and renewables still account for a small share of the total energy mix • The government implements policy frameworks, but businesses do not have capacities to benefit / act upon them • For most of the population, education and training is a privilege, not a right - Many people can't go through college and technical training • Few technological resources in rural areas • Internet connection and access to education concentrated in big cities • Very low digitalisation rate **WEAKNESSES (Environment and Natural Resources** • Environment protection is not on the political agenda of most parties • State: Bureaucracy takes a long time, there are many processes and many levels of approval to achieve changes

External origin [attributes of the environment]		• Conflicts of interest between state entities, the State and the private sector and among the private sector • Lack of transparency on public policies, investments, and regulations • Bad political relationship between old and new administrations for digital transformation
	OPPORTUNITIES (Climate and Energy) • Governments are initiating to strive for a more inclusive energy sector • Local and international energy companies represented in the country which can create mutual learning and support mechanisms **OPPORTUNITIES (Environment and Natural Resources)** • Existing public environmental protection agencies exist and can benefit from private sector support mechanisms • Various civic environmental monitoring initiatives already exists whose lessons learned can be harvested and built upon	**THREATS (Climate and Energy)** • Peru is still obliged to undertake auction bidding rounds for renewable energy projects, leaving it at a competitive disadvantage in enticing capital and undercutting the viability of local renewables businesse • Peru's Politica Nacional de Ambiente (PNA) focuses more on deterioration of ecosystem services and less on climate change leading to a lack of urgency **THREATS (Environment and Natural Resources)** • If glaciers continue to shrink and the supply gap increases, this will lead to extreme water shortages • Inequality and poverty are high, especially among rural and indigenous populations, whose food security depends upon climate conditions • Peru is still a long way from having a comprehensive national forest strategy. There are still significant gaps concerning establishing statutory environmental standards, without a viable concept for formalising the forestry sector and effectively fighting deforestation

4.1.5. Ecuador

During the Ecuador workshop, grassroots practitioners and social innovation startups managers emphasised the crucial role of digitalisation in helping protect life on Earth. They see the benefits of **investing in programs to support public data sensors, satellites, drone technologies and visualisation platforms and devices**. Such tools could help monitor threatened and endangered flora and fauna species from the Amazon rainforest and Galapagos. Data visualisation platforms should also **present data from cities and towns**, like air and water quality. Such a **combined data visualisation system** would allow monitoring and supervision of the environment and possible crimes against it.

Despite receiving international support in the form of training and financing, workshop participants believe the Amazonian region of Ecuador's safety is not guaranteed due to proper management and a high discontinuity in political, economic, and administrative factors. Nevertheless, workshop participants believe **supporting e-government and digital monitoring initiatives as well as minimising costs and bureaucracy for sustainable startups** can foster

new enterprises dedicated to protecting the environment and life on Earth. Such businesses would also benefit from **better legal frameworks for forest protection**.

The workshop participants also suggested **enabling digital training and fostering STEAM knowledge** to develop new social tools and technological devices to monitor conservation, like public Ecological Resource Management platforms. Participants advocate for including a **natural science online discipline** in the national curriculum for all the students.

Participants demand other **learning opportunities such as Massive Educational Online Platforms, as well as Events and Conferences**, such as round tables between private companies, governments and NGOs, **about digital solutions to protect the environment** to share knowledge and spark public debate and awareness. There is a **demand for Open Source and IoT training**, Workshop participants also believe GIZ should **support fair digital rights legislation** in Ecuador due to the controversial existing digital legislation in the country. It would also improve the impact of the work of environmentalists and protect their lives.

Ecuador claims to have over 93% of non-fossil fuels, mainly hydropower (Bloomberg). Ecuador's Ministry of Energy has updated their "Plan Maestro de Electricidad" to include an increase by 1000MW to their renewable energy sector including solar, aeolic and PCH, further reducing dependence on fossil fuels (Energia Estrategica).

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS (Climate and Energy)** • Over 40% of energy comes from hydropower • Government has plans to use private investment to increase their renewable energy portfolio by 1000MW substantially till 2025 **STRENGTHS (Environment and Natural Resources)** • Tradition of conservation - new environmental park in Galapagos • Rising of companies that have alternative protein sources from insects	**WEAKNESSES (Climate and Energy)** • Lack of knowledge in most of the population about green energies and their benefits • Lack of engineering capacity and training programs puts green energy infrastructure at risk or at dependence from foreign talent • Lack of fiscal middle and long-term government incentives for green energy production to the general population • Lack of environmental data management and visualisation tool, presenting energy consumption per location and CO2 production **WEAKNESSES (Environment and Natural Resources)** • Lack of training and knowledge about technology and the environment, including university programs focused on technologies for the environment • Lack of incentives and funds for projects in green tech combined with a lack of knowledge of entrepreneurs on how to apply to international funds and global incentives • Lack of connectivity outside urban area • Limited legal frameworks for forest protection and controversial digital legislation put activists at risk

External origin [attributes of the environment]		
	OPPORTUNITIES (Climate and Energy) • The Andean region provides supportive ground for the development of a regional, decentralised power grid **OPPORTUNITIES (Environment and Natural Resources)** • Possibility to digitally analyse the environment: vegetation lost and endangered species monitoring • Existing legal frameworks can serve as a point of departure for further approval and to hold stakeholders to account	**THREATS (Climate and Energy)** • Dependence on Hydropower in the region can be a vulnerability in times of drought • Solar panels and the necessary battery infrastructure are unaffordable for most people **THREATS (Environment and Natural Resources)** • Lack of supplies to develop hardware and applications • For its size, Ecuador has the highest annual deforestation rate of any country in the Western Hemisphere • In addition to oil exploitation, Ecuador is facing the expansion of large-scale mining operations in high-biodiversity areas with large numbers of endemic species and in indigenous territories and threatening environmental activists • The country's ongoing economic crisis and a dependence on fossil fuels will likely continue to fuel clashes with communities protecting their territories

4.2. Peaceful and Inclusive Societies

Social and economic inequalities remain a massive challenge in the LAC region. This ranges from drastic divides regarding the access to digital infrastructure and education to exclusions regarding gender and discrimination against indigenous communities. In addition, numerous countries in the region are still challenged by **various forms of conflicts and different forms of organised and unorganised crime,** including high rates of youth criminality.

Given these stark inequalities, digital transformation is prone to benefit certain parts of the population more than others and reinforce patterns of power on local, national, and regional levels. This is a crucial aspect when **considering which power dynamics are reflected in the creation of digital infrastructure, services, and training and job opportunities.**

To ensure that digital transformations will not reinforce existing forms of exclusion and conflict dynamics, governments and development organisations need to **ensure digital technologies are employed to foster peaceful and inclusive societies**, e.g. digital solutions that enable access to educational and health services. However, as the country analyses of this study have shown, the mere provision of e-learning programs will not lead to equal accessibility. In many contexts, such as the Peruvian Amazon and Andean areas, classes during the pandemic were held via **radio and SMS due to non-accessibility of the internet**, alongside a **lack of capacities among teachers** to make use of it. This example highlights the need to pay careful attention to **not confuse digital availability with meaningful and context relevant digital accessibility.** An inclusive and peaceful societies approach that supports digital transformation must go beyond the creation of digital infrastructure access by carefully considering which societal groups are involved in the shaping of digital agendas in regard to policy,

education, infrastructure, and business. In the LAC context, this requires not only 'consulting' different communities, such as indigenous communities, but bringing them to the actual drawing table on local, national, and regional levels. An inclusive and peacebuilding approach also requires implementing concepts around **data sovereignty** - open access to data, data ownership and data governance. As Avila (2021) highlighted in a report for the Heinrich Boell Foundation, many countries in the LAC region, including the five countries subject to this study, are signatories to the Indigenous and Tribal Peoples Convention (ILO 1989) which requires the involvement of indigenous peoples in decision making.

As Hofstetter explains in her research 'Digital Technologies, Peacebuilding and Civil Society' for the Institute for Development and Peace (Hofstetter 2021), digital transformation is altering conflict dynamics and peacebuilding practices. On the one hand, **digital authoritarianism, cyberattacks and infringements on digital infrastructures** have opened an entire new battlefield. On the other hand, digital means can be applied in conflict prevention, transformation, and reconciliation processes. The greatest potential is seen in the scope to which digital technologies can empower affected communities, through the provision of means to **self-organise and making peacebuilding processes more inclusive**.

For those opportunities to be leveraged, patterns of exclusion must be addressed. Those patterns, again, do not exclusively relate to aspects such as connectivity. For instance, the structural exclusion of women in the business sector, including environmental companies, remains a widespread issue, as was expressed in the Peruvian workshop, but holds true for many countries in the LAC region. In Colombia, for instance, many rural areas are protected by armed forces, ranging from guerrilla dissidents to paramilitaries or other groups, making them inaccessible. These situations also demonstrate how **peacebuilding and inclusive societies are intrinsically linked to green development.** Natural areas and forests that used to be controlled or are under control of guerrilla groups are difficult to access for e.g., critical data collection for preservation and other activities.

Another limiting factor to more inclusion is said to be the mere **lack of communication about existing initiatives,** for instance in the Ecuadorian context, or **about digital rights, digital fraud**, etc., as mentioned in the Peruvian context.

Those dynamics, combined with **very limited access to the internet in rural areas** in all countries examined for this study, limit the digital transformation potentials, and require a more complex approach to be addressed. **Inclusive access to political participation, education, business opportunities and investment capital require a parallel approach of building respective infrastructure**, making access affordable for all, and providing context-relevant tools and mechanisms of inclusive participation in society and economy.

4.2.1. Colombia

Colombia has had a history of violence and exclusion, gaining most international attention by narcotraffic in the 1990s. Since the 2000s, the country has thoroughly changed to be safer and more prosperous. Investment in digital education, training and inclusion is crucial to an ongoing peace process. The workshop participants emphasized that a **demand-driven teaching focus aligned with the fostering of employment opportunities in digitised industries** is the most critical improving factor. Kit Sin from Ruta N in Medellin shared that Colombia has minimal skills in creating products for exports and suggested creating or supporting a course on packaging and localisation of products like coffee or spices, like Curcuma, to sell as

Amazon products to countries such as China or Europe. The trading of Colombian products in the most straightforward ways for other countries to package and sell limits Colombia's potential revenue and job creation. Potential partners in the digitalisation of the process would include Ruta N themselves, the state agency ProColombia and innovation promoting agencies like Chambers of Commerce and Innpulsa.

With a more regional perspective, Philipp Schönrock from CEPEI, who has worked in several LAC countries, brought forward a great potential of **investing in provincial laws of digital tribulation standards and logistics** to increase regional online trade fostering entrepreneurship substantially. Stefany from JuanFe foundation suggested **investing in dual study systems or creating new demand-driven education courses** to make employment more likely. Additionally, she proposed supporting certification courses for empirical knowledge of different kinds for people with less access to education in the countryside and indigenous communities by SENA.

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS** • Broad reach of SENA education system • Empirical qualifications are starting to be recognized by official institutions thus increasing employability without extra study • Increased in payment systems and online commerce through pandemic • Postgraduate programs in Computer Science and Digital Business are increasing • DANE provides good quality Data	**WEAKNESSES** • Millions of ha of unused land are not accessible to farmers, which leads to increased urbanisation • The Ministry of Telecommunications has very unclear programs, unlikely to have a significant impact • Little civic awareness on benefits of digitization, perceiving it as a threat rather than an opportunity • Considerable gaps in connectivity throughout the countryside, central Colombia and metropolitan areas • The legal framework around taxation on digital goods is unclear
External origin [attributes of the environment]	**OPPORTUNITIES** • Multi-purpose cadastral initiative, part of the peace agreement, can improve land distribution and improve wealth distribution amongst farmer	**THREATS** • Increase in armed actors dissidents of disarmed guerrillas and paramilitaries creating small localised militias • Further unplanned urbanisation can lead to further inequality and further deforestation

4.2.2. Ecuador

Workshop participants from Ecuador believe training and education have a crucial role in leading a more inclusive and peaceful society. Despite the identified need to **implement curricula**

involving technology, entrepreneurship, and the new sustainable economy in public schools, the expansion of **informal education** organisations and platforms has shown to play a significant role in closing the structural divides in the country. Carmen de la Cerda, from BuenTrip Ventures, emphasized the lack of status in engineering in Ecuadorian society which can be addressed through systematic advocacy efforts to promote STEM education and the newly arising job market the field offers.

A regional fund would provide a relevant means to subsidise **open educational formats, such as MOOCs and training workshops** run by NGOs, open universities, and other educational spaces with hybrid activities (remote, face-to-face). For these educational frameworks to address the structural patterns of exclusion weighting heavy in the country, particular attention on digital literacy educational formats being accessible to and applicable by indigenous communities, women, and afro-Ecuadorian communities, as well as persons with disabilities. Alongside respective curricula, schools and public universities also require access to technological devices and means to secure their infrastructure.

The workshop participants highlighted **international exchange programs between different industries and academies** to stir the digitisation process toward a more inclusive society and to set actions focused on **technological and digital ventures**, like Fonquito 3000.

