Opportunities and Challenges for the Twin Transition in Latin America and the Caribbean

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Abstract

As the world turns the page on the pandemic, today's digital technologies and environmental circumstances require rethinking. A wide range of digital technologies can be useful tools to support efforts to *Monitor, Mitigate and Adapt to* climate change. The potential benefits of digital technologies span diverse sectors. The challenge is to support firms all along the value chain in two major and simultaneous transitions: digital and green. Opportunities and challenges may differ for Latin America and Caribbean compared with other regions, yet the *glocal* nature of risks, commitments and regulations, necessitates both universal and tailored policy mechanisms for international cooperation.

Studies about green and digital transformations have largely been conducted in isolation from one another, but this is beginning to change (Rabellotti, 2022). This tendency is mirrored in policy agendas, where the two topics were, until lately, at the top of two ***separate*** policy agendas. In Europe, the twin transition is being promoted as part of an optimal pandemic-recovery strategy, necessitating a greater dialogue between the two policy agendas.

The European Commission argues that there are dual forces which can be guided toward more optimal outcomes. One force is the green transition which aims (via policy directives) to propel the adoption of a greener mindset in the productive sector. The other force is the increased reliance on digital technologies which can help firms and countries reach green goals (European Commission, 2021), with some even going so far as to say that green goals cannot be reached without the support of digital technologies (Digital Europe, 2021a).

On the other hand, digital technologies have their own environmental footprint, not just in terms of carbon emissions, but also in terms of e-waste (ITU, 2019a). Even if digital technologies can save far more emissions than they produce, opportunities to optimize can easily be overlooked without an ***intentional*** connection between digital and climate action (Digital Europe, 2021b).

Evidence suggests that regions benefit more from switching to greener technologies when levels of digital technology uptake are higher, and detrimental environmental effects–related to the proliferation of digital technologies–are weaker in regions with greater adoption of green technology (Bianchini et al., 2022). This has important implications for Latin America and the Caribbean (LAC). While the region is certainly not the greatest contributor to Green House Gas (GHG) emissions, low levels of digital technology adoption may present a double whammy; firms already struggling with lower productivity and facing uncertainty may not gain as much from adopting greener technologies.

Figure 1. GHG Emissions by Region, 2019[1]

Data source: IPCC, 2022.

[1] Regions are defined by the source. 'International Aviation' includes international shipping.

LAC Cannot Afford to Miss the Twin Transition

The sense of urgency about climate change is greater in LAC than in other regions. More than two-thirds of citizens see it as a major threat to their country in the next two decades, and they are right: 26% of the 50 countries most affected by climate change are in LAC (OECD et al., 2022). Countries in the region may be well positioned to take advantage of the green transition to modernize productive sectors. Lema et al., (2020) assert that countries can activate Green Windows of Opportunity (GWOs) to boost technological capabilities which could allow for catch-up or leapfrogging and lower the cost of green transition technologies.

Digital technologies have been shown to reduce a variety of economic costs and boost economic performance at the firm, regional, and national levels (Goldfarb and Tucker, 2019). Digital technologies also provide tools that are useful in the context of actions to address climate change: Monitoring, Mitigation and Adaptation[2]. (ITU, 2019a and ITU, 2019b). Examples listed below are drawn from the two ITU publications, separated by monitoring, mitigation, and adaptation dimensions.

Monitoring

What gets measured gets managed. Using digital technologies and data can improve the assessment and observation of the global environment and threats to the ecosystem. Recent progress in measuring emissions (i.e., satellite technology) helps increase transparency. Now satellites can spot the locations of big emissions and the global community no longer needs to rely on countries' self-reported data (Digital Europe, 2021a). Weather satellites and radar can track the progress of hurricanes, tornados, and forest fires. Earth observation satellites can obtain information about the atmosphere (i.e., CO_2, Ozone), and ocean parameters, agriculture data (i.e., soil) [ITU, 2019a]. Digital technologies and systems can help firms with environmental reporting and compliance. Environmental regulations are getting increasingly complicated and will have consequences for firms along the value chain. When firms are smaller, they tend to have fewer resources and lower capacity to collect the data to manage reporting, let alone to adapt to meet compliance requirements (D4SME webinar March 2022).

Mitigation

Evidence suggests that digital technologies can potentially cut global CO_2 emissions by 20% in other industries by 2030 (Digital Europe, 2021b). For example, digital technologies to improve the energy efficiency of buildings[3] reduce traffic congestion and, thereby, emissions, facilitate smart cities and smart grids (i.e., effective management of renewable energy sources). A smart city project in Vienna helped reduce the CO_2 emissions of a large residential building (with 330 rental apartments) by 71% (Digital Europe, 2021b). In general, in the pursuit of new sources of energy and fuel, ***innovation*** in advanced digital technologies can contribute to sustainability solutions (Geneva Environment Network).

Adaptation

Early warning systems, enhance distribution and flows of food and aid to those affected by natural disasters. Sendai City in Japan, for example, has tested a prototype for a tsunami alert whereby an AI system triggers an automatic launch of a drone, which will then send warning messages to citizens via cell phones and radios. The AI system can use facial recognition software to assist in identifying victims (UNESCO, 2021). Using soil sensors and real-time data can provide more accurate insights than above-ground data (i.e., satellite imagery) about a variety of factors relevant to farmers and other companies in agriculture. CropX, a company automating farm management using soil sensors integrated into a big data platform and what they call 'Ag Analytics', has shown (Digital Europe, 2021b) that their digital technologies can save 40% of the water used across distinct crops. Moreover, these technologies served to increase yield by 10%.