The Startup Ecosystem in Ecuador is still quite small, but growing also in fintech, proptech and healthtech (BuenTrip Hub 2021). Fostering growth and dynamic expansion, responding to concrete needs in different regions of the country, can be achieved by **supporting existing startups to expand** their activities and provide a scheme to grow new start-ups. Serving as role models and gateways to capital, in line with the Colombian success case "Rappi Mafia", the provision of **grants that focus on smaller batches of startups** to grow and internationalise, could build the foundation for such growth. Supporting events and publications such as Opportunity Summit and the Radar Tech Startup can foster credibility and access to the ecosystem. Although there are investors in Ecuador, they are not tech startup savvy. This situation suggests the need to **grow capital access** through the creation of training and incentives for financial actors, High Net Worth individuals and existing investors on how to invest in tech startups in a founder friendly way, as in the case of BuenTrip Ventures. This would boost startup creation and open the possibility to foreign investment in a more mature market. A third requirement relates to the need for a **supportive legal and incentive framework** to foster investment in digital entrepreneurs and startups so that companies can create job opportunities in the digital economy.

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS** • high concentration of urban youth online, mainly using social networks, which amplifies possibilities of debates and contributes to acquiring broader sources of information • The Country faces a critical moment to renew its national educational curriculum aiming to support new century jobs creation.	**WEAKNESSES** • The growth of poverty, the lack of good public security policies, the lack of modern work legislation, and the issues to fulfil the existing laws result in few technological entrepreneurs in the country • When they exist, they mainly focus on the national market • Lack of Internet access in remote areas, combined with the lack of devices for connection, also results in little use of technology in public and private education, making it difficult to access research resources from international institutions
External origin [attributes of the environment]	**OPPORTUNITIES** • Possibility to amplify connectivity infrastructure to foster education in digital technologies and remote working activities • Locally handcrafted products can reach global markets through e-commerce and intelligent logistics	**THREATS** • Lack of access to hardware and its components due to high import taxes and scarce market • The lack of new jobs in a connected economy expands the number of specialised professionals migrating to economically more viable countries

4.2.3. Peru

For digitalisation to play an essential role in leading to a more peaceful and inclusive society, the workshop outcomes emphasised the need for government investment in **connectivity and digital literacy training programs**. GIZ can support programs connected to the National Plan of Digital Literacy on a national level, or foment initiatives like Alfabetización Digital, promoted by Colegio de Ingenieros del Perú. The need to **regulate national telecommunications companies** in order to provide services to all citizens, including providing access to rural areas, shows to be a fundamental step for all society to benefit from the opportunities digitalisation can hold. Policies implementation, supervision, and evaluation in the Telecommunications Investment Fund (FITEL), which provides subsidies for telecom services in rural areas and other places that provide marginal returns for private providers, are crucial to expanding existing connectivity infrastructure.

Further, participants suggest increasing the active role of organisations such La Coordinadora Nacional de Derechos Humanos (CNDDHH), that historically promote knowledge for a peaceful and inclusive societies, in the digital literacy and training process. Investing in training to empower communities with soft skills (like communication, crisis management, leadership, empathy, heritage and culture, emotional intelligence, problem-solving, solutions management, teamwork, project management and fundraising) leads to more equity in societies and more respect for others. Institutions working in soft skills training to the digital economy in Peru

include Maker Space Perú and MakerLAb Perú. Promoting, funding, and connecting such actors can lead to great results in the search for a more inclusive society in the country.

Knowledge in digital rights and digital media production leads to teachers' empowerment and the improvement of digital education in the classroom. To structurally roll out such capacity building mechanisms, the development of respective training of trainer programs will be of central importance. As the country's **Educational Technologies National Strategy 2016-2019 requires renewal** for the upcoming five-year period, this bears a chance to integrate such crucial measures. In this context digital rights organisations like Derechos Digitales could be connected to teacher's training programmes and curricula development on a national level. **Stimulating more innovation potential through STEM education** is also seen as relevant, as is educating entrepreneurs in ethical issues to build inclusive digital societies: "Up to now, businesses just think about digitalisation for online marketing and website building. There is a lot of marketing, very little innovation", said Daniel Caballero, founder of the Peruvian start-up PuccaSky, during the interview. Workshop participants also noted that gender equality programmes, pushed back by the current political crisis, require support and attention and programmes that existed before the current political situation should be reinstalled, including competitions only for women or tax-exemption for companies with gender balance and online coding courses like Laboratoria.

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS** • Digital startups are emerging, forced by the pandemic and the need for online communication • More access to information for young people are changing some paternal society paradigms • Some municipalities develop courses in entrepreneurship, like innovation competitions. But there is no enacted agenda of digital innovation, just product innovation • Programs to promote entrepreneurship exist, but not specifically focused on digitalisation	**WEAKNESSES** • There are few technological resources in the countryside • The same tax rules apply to startups and all other income-generating activities in Peru. As a result, most new organisations ignore formality due to the complexity of the application procedures. Formalisation denotes registration payment and tax over revenues • Lack of knowledge of entrepreneurs on how to maintain and grow their businesses • Lack of soft skills like leadership skills, management skills, collaborative working • Lack of investment in connectivity infrastructure outside big cities • Huge unbalance of gender in the workplace • No legislation on citizens' digital data rights • The high amount of online fraud cases and the lack of mechanisms to protect digital transactions and data evades confidence from the population in going digital • Many people have no information about the digitisation process; people do not know the tools exist, do not know how to use them, and do not know how to create them • The difference between rural and urban areas is immense. For example, accessing the Internet in rural areas is challenging because the connectivity infrastructure is not good. And without

External origin [attributes of the environment]		
		connectivity, education is challenging, as well as it to take part in the digital economy.
	OPPORTUNITIES • National and local programs on digital literacy, offline and face-to-face, promoted by governments or the private sector, already exist • The Peruvian state, and especially the Ministry of Development and Social Inclusion, is committed to working for the wellbeing of all, with particular emphasis on the most vulnerable, and a potential development partner	**THREATS** • Bad retention of Peruvian intellectual talents due to a more significant number of scholarship calls from abroad • Political instability makes it hard for women to participate in the professional market.

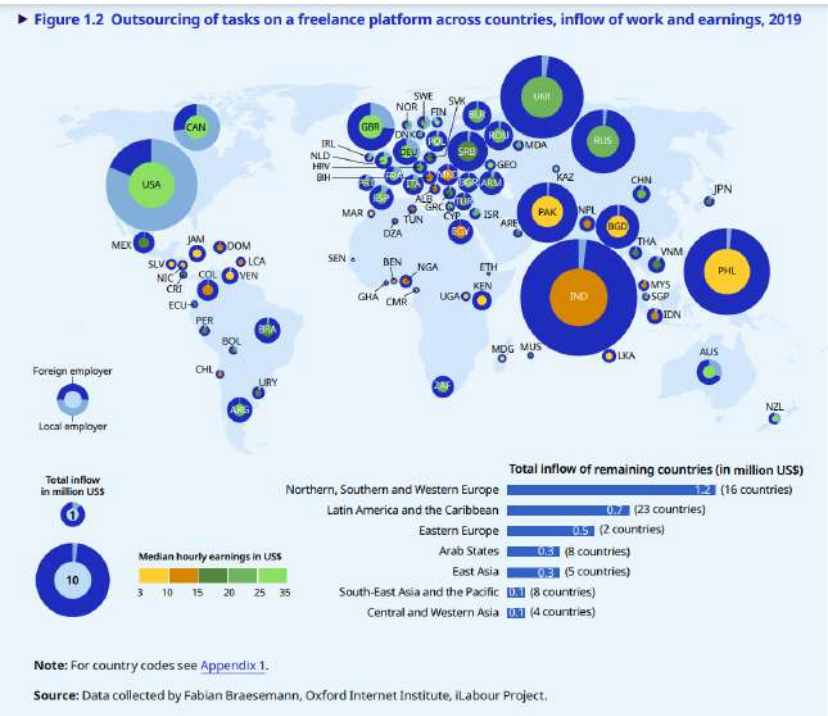
4.3. Training and sustainable growth for decent jobs

Digital transformation can be a crucial driver for training and sustainable growth for decent jobs in the Latin American region if inclusively and sustainably implemented. However, as the UNCTAD Digital Economy Report 2019 revealed, the **LAC region has the lowest share of the global digital economy**. Connectivity and accessibility issues are the leading cause. According to a study conducted by the Inter-American Development Bank (IDB), closing the connectivity gap with OECD countries would create over 15 million direct jobs. It can boost regional economic growth (GDP) by 7.7% and increase productivity by 6.3%. According to a study conducted by the OECD, more than 5% of students in the LAC region can exclusively access ICT at school. Only 14% of the students from poor backgrounds can access the internet at home, unlike 80% of the wealthy students. (OECD, CAF 2020)

Additionally, the **poor infrastructure and the lack of ICT-knowledgeable staff and teachers** keep students from developing skills in the digital sector. Consequently, only a few workers are knowledgeable of digital tools at work. However, ICT knowledge constantly gains importance in the labour market since automation has taken over many former job opportunities. According to the OECD, one out of four jobs is at risk of automation. Especially low-skilled workers and especially women are affected by unemployment due to automation since they mainly perform routine tasks such as administrative work. However, routine tasks are at risk of automation, and non-routine tasks are increasingly taken over by AIs or computer power. These dynamics will lead to new challenges in the labour market and need to be considered in advance. Increasing access to digital infrastructure, including departing from equal broadband access at affordable prices, will be the foundation for increased opportunities in light of future challenges connected to digitisation and job creation.

As in other regions of the world, the digital economy is disrupting the labour market while creating new employment models. For example, during the last decade, the **number of digital work in the LAC region increased** 14 fold, that is, from 4 to 56 according to the data presented in the ILO report "World Employment and Social Outlook (WESO) 2021: The role of

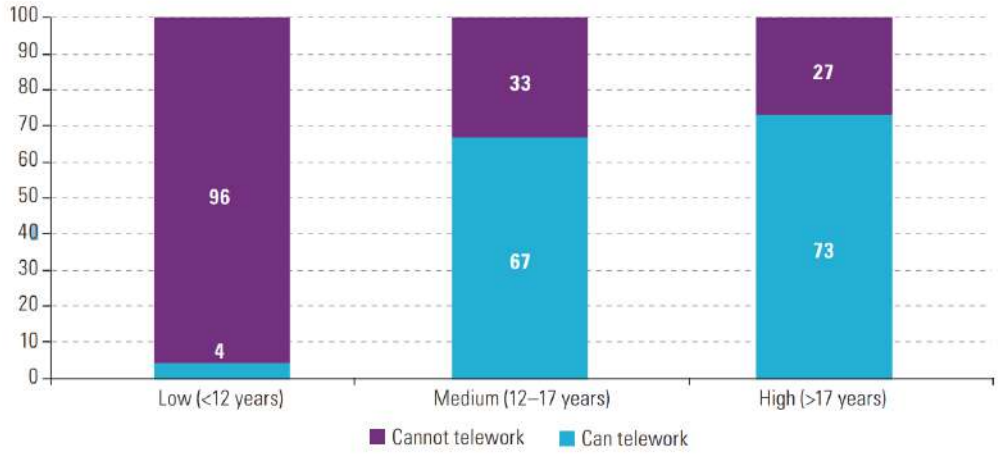
digital labour platforms in transforming the world of work ". The report highlights the significant diffusion of this business model across the world and in the region.



In Latin America, the gig-economy boomed during the pandemic. In Brazil, there were about 500.000 delivery or mobility platform workers in 2020, exceeding previous projections that indicated that there would be 280.000 workers. The increasing number is considered a "direct consequence of the insufficient basic emergency income of US$ 116,00 approved by the Bolsonaro government". Platform workers' rights is a critical issue, with many attempts to organise workers being undermined by **missing labour rights frameworks** and the lack of possibility to influence platform decisions, not in the interest of the workers. For example, delivery workers were declared an "essential service" in Brazil. However, they suffered a 50% reduction of their base income by platforms like Uber Eats, iFood and Glovo. In Brazil, the situation and the protests organised by delivery workers is not legally protected, since the Superior Court of Justice, in 2019 and the Superior Labour Court, in 2020, rejected the existence of employment relationship between delivery workers and platforms, considering it as flexible labour and thus the "non-obligation of exclusivity". Examples like this illustrate the **precarious state of workers in the platform economy** and the **exploitative nature of imported platform economy models**, such as Silicon Valley delivery or mobility platform models. Therefore, the focus in creating sustainable employment opportunities needs to lie on skilled labour and contribution to the digital economy through local digital business models and supportive legal frameworks. It requires access to digital learning opportunities and business development schemes.

Furthermore, **telework is not an option for low-income workers.** In the first three income quintiles, the likelihood of working from home is less than 20% (see figure II.12), which increases people's risk of losing their jobs during lockdowns. These labour market situations significantly affect income distribution, with increases in the Gini index estimated at between 1% and 8%.

Figure II.11
Latin America (7 countries): likelihood of teleworking by level of education
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of household surveys from the countries.
Note: Simple averages of the figures for Chile, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico and Uruguay.

The startup sector is becoming an increasingly relevant job creator in the LAC region. By 2021 technology-based private companies born in Latin America and the Caribbean (LAC), and owned by founders from the region, have created $221 billions of value, raised over $28 billions of equity, and have 245 thousand employees according to the IDB Paper "Tecnolatinas - the LAC Startup Ecosystem Comes of Age 2021" (Peña, 2021).

One of the largest delivery apps in Latin America, Rappi, is also one of the most prominent job creators in the digital economy in Colombia, with over 10,000 employees in 2020 (Statista, 2021). The company said it also has a waiting list of 45,000 people hoping to work for the app. In Colombia, the company is trying out new delivery robots from Kiwibot to increase deliveries while reducing the risk of infection during Covid19 (Caracol Radio 2020). It is also testing a partnership with money transfer startup Valiu, a Colombia-Venezuelan fintech that allows people without bank accounts to send and receive money across borders (Reuters 2020). A majority of Rappi's workers are Venezuelans, and this partnership aims to help them better support their families. As in Europe, Latin America is faced with **complex regulatory challenges regarding the platform economy**, including the question of how to support the growth of local and international platforms that offer decent opportunities and services whilst regulating the exploitation and negative forms of disruption caused by platforms not adhering to labour rights and other standards.

Depending on how digitalisation is proceeding, it can either foster inclusion or widen the gap of inequality. The public sector has a significant role in activating local markets and investing in local ecosystems even though there is a **lack of programmes ensuring that the development of the digital economy will benefit the development of the society at large,** including

vulnerable and underprivileged groups. **Education and skill-building are vital factors** for the creation of new job opportunities. The fast development of technologies requires a broader understanding of computational thinking and skills to seize digital transformation opportunities in an early stage. Apart from the lack of IT capacities, our research revealed a **lack of crucial soft skills required to enter and thrive in a rapidly growing digital economy ecosystem.** It relates to soft skills such as leadership, management, and collaborative working skills. Many interviews conducted for this study flagged the **lack of access to digital and decentralised learning opportunities and the lack of open educational resources** as critical problems and the lack of educational opportunities in formalised education environments, like learning to code in schools. Across the region, there is a lack of learning and training opportunities relevant to the digital economy and digital innovation market. Existing appropriate educational programs are usually in the big urban centres. Learning and training opportunities should be aligned to different regions' contextual conditions and needs. Addressing the prevalent problems hindering access to digital tools and education in digital skills can create new opportunities for marginalised groups so that they can profit from the digital transformation. Moreover, massive investments in training programs serving a digital economy without a respective job market will lead to skilled labour migration.

Entrepreneurship Education Example Ecuador:

Some countries have started introducing large scale programmes targeting these learning deficits both in terms of learning opportunities for entrepreneurs as well as embedding learning about digital skills and related soft skills in school curricula. Ecuador is one such example. Entrepreneurship policy in Ecuador has stood out for its importance to the circular and solidarity economy through the approval of the Organic Law of the Popular and Solidarity Economy. One can note the importance given by the central government to the promotion of entrepreneurship, as evidenced by the high investment of resources for loans to entrepreneurs, and the specific regulation for entrepreneurship, Organic Law on Entrepreneurship and Innovation (ley orgánica de emprendimiento e innovación). This bill, sanctioned in February 2020, is a regulatory framework to promote entrepreneurship at the national level through mechanisms for financing access and bureaucracy reduction. It also seeks to grant permits through a simplified and provisional process. The bill proposes the creation of the National Council for Entrepreneurship and Innovation and a body made up of representatives of central government institutions, decentralised autonomous governments (GADs) and the private sector, responsible for designing a national strategy for entrepreneurship and innovation. The central government has announced a series of specific services for urban and rural entrepreneurs regarding programmes to promote entrepreneurship.

- One emblematic programme of this government is the People's Bank, which seeks to resolve the restricted access to credit for specific sectors of the population, mainly women, young entrepreneurs, migrants, informal traders, small and medium-sized producers.
- Another programme of interest to the government is "Impulso Joven", which seeks to improve skills and generate more significant opportunities to insert young people into the country's productive system. In addition to the delivery of credits for entrepreneurs aged 18 to 29, the programme also includes formal advice for constructing business

plans and training in financial education.

- Another government-driven programme is Apoyo al emprendedor functions as an incubator that advises entrepreneurs, provides access to investment funds; technical even; and business skills development. The Idea Bank programme incubated more than ten projects.
- Concerning programmes to promote technology-based entrepreneurship, the National Secretariat for Higher Education, Science, Technology, and Innovation (SENESCYT) promotes the Ideas Bank. The initiative provides venture and seed capital from public and private institutions and investments from angel networks. The programme also enables access to investor networks to allow ventures to expand. In February 2022, there are up to 12383 projects on the platform, with 24896 actors registered so far. The last open call was in 2021, in partnership with Fundación Impulsa.

Notably, since September 2015, Entrepreneurship and Management have been included in the compulsory national curriculum, with two hours per week during the three years of high school.

Some countries, such as Peru, have also created a legal basis for stimulating growth and job creation through the startup and entrepreneur scene with the Innovative Venture Capital Fund Regulations and are introducing tools for financing startups, like STARTUP 8G Peru. Other countries like Mexico lack financing alternatives due to the high-risk aversion of Mexican investors and limited supply of government support programmes. The leading national government support programme for entrepreneurs, INADEM, was closed in 2019) and little regulatory incentives, with a limited supply of tax incentives for new businesses). High bureaucracy to set up and register companies and complicated and time-consuming tax schemes to understand and comply.

4.4.1. Brazil

The empirical work of this study highlighted opportunities for training and sustainable growth for decent jobs using digital tools in three categories: infrastructure for primary education, training and network, and environmental awareness. The first category directly implies the active implementation of Law 14.172/21, which guarantees access to the internet, for educational purposes, for students and teachers of public primary education. In this direction but outlying the necessary coverage, the Ministry of Education started in 2021 the US$700mi (R$3.5bi) program Educação Conectada, financing high-speed satellite or cable connection to schools and offering minimal training content on different topics. Workshop attendants also see the potential for online and in-person training classes in coding and programming (like A Hora do Código and HappyCode School) and project-oriented training (like Robô Ciência, Naveavela or the FabLabs Ecosystem). Actors also suggested using tools to amplify technology and the environment studies in public schools, for example, supporting the UN pedagogical kit on Oceanic Culture or Sustainability-related Games in school programs. Also, workshop actors endorse the development of open-source, accessible and affordable technologies avoiding the monopoly of tools.

The second category deriving from the research suggests **investment in organisations fostering training for innovation**, like CESAR school in Recife, Sao Paolo and Manaus. Workshop actors also propose direct investment in local NGOs working with training and digital literacy, like Olabi in Rio de Janeiro or Toti Diversidade or EducaDigital, two mainly online initiatives. Giordano Cabral, chairman of the board at Brazilian innovation centre CESAR, during the interview, suggests GIZ creating an **international connection hub** in the form of Instituto Europeo di Design but outside Rio or Sao Paolo. "A foreign educational centre can function as a hub. A learning hub, where you have access to universities and researchers, a global network in the teaching and learning aspect; you also have access to the international market. Workshops of knowledge exchange on political creativity in the overlapping of environmental justice, social issues and digital technologies may be the main axes of such a place". The overall opportunity in this category is to promote capabilities for people to develop appliances that assure environmental and social benefits in the territory.

The last category identifies potential benefits of **using digital technologies to raise awareness on environmental topics.** Training in digital media management for ecological communication for indigenous and local communities can foster environmental protection, public interest and combat online misinformation. An active initiative in the area is the Fakebook organisation. Training on planning, project management, and fundraising may empower communities to spread the news about protecting traditional communities and the environment. "Civil society initiatives using technologies can engage in collecting environmental data and present this data in a way that captivates people: a film, a meme, use the available means of communication systematically, and disseminate it to be information that people consume" - Giordano Cabral.

	Helpful	Harmful
Internal origin [attributes of the organisation]	**STRENGTHS** • An established market for startups. Today, the country has 14,065 startups distributed in 78 communities and 710 Brazilian cities • Innovation hubs and accelerators are present in all the regions, like Sidia Instituto de Ciência e Tecnologia and Manaus Tech Hub in the North, Rapadura Valley, CESAR and Porto Digital in the Northeast, Hub Agritech in the South, Liga Ventures in the Southeast, Hub Gyntec in the Centrewest and national associations like InovAtiva.	**WEAKNESSES** • The innovation sector in Brazil does not have a strategy, and the entire chain in Brazil is fragmented, which makes the system fragile • Brazil had a huge reduction of federal investments in education and research in the last 4 years • There is an evident inequality, the result of historical imbalance, with very few actors being part of the production chains • Few women in situations of power, and the situation sharply decline over the last years. It seems that the number of women working, or studying has decreased • Lack of Knowledge and education gaps with a massive lack of quality training, education, and research connections (Access to other actors inside and outside the country)

External origin [attributes of the environment]	OPPORTUNITIES	THREATS
	• For the last two decades, federal and state governments have fostered open source software use and development, but not as a steady policy	• Only 10% of startups are funded by women; 30% of employees are women, being 25% in management functions • High centralisation of resources in Rio and São Paulo, weakening the vast majority of the country and amplifying inequalities

4.4.2. Mexico (Training and sustainable growth for decent jobs)

With 32 million people without access to the internet, the digital divide in Mexico is stark. The findings of this research suggest supporting technologies to **further open standards and non-traditional connectivity efforts** like the organisation Programa Frida showcases. It furthermore suggests **investing in widespread digital literacy training programs focusing on rural areas** to increase inclusivity and productivity, reducing poverty for the young and elderly. A partner for focused industry education could be AMITI or Centro Latam Digital.

Guillem Torres Sepulveda from Controla Tu Gobierno states that citizen participation is possible through existing legal frameworks. And recommends **intermediary funding organisations for long-term projects (10+ years**) to create change to enable citizen participation for all. Likely partner organisations include Fundar y Poder. There are still many untapped potentials and unmet rights regarding digital literacy. GIZ can support the government by interacting with influential actors like Lourdes Morales, director of CIDE, Monica Tapia from Ruta Civica, and the R3D organisation.

Internal origin [attributes of the organisation]	Helpful	Harmful
	STRENGTHS • Strong institutions that are able to increase competency in digital markets • The Ministry of Economy has high interest in digital economy and startup ecosystem is amongst strongest in Latam with several companies valued at above 1B dollars • Red Abierta mobile network initiative is increasing connectivity substantially	WEAKNESSES • Over 30 million people have no access to the internet with many areas lacking connectivity at all • Schools are not yet focusing on STEM and digital literacy skills • Information management about local government and citizens' rights and duties is not satisfactory

External origin [attributes of the environment]	OPPORTUNITIES	THREATS
	• SICA / TMEC Treaty increases ability to work digitally for US companies • Digital skills in Artificial Intelligence and Data Science are sought after by neighbouring countries and can represent a chance for Mexican capacity building and growth	• Low digital skills and connectivity and unclear taxation could make Mexico less desirable as a location for digital businesses • Pandemic has lowered the advantage of Mexico to provide digital services in Spanish, opening the country to more competition from foreign companies.

5. OPPORTUNITIES AND POTENTIALS: Future Engagement for Digital Transformation in the LAC Region

The qualitative research conducted for this study has brought several aspects to the surface that should be considered in furthering support mechanisms related to digitalisation in the LAC region. In this chapter we will condense the key findings of both the desktop research and the grassroots action research conducted through our workshops as well the regional and national actor interviews and extract key relevant opportunities and possibilities for future engagement in digital transformation of the region (List of Interview and Workshop partners European and LAC level Appendix 1).

While all the examined countries are unique in their political, cultural, and social settings, specific patterns can serve as an interaction framework within the region. In most countries, the following **three factors determine the effects further digital transformation will have on economic and social development**:

1. **Further development of decentralised infrastructure**

   In the context of this paper decentralized infrastructures go beyond Internet connectivity. It includes access to open digital resources, including data and data infrastructures, access to the infrastructure of sovereignty, educational and training infrastructures, open-access tools and content, and local market infrastructures respectful of tradition and cultures.

2. **A co-creative policy development process**

   Co-creative policy development process engages relevant civil society actors in the actual policy making process. A co-creative policy development process requires decentralised processes on different political tiers, departing from the local municipal level.

3. **Sustainable funding mechanisms**

   Sustainable funding frameworks enable of long-term funding availability that can be accessed and activated more flexibly than current instruments. Such mechanisms should align with local grassroots and public sector actors' agendas, rather than pre-assigned from the funding development organisations.