Challenges to the Twin Transition in LAC

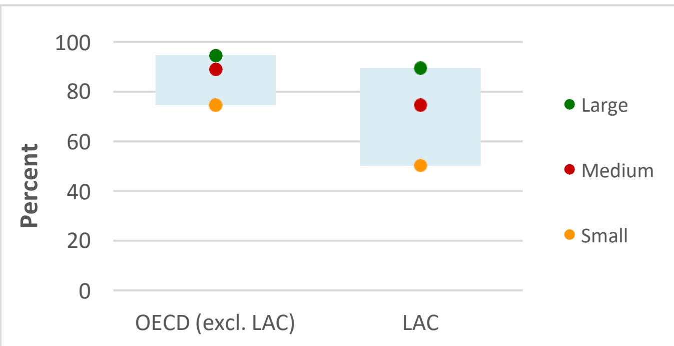
Compared to more advanced regions, digital technology adoption among firms, especially smaller firms, is very low in LAC. This is true for basic digital technologies, such as owning a website (see Figure 2). It is also concerning because gaps tend to be exacerbated as the sophistication of digital technology increases (IDB,

[2] Examples listed are drawn from ITU, 2019a and ITU, 2019b.

[3] Globally, commercial and residential buildings are estimated to be responsible for ~6% of direct emissions and ~12% of indirect emissions (ITU, 2019a)

2022), slowing the twin transition as a whole. Generally, digital technology adoption levels and integration into firm practices will need to increase to provide the kind of digital support needed for the green transition. While lead firms in global value chains will increasingly rely on green suppliers whose production methods can be traced and verified (typically using digital technologies), suppliers will thus have to comply with green and digital standards to be able to participate in the global economy (Amoroso et al., 2022).

Figure 2. Percent of Firms having their Own Website, by Firm Size[4]



Data source: Own elaboration based on the World Bank Enterprise Surveys and the OECD Business ICT data.

The twin transition could also widen productivity gaps between firms and productive sectors since, despite the benefits and opportunities it brings, investing in new technologies is uncertain and has long-term payoffs–a leap more challenging for SMEs to take (Amoroso et al., 2022).

A framework and clear performance indicators for the twin transition are needed. Most of the literature on this topic is still 'grey literature'. Guest editors for Technology in Society recently launched a call for papers, citing a long list of open research questions and suggesting that academia needs to rise to the occasion to assist in translating broad policy notions about the *twin transition* into explicit (and presumably testable) strategies.

The classification of economic activities that can be undertaken to address climate objectives is complex. Although the EU Taxonomy Compass has made progress by making the EU's classification of activities (by sector) more easily accessible, measuring the intensity of activities and their environmental (and economic) impact still poses a challenge.

Borders do not constrain environmental goals and issues; they are international by nature. As such, they require international collaboration, which includes discussion and agreement about priority action-areas, and active participation from different countries with a wide range of issues and incentives.

Policy recommendations / conclusions

Lift the Limits of Language: Communication channels need to be strengthened with a 'common language' that can be used between firms in a value chain and public sector entities. In Europe, clusters have been promoted as a good structure for fluid information flows because they are well-positioned to connect to top-down initiatives (EU Green Deal and Digital Europe) with bottom-up industrial ecosystems (Interreg Europe, 2021)

Establish Measures to Manage: The LAC region needs better **diagnostics** to identify promising (or strategic) sectors and priorities and set forth sector-specific goals and key performance indicators (KPIs) for the twin transition. Digital Europe (2021b) identified 5 sectors in Europe where digital technologies could potentially serve to reduce the most CO_2. LAC economies could consider doing this (a) regionally, (b) by country, or (c) by sub-regions (i.e., Central America, South America, and the Caribbean, separately).

Global Community as a Catalyst for Investments: The LAC region needs support to offset the inherent risks of investing in **new (digital and green) technologies and innovative** approaches to foster experimentation and ultimately make progress toward achieving green goals established by (a) individual LAC countries, (b) regional goals, and (c) international goals. Support for larger versus smaller firms may differ depending on their baseline digital maturity. The public sector is crucial for creating the stability necessary to encourage subsequent private sector investment.

Test and assess different policy mechanisms (i.e., mandates and incentives): Pilot horizontal initiatives such as the development of **digital skills and data**

[4] Notes: The Enterprise Surveys defines firm size as: Small (5-19), Medium (20-99), and Large (100+) and the OECD defines firm size as: Small (10-49), Medium (50-249), and Large (250+). OECD Business ICT data were used for Brazil and Colombia. Regional averages are the simple averages of data available for countries in 2019 (OECD excluding LAC member countries) or latest year available from 2016-2019 (LAC).

cooperation (i.e., Euro data spaces), and vertical interventions such as a directive for energy performance of buildings, smart meters and digitalization of the grid, use of **dynamic pricing** (i.e., lower prices for charging an electric car during off-peak times), support investment in energy management systems for SMEs (Digital Europe, 2021a).

Promote a culture of continuous improvement driven by evaluating the expected and achieved impact of policy mechanisms and program interventions. Systematic evidence-building is needed for a more comprehensive understanding of the scope of possible contributions of today's digital technologies for achieving green goals in LAC.

Acknowledgments

This policy brief was prepared by the Climate Change Cluster in the Competitiveness, Technology, and Innovation (CTI) Division of the Inter-American Development Bank (IDB).

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