This **triangulation is applicable across different sectors, on the local, national, and regional level**. It is necessary to operate from the local to the national level in order to enable bottom-up scaling processes, built on local digital initiatives, and elevate these local efforts to become part of strategic national and regional development processes, with dedicated feedback loops to all stakeholders involved. The success of such a framework being implemented largely depends on local actors being put in control and being given a seat at the table of the national and regional level governance processes. Chapter 5 is divided in two sections:

- **Multilateral perspective**
  A reflection on regional activities and future opportunities for BMZ in cooperation with European development and collaboration with regional level LAC actors based on the individual interviews with GIZ and KfW representatives and desk research findings. This section delivers **overarching inputs for the conceptual framework**.
- **Bilateral perspective**
  An analysis of the country and focal topic opportunities based on individual interviews with national digital innovation and digital rights actors, national GIZ offices staff, multi-stakeholder workshops, and desk research findings. This section delivers **concrete recommendations for the three areas of the conceptual framework**.

5.1. Regional and Multilateral Perspective

5.1.1. Digitalisation and Regional Expertise within the BMZ - internal coordination and commitment as prerequisite

Clarity regarding its agenda and goals, and internal coordination, on the government level, not exclusively on the BMZ level, are crucial for sustainable impact. Currently, BMZ's digital and LAC Regional Division are not equally engaged. This study revealed that internal BMZ coordination, especially between the regional and digitalisation divisions, is required as they in

volve separate actors that would benefit from stronger internal structural coordination. A more substantial political commitment of BMZ's Regional Division is vital to integrate and expand already existing digital initiatives through collaborations with the other D4D hub member states and direct co-financing programs with the European Commission. Collaboration between the Digital Division and the Regional Division can be intensified. However, it still requires more robust digital potentials and stable cooperation on the regional end.

MAIN TAKEAWAYS

- ➔ Digital and LAC Regional Division would benefit from more structural coordination to ensure BMZ and GIZ's long year expertise, lessons learned, and networks built will be transformed into fundamental pillars of the Hub's LAC agenda.
- ➔ As staff fluctuation in the divisions can lead to knowledge loss, assessing potentials for more substantial knowledge creation and preservation should be considered. BMZ's internal mechanism for strategic engagement of Regional and Digital Divisions would benefit from further and more sustainable development.

5.1.2. LAC European Digital Alliance - Aligning BMZ Activities with Team Europe Initiative ‘EU LAC Digital Alliance’ and Leading with Experience

The EU has just begun dealing with digitalisation in the LAC region. It means there is massive potential for the BMZ to contribute with its long-standing experience and align its Digital Agenda with the D4D LAC hub agenda via the EU LAC Digital Alliance. The member states will shape the Alliance agenda beyond the current infrastructural investments. They can influence it through their financial commitments while setting priorities outside the pre-programmed areas. For instance, set out to focus on Cybersecurity and take agency in respective activities, such as an educational program. The BMZ has the chance to set its priorities. Since Germany is well-positioned to actively steer the EU LAC Digital Alliance agenda and given the BMZs mandate for more vital coordination on a European level, it should consider the D4D Hub as the central platform for BMZs activities related to digitalisation. This coordination provides the opportunity to address the three key findings deriving from this study in its bilateral and regional direct collaborations and its influence in shaping the European level action agenda for the region.

At present, the implementation of EU funds is mainly channelled through UN agencies, as they are on the ground and can act quickly. However, the European Commission seeks to increasingly involve the implementing organisations of the member states, as they are also active in the respective partner countries. The D4D Hub offers a platform for actors such as BMZ or GIZ to involve their local and regional partners and networks. The LAC Branch is currently mapping actors to identify which member states are doing what and which networks already exist but reduced the efforts to engage civil society actors to some hearings inviting civil society actors. To date, no holistic approach has been implemented to integrate grassroots actors or civil society.

MAIN TAKEAWAYS

- ➔ The EU LAC Digital Alliance is not planning country-level support activities. However, the GIZ country offices' experiences can offer valuable insights for the Alliance. GIZ can contribute substantial expertise on regional multi-stakeholder strategy design processes through the perspectives of their seconded staff. Here, the BMZ can play a facilitating role. BMZ/GIZ needs to build upon GIZ country offices' profound digitalisation agendas and experiences for strategic approaches on the EU level.
- ➔ BMZ may need to help foster collaboration as various GIZ country offices in the LAC region with digitalisation experience and portfolios hold important experiences and expertise which can be leveraged for the new EU LAC Digital Alliance.
- ➔ BMZ can directly share its wealth of lessons learned from the regional actor partnerships with CEPAL, SICA, and CAF and the GIZ country office experiences.
- ➔ Strong coordination and integration of activities within the EU approaches are essential to prevent parallel tracks and reinvent the wheel, mainly where similar activities are in planning, like setting up data centres.
- ➔ Another opportunity lies in the multi-stakeholder approach underlying the D4D Hub. In the so-called advisor groups, different actor groups can meet, exchange experiences, and, thus, contribute to the work of the D4D Hub. This mechanism ensures that those many perspectives are addressed in the Hub's project implementation. BMZ can bring German actors working in some thematic regions and experts on specific digital topics to those different tables. It also provides an opportunity to become a dedicated actor in stressing and pushing the essence of engaging multiple stakeholders on all levels, ensuring that political commitments are co-created holistically, thought through to the execution and with local actors playing a respective role.
- ➔ Co-financed BMZ projects with the EU can be a tool to push already existing cooperation and projects within the new D4D Hub agenda.

5.1.3. Harmonising Programming Timelines and Understanding the Ecosystem

GIZ's SICA team has also been in exchange with GIZ EU colleagues, supporting the development of various Team Europe Initiatives. Challenges for more coordination and subsequent collaboration can relate to the different timelines and processes taking place on very different levels. There is high potential in the region for collaboration with the EU and high opportunities for synergies between BMZ actions and EU TEI that can be leveraged through respective alignments. Moreover, Team Europe Initiatives are planned for each country, but a LAC strategy is developed through the EU LAC Digital Alliance. For SICA, these constellations would have to link all national strategies and align them with the regional plan. Scaling national approaches to the regional level has been said to be a significant challenge for SICA, given that SICA activities follow a different project logic, departing from the regional level. Generally, it would be more intuitive to depart from a regional approach and adapt on national levels. However, this process is prevented because the planning processes run in parallel. As BMZ is expected to strongly operate through the EU instruments, such as the EU LAC Digital Alliance, this can be a chance to switch to a region-to-national approach for various processes, allowing for harmonisation and simplification between their different partner institutions. GIZ's SICA

team engaged in the national TEI planning strategies and identified potentials for co-financing. Once BMZ might approve their project sketches for BMZ iPA 2023, they can include those potentials into their final proposals. In that case, a new, more substantial exchange with EU colleagues could take place.

In 2021, SICA analysed its executive secretariats' roles and responsibilities and their approach to digitalisation. Conducting such a mapping might also help the BMZ create an overview of its national agendas via the GIZ offices and other programs. Interviews with the GIZ country offices revealed an overwhelming abundance of programs and projects, alongside a massive complexity of integration of digital components and collaboration with different stakeholders. Therefore, gaining a solid overview of GIZ structures and activities would equally benefit the GIZ to streamline its activities in the region and provide support across more and less digital literate offices.

KfW also highlighted the critical role of collaborating at the sub-national level, with federal states and their respective ministries or municipalities, particularly in Smart City and local data gathering contexts. Also, GIZ Ecuador and Brazil country offices stressed the relevance of sub-national levels and digitisation projects. Both GIZ and KfW highlighted that more focus on, and engagement with, federal states and local actors has been crucial for their groundwork. Expanding cooperation with sub-national actors, including federal states, municipalities and civil society actors engaged in public service delivery is therefore advisable.

ECLAC's and SICA's profound experience in cross-national strategy and policy framework development are centrally important. ECLAC has been brokering a policy network on the internet and jurisdiction, among others, and acting as the eLAC agenda's secretariat. Best practices for regional and national multi-stakeholder approaches to policy framework development exist in ECLAC and innovative networks, such as #i4policy, which has led to national multi-stakeholder policy co-creation in various African countries. Such approaches can serve as valuable frameworks to learn from and, regarding the latter, be adapted to the LAC context. SICA also has a long-standing collaboration with the BMZ, focusing on regional market integration. It demonstrates best practices in the development of digitalisation strategies from the national to regional level. Additionally, it includes experts from different countries and core identified digitalisation areas, as elaborated in Chapter 2.

MAIN TAKEAWAYS

- ➔ Learning from and building on SICA’s context-driven and strategic approach to digital programming on a supra-national scale
- ➔ As GIZ has secondment staff within SICA and ECLAC, this brings a massive opportunity for the BMZ to actively bring their regional actors to the table of the EU LAC Digital Alliance, and to promote any new strategies to be built on already existing frameworks in order to avoid parallel structures.
- ➔ It will be essential to build on already existing coalitions. Given that ECLAC is the only institution composed of all member states, it would be counter-effective, as BMZ, to coordinate a subset of those, as those approaches have not shown to be successful or sustainable.
- ➔ eLac, with its 23 member countries, can act as a central hub for a ‘German strategy’. ECLAC is also already experienced in actual multi-stakeholder processes. Civil society, technical bodies, science and research, development banks and similar bodies are involved in the process of observer groups. Dialogue and exchange formats at (sub)regional level would best be served by using existing structures where existing, such as the eLAC platform, instead of inventing parallel structures for solutions.

5.1.4. Embracing Existing and Creating New Instruments for Policy Exchange and Structural Collaboration

Many lessons learnt can be drawn from the long-term collaboration model between GIZ/BMZ and ECLAC. The secondment of the staff into the institution is seen as a programmatic collaboration, providing expert consulting to the local or regional organisation. Some interview partners highlight the true cultural shift, which takes a long time. However, the model of seconding staff embedded in another country's government or regional government organisations needs review in today's digital age. Considering today's need for exchange regarding policy formulation and building political cultures of sovereignty and collaboration, a more reciprocal exchange system is needed. This exchange system could include inviting experts from LAC countries to work in the EU and member state institutions to learn about the political culture and digital policymaking from a European perspective. Capacity development through staff embedding can occur not only through equipping the partner organisation with expert consultants but also by enabling learning opportunities for the staff of an organisation through such exchange programmes.

Policy exchange programmes should be a new instrument complementing this current system. Such an instrument can establish new networks as well as peer capacity building. Another needed instrument is the introduction of formats that allow different actor types to co-create inclusive national and regional strategies, such as policy frameworks. Inspiration can be taken from grassroots initiatives that bring together innovators and political decision-makers, such as the “Ministers meet Makers” format or #i4policy objective policy legislation co-creation process.

It has been highlighted that the ministries engaged in ECLAC are interested in eye-to-eye exchange/collaboration with the respective ministries of the German government. Also interviews with KfW actors emphasised the need for eye-to-eye collaboration with the respective governments. Regarding the challenge of susceptibility for data manipulation in politically challenging country contexts for instance, it was emphasised that these types of challenges are not of technical nature that require ‘help’. Rather, the national actors seek collaboration and knowledge exchange as to how to navigate those political risks. Here, BMZ’s role could be to act as an intermediary. Given Germany’s distribution of responsibilities across different ministries and its decentralised approach to digital policy making, this will require cross-departmental alignment.

Harmonisation of approaches amongst German federal government bodies: As digitization is managed decentral by the German government and different ministries have different responsibilities, it is important to ensure efforts are aligned. On a sectoral level, several parallel or unconnected activities exist in similar topic areas. For instance, both BMZ and BMI run different international Smart City networks, that do not cooperate.

One mechanism to support the building of a common European and LAC digital vision and space is the support of joint research and development and innovation activities. Structures such as the Horizon EU fund could be opened to allow more direct collaboration with stakeholders from other regions.

5.1.5. The need for agile funding models and a strategic lens on digitalisation

KfW, on behalf of the BMZ, has robust engagements in financial assistance in the LAC region, with demonstrated experiences in the provision of funding schemes that address the fast pace of digitalisation and innovation. As Jens Mackensen, responsible for sustainable financing of environmental protection in the Amazon Delta at KfW, said, **'innovation and demand are both not plannable'**. KfW emphasised the need for more responsive funds. Simultaneously, it emphasised that setting up funds without being locally embedded and holding trust from the local actors has shown not to work.

Setting up locally embedded responsive funding structures on a regional level, accessible for all countries, provides a huge opportunity to enable rapid response and support mechanisms. These flexible and demand-driven support mechanisms have shown to be instrumental, exclusively though, when embedded in the local actor ecosystem. The ladder requires continuous eye-to-eye collaboration efforts and the gradual creation of a trust.

Various GIZ country officers critically acknowledge that a more cross-cutting and strategic approach to digitalisation is necessary, which does not depart from the development of certain applications or other ICT tools. To date, agendas addressing how digitalisation can structurally impact entire sectors still need to be further developed in various country offices.

In what follows, this study analyses the country and focal topic opportunities, again based on the individual interviews with representatives of the local digital innovation and digital rights community, interviews with GIZ country offices, multi-stakeholder workshop, and desk research findings. This next section delivers concrete **inputs for the three conceptual framework areas**.

5.2. Country Opportunities and Possibilities

5.2.1. Brazil

Green development

Brazil is highly advanced and has numerous activities supporting green development processes, ranging from renewable energy creation to collecting and processing aerial data for ecosystem and land rights protection. However, the political situation is destabilising environmental programs and communities. Furthermore, non-supportive political circumstances can result in dangerous data biases and the ignorance of central needs, leading to an increase in the country's already drastic inequalities.

The collection and evaluation of environmental data show to be instrumental in the implementation of an inclusive and safeguarding green development agenda. Whereas Brazil is the regional flagship in data management with its National Space Agency, investments into diversification of data to reduce risk susceptibility have proven crucial in the current political context. The KfW already holds tremendous experience and is strongly investing in the growth and diversification of data through investments in data centre creation, support, and diversification of collaborations. For the GIZ, decentralised engagement and capacity building structures can provide a massive opportunity. As the empirical research has shown, current efforts from the GIZ side are intensely focused on bilateral cooperation with various ministries. A diversification

of collaboration partners can address the critical political situation to be navigated when it comes to environmental protection in Brazil. Approaching green development through an entrepreneurial focus with solid attention on the creation and strengthening of a decentralised green energy start-up ecosystem can provide a non-conflictual framing of activities whilst, at the same time, addressing the staggering inequalities concerning access to education, training and local job opportunities, as well as unequal access to renewable energy supplies in rural areas. Simultaneously, such a decentralised approach will support context-relevant green energy solutions and processes.

Environmental, social, and ESG companies require support to develop mitigation plans using technologies focused on environmental measurement and public data visualisation tools. And at the same time, allowing society to monitor ecological data while training local communities in the fabrication and application of environmental measurement technologies. "It is in the hands of the private sector to make this change happen with the necessary speed. It is much more in the hands of the private sector."- states interview participant Fernanda Castilho. Mapping and engaging with already existing private-sector actors will be a central pre-condition. Deviating from a classic approach seeking advice towards bringing the local startup and private sector actors in to advise BMZ and its country execution would be the way to go.

The widespread lack of awareness on environmental issues is changing with a new generation. This change provides the massive potential to support interest in a digital green economy through job creation measures. In addition, collaborating with local digital innovation and start-up communities provides a vast opportunity.

Training and sustainable growth for decent jobs

Brazil is outperforming other countries in the region regarding digital innovation, with a rapidly growing and maturing start-up ecosystem. What is needed now is an inclusive expansion across the country. Unfortunately, innovation and relevant education means remain exclusively bundled in urban hubs, and little attention has been paid to promoting and fostering innovation in other regions. This gap relates to educational standards alongside basic connectivity, financial infrastructure, and legal infrastructure. Whereas Brazil holds a 74% total internet user rate, e-readiness for e.g., e-education to close educational divides requires separate evaluation as Internet usage stats oftentimes overshadow the distinction between accessibility and the capacities to make use of it for educational or political purposes. These divisions occur in all country regions and address all areas we define under decentralised infrastructure, namely connectivity, education, and job market opportunities. Furthermore, it underlines the need to support an integrated approach to creating individual educational formats and a regionally context-relevant startup infrastructure. It aims to foster education and job creation tailored to specific regions' needs whilst simultaneously growing the business framework enabling local employment. Such an integrated approach might subsequently counteract brain drain towards the urban hubs but strengthen local education and markets.

Existing training programs cannot address the growing demand for trained workers in the digital market. A decentralised approach provides the opportunity to counteract further centralisation that reinforces educational, social, and economic divides whilst enabling innovation to grow directly within its respective contexts, with local people, best knowing the contexts and needs, better trained for employment.

The number of women in Brazil who have attained tertiary education is higher than the percentage of men, although they are less likely to be employed. This provides a central opportunity to address the remaining gender divide, through the support of training and job creation frameworks particularly preparing women for the opportunities held in the rapidly growing digital market. Opportunities to foster diversity in Brazil's digitalisation scene should be made use of, argued the workshop participants. Indigenous and original communities, women, afro-Brazilians and the LGBTQI+ population shall play a central role in the digital economy's future. From media dissemination about indigenous practices and rights (Instituto Socioambiental, Índios Online) to traditional communities content sharing platforms (Video Nas Aldeias, Black-Flix), to online training focused on gender (Escola De Você, Programaria and Taebí-Bé Digital), "efforts need to be explicitly purposeful to attract women, attract blacks, and better welcome different publics, such as the LGBTQI+ community", said Giordano Cabral in the interview process. In addition to localised digital and media educational programs, GIZ can foster governmental connectivity projects like WiFi Brasil (former GESAC) to reach indigenous and other traditional communities not yet connected.

The Brazilian GIZ office is already running the so-called Digital Dialogue Project, seeking to increase cooperation on digital policy issues to prevent fragmentation, which also addresses digital business models and start-up support. Expanding such a framework to include civil society actors, such as local digital innovation actors as well as actors from the local regions which can benefit from a more decentralised growth attention can provide great potential.

In Brazil, digitalisation can either decentralise national policies to regional levels. Workshop participants argued, local thematic councils can access information to monitor and implement public transparency. Moreover, GIZ can foster civil society initiatives in the topic (like Colab, MeuMunicípio, MeuDeputado, DataPolicy and Transparência Brasil), combining them with educational organisations like Politize!.

Recommended Action Areas: Brazil

A. Developing decentralised Infrastructures

WHO	WHAT	WITH WHOM	HOW
BMZ/ KfW	Align activities and efforts in supporting and enabling national data diversification mechanisms	Public and private actors, including (independent) universities and research institutes	Align investments in data centre construction Create joint programmes between civil society and research institutions Invest in expansion of existing data repositories/centres, e.g. maintained by universities or non-state actors
BMZ/ KfW	Support the development of open data initiatives and repositories	Public sector, civil society, especially the open data / open knowledge community, and academia	Provide long-term support mechanisms to civil society and academia to enable safeguarding & sustainable maintenance,

			and population of data repositories integrate universities and their data collection efforts through the provision of collaboration schemes that enable them to collect data beyond their narrow research project means, and to collect more practicable data
BMZ/ GIZ	Support the development of locally embedded open data initiatives and repositories	Public sector, civil society, private sector actors and academia	Support traditional organisations in becoming data savvy and able to transition into data trusts or stewards Actively engage/learn from/support existing open data and open knowledge community and their existing capacity building schemes Enable cross-country exchange of expertise of open data and open knowledge community (e.g., through AbreLatam, Open Knowledge chapters, etc.)
BMZ/ GIZ	Assess the need for data literacy capacity building and establish support mechanisms for training programs, e.g. through respective training programs with Universities or educational NGOs	Civil society, training institutions	Identify existing open data and open knowledge actors and build on existing capacity building structures Taken existing lessons learned and needs into account for creation of decentralised capacity building program that can equip also remote communities with respective capacities and build towards the collection and use of decentralised, locally relevant data repositories, use data for advocacy purposes
BMZ/ GIZ	Provide central support to the creation of data literacy capacities embedded in indigenous and traditional practices and in rural areas	Organised civil society, local schools/training centres	Support programs to develop context-driven data literacy modules in collaboration with relevant stakeholder groups
BMZ/ GIZ	Support the development of local digital ecosystems, in particular access to entrepreneurial and digital educational opportunities	Start-ups and innovation spaces, local training centres	Identifying local needs and capacities and investing in locally driven alignments of job market opportunities and respective growth mechanisms with responding educational / training schemes

B. A co-creative policy development process

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ	Bring existing private organisations and start-up actors together with local communities to identify risks and needs as precondition for policy dialogue	Government representatives, local innovation/start-up actors, local open data and open knowledge community, digital rights actors, local communities in different regional contexts	Multi-stakeholder pre-policy co-creation: Bringing start-up entrepreneurs and local communities together to co-design framework conditions for supportive legislations and implementation strategies.
BMZ/ GIZ	Consider local governance level engagement in policy development in situations where/if national level collaboration prompts difficulties	Local governments/municipalities, local innovation/start-up actors, local open data and open knowledge community, digital rights actors, local communities in respective regional contexts	Support local awareness creation and exchange mechanisms between local governments and digitalisation experts (see with whom) Enable regional exchange of lessons learned Support innovation for policy co-creation processes (e.g. inspired by https://i4policy.org/innovation)

C. Sustainable funding frameworks

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ	The growing interest in environmental topics within young generations can be harvested through targeted support mechanisms, such as young innovation funds and training programs in all regions	Environmentalist groups, training centres / maker spaces	Equip training centres with means to develop new advocacy and engaging training formats
BMZ/ KfW	The provision of flexible and long-term funding models to diversify into central Brazil can support the entire country to benefit from Brazil's stellar digital innovation ecosystem.	Start-up ecosystem, related civil society groups, education, and training institutions	Provide modular funding solutions and collaborative funding schemes, allowing young start-ups etc. to grow beyond prototype phases and to strategically collaboration with civil society groups and other institutions
BMZ/ GIZ	A stronger focus on inclusive mechanisms to indigenous communities, through the creation of educational and training modules alongside entrepreneurial activities will help to create a holistic response to existing divides.	Indigenous community representatives, (local) educational and entrepreneurial experts	Active engagement of local community voices to develop needs-driven mechanisms

BMZ/ GIZ	Leveraging the potential of highly trained women in the country through providing them opportunities in the digital market will provide an opportunity to close their gap to be equally integrated in the workforce.	Women with respective degrees, local start-up scene, digital entrepreneurship representatives, educational institutions	Identify, and respond to, requirements / needs to create stronger women enabling work environments and incentives

5.2.2. Colombia

Green Development

Environment, climate change and sustainable economic development are core programmatic areas of the Colombian GIZ office. However, capacities to address digital transformation potentials in programming are in their infancy.

Despite the minimal share of the IT sector in the country's labour force, the most significant potential in the Colombian context is the strong and growing startup scene, even if largely centralised in the capital, creating a massive divide between other parts of the country. In addition, Colombia faces a staggeringly high level of informal labour and strong labour migration from the rural areas to the cities.

Whilst the Colombian government favours digitalisation, green development can still benefit from more attention. Considering the country's environment suffering from considerable pollution from illegal mining and deforestation, promoting the massive potential of digitalisation for green development holds central potential. Therefore, addressing green development through an entrepreneurial lens can be an excellent opportunity to foster attention and respective openness for supportive legislative frameworks on the government agenda. Moreover, the lack of state presence also suggests a more substantial involvement of civil society groups to create an inclusive green development agenda, accounting for all regions, counteracting urban innovation centralism and labour migration. In addition, the structural integration of Indigenous communities in the design and implementation of conservation plans through capacity building programs empower them as the de facto stewards of the land. Finally, collaborations with the vibrant startup scene, supporting growth incentives outside Bogota, can be an opportunity.

A solid decentralised approach is needed to engage Colombia's digital innovation scene in designing an inclusive agenda to tackle the pressing need for a wide-reaching environmental plan.

A combination of high levels of corruption with the quasi absence of data registries and a malfunctioning and neglected cadastral system to monitor environmental circumstances in the country calls for programmatic investment in actual databases and a diversification thereof. KfW activities on the diversification of data sources in Brazil, for instance, are inspirational sources of lessons learned. It would also align with the suggestion to focus on a nation to regional approach in strategic regional collaboration strategies.

Peaceful and inclusive Societies

Despite the peace agreement and constitutional and practical efforts to provide democracy supportive tools, Colombia is still profoundly affected by high rates of violence and human rights abuses, mainly targeting social and environmental leaders and former guerrilla fighters. In addition, digital and educational divides between urban and rural areas are significant, resulting in high levels of digital illiteracy in rural areas. Furthermore, Colombia also faces a central need for data creation. A stable cadastral system, for instance, forms the basis to comply with appropriate land distribution as enshrined in the 1st point of the peace agreement.

Engaging in a triangulation approach as our conceptual framework proposes, integrating decentralised infrastructure creation, integrated with context relevant digital entrepreneurship and business development is also here the foundation for meaningful harvesting of digital transformation potentials. Prior efforts of internet infrastructure creation in rural villages failed due to government corruption. Therefore, it is essential to combine further infrastructure projects with the development of regulations and legislative frameworks that make digital transformation less prone to infiltration.

The Colombian GIZ office is still in its infancy with its digitalisation processes. Therefore, if it wants to play a role in the local complex digital transformation processes, it will have to build multi-stakeholder solid coalitions. Given the already mature structures and expertise in neighbour country offices, an initial exchange of lessons learned is advisable. However, most central is the engagement of multiple stakeholders from the different regions to identify meaningful ways to strengthen other peaceful and inclusive transformation processes. For instance, recognising locally relevant and accessible data collection and storage can provide decentralised pathways to evidence creation as a crucial foundation for rights advocacy.

A solid opportunity to build on when addressing these divides through a capacity-building approach holds the SENA vocational training program, a majorly important centre for technical and technological education in the Latin American context, reaching rural areas and indigenous communities. Furthermore, enabling digital literacy and meaningful entrepreneurship improvements by creating new educational modules focused on subsequent entrepreneurial or job creation opportunities can structurally support the advancements of inclusive development in the Colombian context.

Recommended Action Areas: Colombia

A. Further development of decentralised infrastructure

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ	Supporting the alignments of the country's start-up potential with national and local needs can foster the re-integration of certain civil society groups and foster the building of needs driven educational and job market structures in all regions.	Civil society representatives from /in different regions, start-up community, educational experts/regional educational institutions	Identifying local needs and capacities and investing in locally driven alignments of job market opportunities and respective growth mechanisms with responding educational / training schemes

BMZ/ KfW/ GIZ	Supporting the creation of decentralised data registries and respective capacity building in all regions will create a less susceptible data ecosystem whilst providing capacities and employment opportunities in otherwise left-behind environments.	Open data community, digital rights actors, existing data repository holders, universities/independent research centres	Align with KfW agenda Identify gaps in current data landscape, regarding collection, monitoring and safeguarding processes, capacity building Build mechanisms responding to the identified shortcomings and needs
BMZ/ GIZ	Supporting a decentralised human rights monitoring ecosystem, and support mechanisms for affected communities through locally relevant digital means, will support a nationwide effort to create a long-lasting conflict-free environment, less prone to corrupt monitoring mechanisms	Human rights and digital rights actors, environmental groups, juridical representatives	Identifying monitoring needs in different contexts and collectively designing response mechanisms, entailing capacity building and infrastructure
BMZ/ GIZ	Linking to the established educational infrastructure SENA with new digital education trajectories and parallel investments in responding job market can provide a solid approach to decentralised and inclusive capacity building and employment schemes.	Digital innovation and entrepreneurial actors, SENA representatives, digital education experts	Identifying means to expand SENA curriculum and roll out in different regions, Providing incentives to local entrepreneurial and start-up scene to engage as educators and expand across country

B. A co-creative policy development process

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ	Bringing start-up scene and civil society actors together with digitalization willing government actors can foster the identification of main potentials and obstacles to develop a decentralised and transparent policy (development) framework.	Local start-ups, relevant ministries, private sector actors	Multi-stakeholder policy co-creation: Bringing start-up entrepreneurs, relevant ministries, and private sector specialists together to co-design supportive legislations and implementation strategies.
BMZ/ GIZ	GIZ can play a driving role in supporting a multi-stakeholder policy development framework that favours a green, inclusive, educational, entrepreneurial, and safeguarding regulatory framework.	Civil society actors, digital rights actors, private and public sector representatives	Multi-stakeholder policy co-creation: Funding an #i4policy like innovation for policy process

C. Sustainable funding frameworks

WHO	WHAT	WITH WHOM	HOW
BMZ/ KfW/ GIZ	Decentralising the existing start-up scene can be supported through structural, longer term funding incentives enabling relevant actors to expand their activities into rural areas and other cities.	Start-up actors, local development banks, local digital innovation representatives/civil society groups	Learn from existing funding models in already more developed start-up environments Identify needs and potentials for start-up development and entrepreneurial opportunities in remote areas Provide long-term funding scheme for start-ups to collaborate with local actors in expanding their activities in those areas

5.2.3. Mexico

Green Development

Mexico has an ambitious government, keen to become a regional leader in digitalisation and has introduced a National Digitalisation Strategy as early as 2013. However, alongside a substantial national and sub-national digital divide, the country struggles with primary distribution, such as equitable access to water and land.

Whilst Mexico has an actively organised civil society striving to preserve natural reserves, information gaps, low data quality, and missing access to open data are slowing down efforts. Moreover, Mexico's robust mining industry limits environmental actions and conflicts between mining companies and local communities are omnipresent. The mining legislation does not focus on protecting biodiversity and local communities.

This situation provides strong potential for supporting sustainable, inclusive, and independent databases. Aiming to create diverse and open databases accompanied by decentralised training provisions for capacity building can be a huge opportunity.

As the GIZ country office reported, the proclaimed digitalisation enthusiasm of the government is hard to notice, and collaborations with relevant ministries, such as the ministry of environment, prove difficult. Partnerships with the private sector and universities have shown most promising. Yet, an active civil society environment provides much ground to diversify cooperation. It also embeds efforts in local contexts while building coalitions in decentralised manners to ensure context-relevant approaches. For this reason, it is also fundamental to include relevant civil society actors. Such coalition building also allows the German development cooperation to rethink its expert and support model. Engaging local communities, such as environmental activists and innovators as leading experts in, e.g., university backed research, could reshuffle how to engage in multi-stakeholder formats.

Sustainable Growth for Employment

Mexico is said to outperform Latin America and the Caribbean (LAC) to shape an inclusive digital economy and society. However, structural divides persist, be it internet use in urban versus rural areas or the massive disparity in internet use of indigenous communities. A significant problem in the country context is also the high level of informality, with 56,1% of people not being part of the social system. Furthermore, although the government has promoted the expansion of internet infrastructure to underserved areas, connectivity alone cannot foster sustainable growth in areas facing other structural exclusions, such as training opportunities relevant to inclusive partaking in the development of an employment ecosystem. Thus, here, harvesting digital transformation potentials to foster sustainable employment growth requires a triangular approach to enable an inclusive engagement of and benefitting from those potentials.

Also, in the Mexican context, great potential is found on the sub-national level, reinforcing the need to shift a focus to inclusive, decentralised support mechanisms from the local to the national level. GIZ can support the push for an integrative approach engaging local actors, from indigenous groups to existing maker spaces, into policy development processes on the national level. It is also crucial to link the same actors to develop training to job market creation, increasing the digital economy from the grassroots upward. It is a fact that GIZ perceives the private sector and university as main innovation drivers. But it is necessary to ensure that civil society, especially the digital innovation, digital rights community, and critical actors from excluded communities, has a place on the structural drawing board. Moreover, those actors need to become an integrative item on the programming agenda to foster locally applicable/relevant research and private sector growth.

As discussed, Mexico's Estrategia Digital Nacional does cover the digital economy and education as two fields of attention alongside other legal frameworks to enable citizen participation. It is an opportunity to create education and job access on local levels and foster it through the investment in locally driven framework design processes.

Flexible funding schemes in structural, thus the longer term, constitute a crucial foundation to ensure that digital transformation processes are inclusive, with citizen organisations taking a decisive role in it.

Recommended Action Areas: Mexico

A. Further development of decentralised infrastructure

WHO	WHAT	WITH WHOM	HOW
BMZ/ KFW/ GIZ	Support the creation of a decentralised and independent data and data repository infrastructure.	Civil society groups, universities, independent research centres, relevant ministries	Align with KfW agenda Identify gaps in current data landscape, regarding collection, monitoring and safeguarding processes, capacity building Enable collaborations with active civil society groups,

			universities, and the private sector across all regions Build data creation and use mechanisms responding to the identified shortcomings and needs
BMZ/ KfW/ GIZ	A decentralised approach combining investments in rural connectivity with digital literacy can leverage the digital economy potential in the country.	Digital providers, rural educational institutions, digital literacy, and digital innovation experts/organisations	Co-design a cohesive strategy to align the expansion of connectivity with the integration of digital literacy and digital skills capacity building mechanisms rooted in the needs of local communities, tuned towards digitalisation aspects that can foster their protection and development
BMZ/ GIZ	Support the context-driven creation of new educational and training programs is a key factor for digital capacity development that is responsive to local needs and opportunities	Ministry of education, educational and vocational training institutions, universities	Curricula development Creation of open educational resources and learning environments Engaging local communities in curriculum co-design process
BMZ/ GIZ	Supporting the creation of respective locally relevant job market and business opportunities will provide a holistic approach tying in with new educational programs.	Vocational training institutions, universities, start-up scene and other relevant entrepreneurial actors	Aligning educational/training schemes with creation of needs-driven local job opportunities/creation thereof

B. A co-creative policy development process

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ/ CE-PAL	Drive policy framework development from bottom-up, through the engagement of civil society and private sector actors from all regions, 'inviting respective ministries in'	Civil society actors, private sector/start-up actors, digital rights actors, relevant ministry representatives	Multi-stakeholder policy co-creation: Supporting the creation of a decentralised policy-dialogue mechanisms, bringing multiple-stakeholders on provincial levels together and scaling towards national level policy dialogue. Simultaneously, engaging with relevant government actors to identify an accountability mechanism for dialogue outcomes to be enacted.

C. Sustainable funding frameworks

WHO	WHAT	WITH WHOM	HOW
BMZ/ KfW/ GIZ	The potential of the country's very active and well-organised civil society can be harvested through the provision of structural funding schemes to strengthen their networks and by supporting them to take on leading roles, e.g. in civic driven policy development processes or in the strengthening of a infrastructural decentralisation approach that closes connectivity, education, and job market divides in an integrated manner.	Civil society organisations, start-up scene	Learn from existing funding models in already more developed start-up environments Identify needs and potentials for start-up development and entrepreneurial opportunities in remote areas Provide long-term funding scheme for start-ups to collaborate with local actors in expanding their activities in those areas

5.2.4. Peru

Green Development

Other than some neighbouring countries, the Peruvian government is lagging in overall prioritising an environmental agenda. As a result, the country shows low investments in sustainable energy programs. Workshop attendants stressed advocating for more vigorous attention to environmental protection on all ministerial agendas. However, BMZ and GIZ support the Peruvian government since a long time in the environmental sector, also regarding environmental legislation development. These perceptions and realities demonstrate an opportunity for BMZ to stronger advocate for the engagement of multiple stakeholders in these processes and invest in making their activities transparent to relevant civil society groups.

Peru can also still learn from neighbouring countries and engage in a genuinely holistic inclusive national ecological protection agenda, including the creation of a meaningful legislation framework, accounting for transparency and safeguarding when endeavouring into data and digital infrastructure building to support environmental protection strategies. Thus, bringing digital innovation actors and environmentalists together with public and private sector actors to create multi-stakeholder alliances that incorporate local actors as leading experts can be seen as an opportunity to shift conventional, more top-down consultation approaches.

Therefore, a decentralised strategy to environmental protection policies and action is not served by striving for a forced digital innovation approach. Working with different stakeholder groups, including grassroots actors like local communities and civil society groups, requires ensuring the tools and communication means used are working in the stakeholders' respective contexts. Whilst a young startup scene in the country may be familiar with using advanced technological means, such as measuring air and water quality with AI, engaging other community stakeholders may require other less high-tech tools. It is essential to acknowledge and ensure an inclusive, context-driven, holistic approach. It also entails respecting local cultures and their collaboration traditions.

One key opportunity, also in the Peruvian context, is the creation of open, inclusive, and independent databases of environmental data. Diversifying methods to actively engage local actors across the provinces in data collection strategies does provide an opportunity to strive for a holistic approach from locally collected data to data digitalisation and storage in respective databases that, however, also need to connect back to the communities.

Collaborations with universities across the country can be relevant, considering that conflicts of interest between state entities and the private sector and among private sector actors exist. Developing new collaborations with universities and independent research institutes allows for long-term data collection strategies. Moving beyond the typical short-term research project data collection, often disconnected from the needs of local communities, can be an excellent opportunity for structural change collaboration frameworks.

Peaceful and inclusive societies

In the Peruvian context, digitalisation can play a leveraging role to foster more peaceful and inclusive societies through inclusive access to fundamental internet infrastructure. Also, the capacity to use it in the provision of empowerment and skill-building is an opportunity to empower currently marginalised civil society sectors. It is necessary to equip youth and other citizens with crucial soft skills for peaceful togetherness as an integrated component in digital literacy programs. The local digital innovation scene, such as local makerspaces, can play a central role therein.

Peru has a long-standing active civil society ecosystem promoting peacebuilding through digital literacy and training programs. Consequently, bringing these different communities into a leading role in developing decentralised inclusive national legislation and structural funding schemes, departing from a review of the Educational Technologies National Strategy 2016-2019, bear massive potential.

Further, potential lies in actively engaging established civil society actors, such as Derechos Digitales, to develop a context-driven teacher's training strategy, adhering to diverse local realities and needs.

Thus, in the Peruvian context, strong attention to collaboration with local governments is an essential mechanism. As this research has shown, some municipalities are already developing courses in entrepreneurship, e.g., through innovation competition. Building on those locally driven initiatives and supporting municipalities to engage in the creation of a structural digital innovation agenda, promoting digital education, innovation, and entrepreneurship on local levels, and bringing efforts together in an overarching, national supportive funding, and supportive legislative structure, such as fair tax rules, should be the mid-term vision for support from the German side.

Recommended Action Areas: Peru

A. Further development of decentralised infrastructure

WHO	WHAT	WITH WHOM	HOW

BMZ/ KfW/ GIZ	Collaborations with active civil society groups, universities, and independent research centres will support the creation of a decentralised and independent data and data repository infrastructure.	civil society groups, universities, independent research centres	Align with KfW agenda Identify gaps in current data landscape, regarding collection, monitoring and safeguarding processes, capacity building Build mechanisms responding to the identified shortcomings and needs
BMZ/ GIZ	Decentralisation can be achieved through increased concentration on a combined approach to connectivity provision, digital empowerment, and skill building opportunities in left out communities.	Digital providers, rural educational institutions, digital literacy, and digital innovation experts/organisations	Co-design a cohesive strategy to align the expansion of connectivity with the integration of digital literacy and digital skills capacity building mechanisms rooted in the needs of local communities, tuned towards digitalisation aspects that can foster their protection and development

B. A co-creative policy development process

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ/ CEPAL	A green digital development agenda can be addressed through fostering regional policy exchange and international policy dialogues.	Civil society, private and public sector actors specialised in the respective green development focus area	Support CEPAL's national to regional strategy development processes by enabling an eye-to-eye agenda design and implementation process with respective civil society actors
BMZ/ GIZ	Policy dialogue on local level can be fostered through bringing civil society groups and regional ministers together with representatives of digital innovation and the environmental scene, whilst following local collaboration traditions.	Civil society groups working on digital rights and local matters, environmental groups, local ministries	Eye-to-eye exchange, development, and implementation of measures following communication and other traditions of the communities engaged Incentives and obstacles for inclusive, local level expansion can be identified through actively engaging the young start-up scene.
BMZ/ KFW/ GIZ	Sustainable data structure framework development can be fostered through support mechanisms to engage civil society, universities, digital rights actors, and independent research institutes.	Civil society, universities, digital rights actors, and independent research institutes	Align with KfW agenda Support a co-creative strategy design approach with all actors to identify gaps in current data landscape, regarding collection, monitoring and safeguarding processes, capacity building

			Invest in mechanisms responding to the identified shortcomings and needs

C. Sustainable funding frameworks

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ	Engaging with civil society, rights groups, indigenous communities, and women groups, also in remote areas, can be strengthened through the provision of incentives to the country's young start-up scene.	Young start-up scene in country, more developed start-up scene in other countries in the region, local representatives	Learn from existing funding models in already more developed start-up environments Identify needs and potentials for start-up development and entrepreneurial opportunities in remote areas Provide long-term funding scheme for start-ups to collaborate with local actors in expanding their activities in those areas
BMZ/ KfW/ GIZ	Investing in the co-development of integrated training and job creation mechanisms should be enabled through the provision of long-term funding schemes for digital innovation and digital rights actors and educational institutions, such as universities.	Digital rights and digital innovation organisations/start-ups, educational institutions	Bringing the entrepreneurial and educational side on one table to align capacity building with the creation/growth of responding employment opportunities.
BMZ/ GIZ/CEPAL KfW/ CAF/ national development banks	To allow for university collaboration for data collection and repository purposes decoupled from short-term/research project based academic funding structures, it will be important to develop possibilities to fund structural funding approaches.	Civil society organisations, universities	Consider the development of a regional based multi-stakeholder funding scheme, bringing civil society organisation and academic institutions into coalitions, following the concept of Horizon 2020 grants

5.2.5. Ecuador

Ecuador will be one of the countries in which the BMZ is investing in the creation of a digital centre. Whereas current plans are to align the centre's focus with the current portfolio, such as procurement processes, supply chain, and open government, the establishment of the centre provides a chance to shape its agenda around locally expressed needs and to consider a sustainable approach that provides mechanisms for the centre's activities to benefit the entire country.

Green Development

Ecuador has a minimal internet user rate and digital literacy alongside a significant gender gap in internet use. On the other hand, the country demonstrates openness to engage in an ethical pathway to digital transformation. It forms part of the Cyber Resilience for Development, a European Union project designed to promote cyber-resilience and digital security to protect public and private enterprises across the globe. Especially in the Amazon region, the safety of local actors is under constant threat, which needs particular attention when engaging different communities in strategic development and implementation. Workshop participants express the need to support fair digital rights legislation in Ecuador as the mentioned digital legislation shows to be very controversial (O'Brien 2019).

Grassroots practitioners and social innovation startups consider using digital innovation to protect the environment and foster a green development agenda. They have particularly highlighted the crucial role of open and independent databases. These constitute an essential foundation for monitoring and evidence creation to hold human rights or land rights violators accountable.

The GIZ portfolio in the Ecuadorian country office is rapidly growing with digitisation initiatives in its three cluster areas: social development, governance, and environment and green development. However, it struggles to diversify its collaborators. It is essential to ensure an inclusive diversification approach as a foundation of further engagement to ensure that local conditions and needs are addressed, and digitalisation potential for an environmental development agenda of the country will benefit all rather than widening gaps. Given that the country office is still developing its internal digital literacy, it is an excellent opportunity to engage the local environmental activist and digital innovation startup scene as experts to develop inclusive structural approaches, harvesting digitalisation potentials for environmental protection and a locally relevant green development agenda.

As the empirical part of this study has revealed, these locally embedded actors have a clear idea of which digital means and procedures can benefit environmental protection in the country, with specific attention to safeguarding the communities in the Amazon region. Enabling coalition and program development that puts these actors in the driving seat holds great potential to ensure local engaged communities and uplift the needed capacities to excluded communities. Through respective capacity building programs, the provision of basic infrastructure, e.g. integrated into the national school curriculum, will form an essential part to secure the triangulation of infrastructure building alongside the creation of accountable policy frameworks and a sustainable funding structure. Furthermore, it will help to counteract the lack of knowledge in most people about green energies and their benefits and the lack of engineering capacity. The latter is said to also benefit from creating programs to exchange professionals and academics from more digitised countries in the region.

Workshop participants also propose the need to minimise costs and bureaucracy for sustainable startups to foster new enterprises dedicated to protecting the environment and life on Earth. And thirdly, those businesses, civil society organisations and environmental rights activists need to be shielded within legal frameworks for environmental protection alongside securing their digital rights and an open data policy.

Such an inclusive approach will be required to close the disconnect between current GIZ activities and what resonates on the civil society and startup community level. For example, GIZ

engages private sector actors in creating the information and knowledge sharing platform Bio-Wiki, but civil society and the local startup scene are unaware. Instead, they claim the crucial need to create an inclusive environmental data system.

Inclusive and Peaceful Societies

In the Ecuadorian context, bureaucratic hurdles and corruption constitute the main obstacle to development. The pandemic has increased corruption crimes, reinforcing the crucial need for anti-corruption measures. Adequate employment is accessible mainly to highly educated citizens, including a massive youth unemployment rate.

GIZ has been using digital means to combat violence against women and create secure workspaces. The app ComVoMujer/ PreViMujer and a training platform for the certification of public and private companies as "empresas seguras libres de violencia contra la mujer" was promoted. However, structural approaches are asked to fight the remaining shortcomings sustainably.

Much effort is required regarding infrastructure building as inequality is the main bottleneck in the country. Whilst families lack economic means to access basic internet and educational infrastructure. Workshop participants highlighted the crucial role of inclusive training and education access to foster a more inclusive and peaceful society. Non-formal education organisations and platforms can play a significant role, particularly in remote areas, combating unequal access to formal education. In addition, implementing a curriculum involving technology, entrepreneurship, and the new sustainable economy in public schools has a huge potential in bridging the gaps in digitalisation.

As the country faces a moment to renew its national educational curriculum to support new century job creation, it is an opportunity for GIZ to act as a connector point for relevant local and regional actors from the digital innovation and entrepreneur ecosystem into the design process.

Levering the potential of digital transformation therein requires a multi-tiered approach, as the possibility of STEM is not yet recognised as profitable in Ecuadorian society, does require respective awareness creation and integrated investments in creating a responsive and locally relevant job market.

Ecuador has a still small but existing startup ecosystem. For those companies to invest and train digital entrepreneurs and create job opportunities in the digital economy throughout the country, legal and incentive frameworks need to be created. GIZ can play a supportive role in steering inclusive policy development processes with the respective governments.

Moreover, fostering diversification to provide inclusive responses to exclusionary structures, municipalities and governments offer great potential cooperation partners. They often have their own innovation offices in public and private education, making it difficult to access research resources from international institutions. Providing structural incentives to enable more inclusive startup growth and engagement offers a massive potential to close various gaps.

Recommended Action Areas: Ecuador

A. Further development of decentralised infrastructure

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ	Supporting a combined approach of expanding access to education with integrated digital literacy and STEM education can foster an inclusive approach to digital literacy and educational divides, with particular attention to at risk communities.	Civil society actors working with at risk communities/leaders of at-risk communities, Education institutions, schools, formational training institutions, and universities, ministry of education	Co-identifying root causes of access to education of certain communities and in certain regions. Working towards the expansion of educational means to excluded communities. Supporting ministry of education in integration of STEM education in national curricula
BMZ/ GIZ	Supporting a strategic multi-stakeholder approach can be fostered through a re-evaluation of the current multi-stakeholder approach in the creation of platforms such as BioWiki and through placing relevant civil society groups in expert roles of the process.	Civil society groups, local start-up actors, public sector actors	Take active measures to expand collaboration schemes for projects such as the BioWiki, through equally engaging civil society actors and the local start-up scene in needs identification, ideation, development, and implementation processes
BMZ/ KfW BMZ/ GIZ	Supporting the creation of a decentralised and independent data and data repository infrastructure meaningfully accessible to all communities.	Existing data centres, open data community, universities and independent research centres, supportive public institutions	Streamline activity portfolios of KfW and GIZ Support public and private sector actors Support open data initiatives and independent research centres in setting up / expanding their data repository means
BMZ/ KfW/ GIZ	The new digital centre can play a key role to support or host an independent data repository and connected capacity building programs.		Align with KfW agenda Identify gaps in current data landscape, regarding collection, monitoring and safeguarding processes, capacity building. Build mechanisms responding to the identified shortcomings and needs.
BMZ/ GIZ	Capacity building mechanisms in remote areas should be co-designed with local digital rights and human rights groups in expert roles.	Civil society organisations working in digital rights/human rights, civil society groups working with left out communities, local communities	Support collaboration mechanisms for multiple stakeholders to identify capacities relevant to different contexts and derive respective training programs

B. A co-creative policy development process

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ	Supporting a multi-actor collaboration for inclusive and rights-based policy dialogue departing from provincial level, and particularly engaging at risk communities and digital rights groups, can help to hold the government's commitment through its existing, but controversial, digital legislation to account.	Civil society actors, digital rights actors, digital innovation actors, private sector, academia, government representatives	Supporting the creation of a decentralised policy-dialogue mechanisms, bringing multiple-stakeholders on provincial levels together and scaling towards national level policy dialogue. Simultaneously, engaging with relevant government actors to identify an accountability mechanism for dialogue outcomes to be enacted.
BMZ/ GIZ	The growth of a potent local start-up ecosystem can be fostered through start-up friendly tax structures and legislations developed through a co-creative policy development approach, securing to incorporate their needs.	Local start-ups, potentially start-up networks from neighbouring countries with already more advanced start-up ecosystem, relevant ministries, private sector actors	Bringing start-up entrepreneurs, relevant ministries, and private sector specialists together with experts from countries with advanced start-up taxation systems and legislations, to co-design supportive legislations and implementation strategies.

C. Sustainable funding frameworks

WHO	WHAT	WITH WHOM	HOW
BMZ/ GIZ	Building on existing capacities for digital literacy and rights education can be supported through the creation of structural financial support to rights communities as well as local educational infrastructure, such as local schools.	Digital rights communities and local schools and training centres	Providing structural funds for digital rights communities to collaborate with schools in the development of digital literacy and rights education curricula. Supporting local schools to connect with digital rights actors to c-develop respective curricula or workshops.
BMZ/ KfW	A bigger scale, agile fund, able to activate in a demand-driven, not pre-programmed way will enable to provide funding opportunities supporting innovation approaches/actors as they emerge.	SICA and/or national innovation actors	SICA could serve as funding platform able to distribute at a needs-driven base in the country but also as a regional hub to all countries as needs arise. Alternatively, the creation of a national innovation fund, hosted by a national organisation can serve as the coordinating and distributing hub (example prototype fund but longer term and demand driven, not prototype based)

5.3. Summary of Cross-Sectoral and Regional Recommendations

This paper examines both, the country level as well as the regional perspectives. The following are recommendations for implementing the proposed framework on a regional level in the LAC region, building on the country level interventions.

a) Further development of decentralised infrastructure:

Many of the activities needed to create decentral infrastructures on the country level can be made more impactful by coordinating regional level activities to create combined efforts and shared digital spaces for countries in the LAC region. They can include:

- Ensuring that large scale infrastructure projects such as the Bella2030 project are aligned with decentralization efforts on a country level
- Creating data infrastructures to enable democratic database development is a key priority for the LAC region. It will be important to connect national with regional and international efforts for data standardization and interoperability issues.
- National efforts to create access to knowledge via open data and open knowledge repositories also can and should be connected on a regional and international level – enabling people to benefit from shared resources
- National efforts to create market infrastructures should be connected to regional market development efforts. Here, the eLAC vision of creating a regional digital market could be supported by creating a dedicated exchange of experiences between the EU and LAC region in particular about strengthening users and consumers rights and opportunities.
- Network approaches: Expand on networking initiatives and enable grassroots actor-driven networking initiatives to scale - concrete partnership on international level results in impactful projects like #peacehackcamp, a collaboration between the Global Innovation Gathering e.V. in Berlin and Apiário, in Bogota.

b) A co-creative policy development process

National level efforts to create participatory, bottom-up policy processes can be met with regional processes that enable eye-level exchanges and dialogues with the EU and other regions in the world.

- On a regional level, different ‘LAC meets EU’ formats can be developed, including different stakeholders from civil society, academia and the private sector in multi-stakeholder policy dialogues. These can include creative policy formats such as bringing together digital practitioners with policy makers to create deeper understanding for the technical and social side of digital transformation.
- Making available, co-creating and employing Open Source governance resources can be a regional level effort to enable countries in the region to build their digital governance capacities. These resources can be access to and trainings for Open Source governance tools such as decidim. It can include efforts to adapt and scale municipal level solutions such as Free and Open Source Software for Digital Sovereignty

provided by the city of Barcelona's Municipal Institute of Information Technology (IMI) and building a regional network of cities undergoing digital transformation.

- Many cities in Germany and Europe and the LAC region are working on the same topics such as setting up open data repositories. Here, a concrete need is to connect people working in city administrations using the same software to exchange implementation experiences. Some exchange is taking place through existing networks such as the International Smart City Network (ISCN) but that could be continued and intensified.
- Regional level policy efforts can include different tools to strengthening Civil Society in the region and their role in policy dialogues. This can include creating shared learning spaces and network activities for digital rights actors from Europe and from the LAC region, for instance to exchange experiences on campaigning, lobbying tactics, or policy assessments. Network approaches and exchanges can be useful mechanisms. A current example from Africa is a group of African civil rights activities and lawyers touring the EU to learn more about the Digital Single Markets act and AI directive, in order to lead correlating policy dialogues in East Africa. Such efforts can be copied, supported, expanded, and scaled.
- These processes could result in the creation of measurable indicators in the LAC region and a move from dialog to implementation

c) Sustainable funding frameworks

Creating open, agile and long-term funding mechanisms will be crucial for sustainable digital transformation. National efforts need to be met with regional and international funding mechanisms. Civil society actors around the world agree that a more diversified funding for open technology is necessary in order to secure independence and the sustainability of our digital infrastructures, and to ensure responsive, inclusive digital transformation.

- For regional support mechanisms, providing flexible funding schemes that can be made available rapidly and agile to all countries in which innovation sparks will be central to align with the dynamics of digital transformation.
- Mechanisms are needed to fund the creation of open resources. A global, or a European, or many including a LAC Open Tech Fund should be created that serves similar purposes to the US based OTF but without being solely funded by the US government. Additionally, the creation of open source software and hardware such as the BMBF funding Open Prototype Fund could be created for the region.
- Moreover, existing local funds can be supported. Ready to support initiatives on the ground range from the Open Calls for Climate Change Mitigation Plan from Instituto Procomum, to the afro-centred social innovation fund Fundo Baobá to the Peruvian platform for socio-environmental enterprises Kunam.

6. Summary and Next Steps

This paper is a contribution to the question how German development cooperation can support digital Transformation in the LAC region. It combines a number of different perspectives and research angles: a) The German development cooperation perspective through the consultation with BMZ, GIZ and KfW as well as the interviews with members of these organisation and seconded staff members to regional LAC organisations b) the LAC regional perspectives through further stakeholder interviews c) the country level perspective through the workshops and national stakeholder interviews. In addition to providing a general overview of the ICT sectors in the countries selected for this study, the paper zooms in on selected sectoral topics on different country levels.

Summary of Findings

This paper accounts for different stakeholder perspectives, their political interests, and the needs to coordinate and harmonize their approaches:

German – Germany has an interest to continue its long-standing cooperation in the area and build on existing traditional development engagements whilst focussing on future oriented topics and methodologies. Supporting the digital sovereignty of partner countries is a clear goal set by the coalition treaty of the new German government. Therefore, it is within Germanies core interest to build structures of digital sovereignty and digital cooperation.

EU – As the EU is carving a third internet model as a contrasting approach to the USA and China, value-based policy driven digital transformation, it is in the interested of the EU to pursue this third model in cooperation with other regions of the world. After a previous focus on Africa, since the opening of the D4D hub there is a new focus on the LAC region. Therefore, it is within the EU's interest to support and engage the LAC region as partners in creating democratic digital transformation approaches.

LAC Region – The LAC region, in its diversity, seeks collaboration with other regions of the world, including the EU and Germany. In particular, there is a strong interest in harnessing the potentials of digital transformation for ecological social justice, and climate protection. Therefore, there is an alignment of interests with Germany and the EU that can be built on with the opportunity of developing shared or joint approaches and working at "eye-level" rather than in classic development structures. This can range from creating large infrastructure projects, for instance through green hydrogen projects, to joint policy dialogues.

Country Level – As many LAC countries are missing digital policy frameworks, there is particular cooperation potential in this area. Further, there is a clear need for using digital transformation for creating evidence-based systems, monitoring systems and the necessary data infrastructures at country level.

Within the very different societal and political situations, many reoccurring themes and issues were identified:

- All LAC countries face steep divides between urban and rural areas, with most digital transformation concentrated in a few urban centres. Infrastructure development thus requires parallel investments in digital literacy

- Most LAC countries share a clear need for creating data driven decision making systems, monitoring systems and the necessary data infrastructures
- Many LAC countries are missing digital policy frameworks, engaging multiple stakeholders from diverse local context.
- There is need to create access to information and skill building in order to improve future employment opportunities, in particular for people living in rural areas, women, indigenous people and people from low-income backgrounds
- There is a need for future infrastructure developments to create access for those who are unconnected to global broadband structures and find decentralised approaches to create better access in rural areas
- Further, there is a need to ensure these infrastructure developments, particularly in rural areas are connected to educational opportunities and digital market building programmes as well as accompanied by digital rights programmes

Out of these cross-cutting findings an overarching guiding framework for future engagement in digital transformation in the LAC region has been formulated.

Summary of action framework areas

1. **Further development of decentralised infrastructure**
   Supporting the development of and access to locally relevant open digital resources, including data and data infrastructures, access to the infrastructures of sovereignty, educational and training infrastructures, open-access tools and content, and local market infrastructures respectful of tradition and cultures is the base for inclusive digital societies and therefore should be a key area of engagement for development organisations supporting digital transformation.
2. **A co-creative policy development process**
   The European value-based model of digital transformation and the policy trends being set by the EU can serve as a base for inviting countries from the LAC region to engage in co-creative policy development process including relevant civil society actors. This can be a base for dialog and cooperation in the LAC region, complemented by strengthening the role of local stakeholders through bottom-up policy process.
3. **Sustainable funding frameworks**
   Creating sustainable funding mechanisms that enable reliable yet flexible support for local actors' agendas, designed to respond to the dynamic emerging of innovation potentials, rather than pre-assigned from the funding development organisations will be a key for future development cooperation.

Recommended Next Steps

The broad and multi-layered research scope of this paper was beneficial for creating an overview of the above-mentioned regional complexities including, the different stakeholder perspectives. However, given the fact that the active research phase was limited to just around two months, including the end of year holidays, covering all the above-mentioned perspectives in an adequate depth was a tall undertaking. This paper can therefore, at best, provide

oversight and inspiration. By combining the very grassroot perspective of the national level stakeholders and the regional political perspectives, we were able to identify certain trends and patterns as well as identify key areas for future action. These inputs can provide a base to develop new instruments and approaches, as well as concrete project and actions.

We recommend further research in order to add to the insights provided by this paper:

a) **An analyses of other donor activities in the region:** This paper does not cover the activities of other donors. It would be advisable to investigate harmonizing approaches and activities in the recommended action framework areas and therefore recommendable do conduct further research into existing and planned programmes.
b) **Sectoral research on country level by local stakeholders:** Further research needs to be done to deepen the results presented in Chapter 4 and the correlating recommendations for future activities in these sectors. This research can include analysing government programmes and interviewing a broader range of stakeholders.
c) **Feasibility studies for selected recommended future interventions and instruments:** We recommend selecting a number of the recommended future activities in the three action framework areas and conducting further research as to how they could be implemented. This can include further interviews with the suggested partners, target groups and other local stakeholders in order to deepen the understanding of already existing collaborations and agendas, and base future strategies on these.

Apart from conducting further research, we recommend the following next steps:

- **Internal Harmonization:** Set up meeting between BMZ's regional and digital units with respective GIZ and KfW representatives to discuss findings of this paper and coordinate next steps regarding further research and planning of future activities.
- **EU Level Harmonization:** Meet with GIZ seconded D4D Hub staff to discuss findings of this paper and discuss how Germany can best contribute to the D4D Hub agenda for LAC.
- **Regional Harmonization:** Bring GIZ country offices in dialogue with seconded staff to regional institutions (SICA, ECLAC) in order to identify entry points to streamline activities and to foster mutual learning and capacity building.
- Start with the development of new instruments, needed for future cooperation.
    - This can include reviewing how global and regional network approaches can be integrated and further developed.
    - Further, new funding instruments can be developed, possibly in cooperation with the EU and regional development banks.
    - New policy instruments can be tested including innovative, agile, multi stakeholder approaches.
    - BM can intensify and create regular stakeholder dialogues. This can be a helpful tool to complement the further research and create sustainable relationships with relevant stakeholders and potential partners to develop the ideas for future activities. Stakeholder dialogues could perhaps take place in consultation formats such as regular round table meetings.

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APPENDIX

Appendix 1: List of Interview and Workshop partners European and LAC level

Interviews Overview: Regional Actors

Interviewee	Regional Actor	Organisation	Role
Frank Weiler & Johannes Scholl	KfWKfW / SICA & KfW / CAF	KfW	Urbane Klimaanpassung in Zentralamerika / SICA & Beteiligung am Multi-Donor Trust Fund (SECCI) Central American and Caribbean Climate Insurance Facility (CCRIF) Regionalprogramm zur Stromeinsparung, Phase II (CAF)
Manfred Haebig	GIZ/CEPAL	GIZ	Asesor Principal Programa CEPAL-BMZ/GIZ
Katharina Arndt, Eva Hoerman	GIZ/EU-D4D Hub	GIZ	Katharina Works for the GIZ in the European Commission (DG INTERNATIONAL PARTNERSHIPS (former DG DEVCO)), Eva EU D4D Hub
Isabel v. Griesheim	GIZ/SICA	GIZ	Head of Regional Energy Projects
Jens Mackensen & Jens. Ochtrop - group interview	KfW	KfW	Nachhaltige Naturschutzfinanzierung Amazonasbecken (OTCA) Ecuador & Wasserver- und Abwasserentsorgungsprogramm und Wasserverlustreduktion

Interview Overview: Organizations

Interviewee	Country	Organisation	Role
Fernanda Castilho	Brazil	MOSS.EARTH	Chief Legal Counsel and CCO
Giordano Cabral	Brazil	CESAR	President of the administrative council

Kit Sin	Colombia	Ruta N	Development of Solutions
Margarita Pacheco	Colombia	Fundación Natura	Board of Directors in the Natura Foundation
Cristian A Gibaja Gil / Jhonatan Paliza	Peru	Yau! Peru	Cristian is the founder and responsible for marketing/ Jonathan is responsible for administration and is an industrial engineer
Daniel Caballero	Peru	AFRY and PuccaSky	Co- Founder of PuccaSky and Engeneering at Afry
Guillem Torres Sepulveda	Mexico	Controla tu Gobierno	Co-Founder Controla tu Gobierno
Carolina Puerta Ocampo	Mexico	Alianza por la Inversion de Impacto Mexico	Director
Alejandra Correa	Ecuador	Bou Company	Business Development Manager
Carmen de la Cerda	Ecuador	BuenTrip Ventures	Co Founder

Workshop Participants

Country	Participant	Organisation
Brazil	Jessica Lobo	Ao Vento
	Joana Varon	Coding Rights
	Luiz Filipe Carvalho - Hakkuna	Hakkuna
	Victor Durigan	Vero
	Hiure Queiroz	Colab / Sítio do Astronauta
	Andwara Pataxó	Pataxo Indigenous Ecotourism Association Aldeia Velha
	Cristiano Lopes	Naturabit
	Regis Bailux	Verdejar dÁjuda
	Uirá Porã	Felicilab
	Rodrigo Silvestre	Felicilab

Colombia	Stephany	Fundacion Juanfe
	Andres	Arasari Conservacion
Peru	Jhosep Guzman	Whaposat
	Cristina Puiggros	Entrearboles Peru
	Maricielo Arévalo	Empoderamiento de la Mujer Amazonica
	Javier Carrasco	WAWA Laptop
	Gustavo-PNCAZ (Gustavo)	PNCAZ
	Verónica Valverde	ConCiencia Marina
Mexico	Haydeki Quijano	SocialTIC
	Regina Cervera	C Minds
	Vladimir Cortés	Articulo 19
	Angelina Alarcón	Saturdays.AI
Ecuador	Jorge Guallichico	Terroformaciones
	Indira Vargas	
	Santiago Ron	PUCE
	Paulina Villamil	IMPAQTO
	Francisca Castellanos	Crick Superfoods
	Andres Tapia	

Appendix 2: Stakeholder lists per country

[See excel file attached]

Imprint

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