



SDG ACCELERATION ROADMAP

UNLEASHING THE POWER OF
PRIVATE-SECTOR DATA IN THE GLOBAL SOUTH



Dymaxion Labs: Satellite imagery for the Public Good in Latin America

Dymaxion Labs: Satellite Imagery for the Public Good in Latin America

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Acronyms and abbreviations

API	Application programming interface
CAF	Andean Development Corporation
CSR	Corporate social responsibility
EO	Earth observations
ESG	Environmental, social, and governance
IADB	Inter-American Development Bank
IDRC	International Development Research Centre
IoT	Internet of Things
LAC	Latin America and the Caribbean
MIDES	Ministry of Social Development of Uruguay
ML	Machine Learning
NGO	Non-governmental Organization
SAR	Synthetic-aperture radar
SDG	Sustainable Development Goal
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme

Executive summary

In 2021, Cepei and LIRNEasia launched the Sustainable Development Goal (SDG) Acceleration Roadmap project,¹ supported by the International Development Research Centre² (IDRC), and in partnership with the Local Development Research Initiative (LDRI) in Kenya,³ the Caribbean Open Institute (COI) in Jamaica,⁴ and the Centre for Continuing Education (CCE) in Palestine.⁵ With the midway point⁶ of the Sustainable Development Goals (SDGs)⁷ fast approaching, the project's purpose is to understand just how far the private sector's data-related contributions to public policy in the Global South extend. Our primary research question is: **what is the private sector doing to make more and better data available to achieve and monitor the SDGs in the Global South?** To answer this question, over the course of 2022 and 2023, we are undertaking and publishing research and fostering global dialogues about the value of public-private partnerships in the data and digital policy spaces.

This document presents the main characteristics and lessons of a data for public good initiative carried out by Dymaxion Labs,⁸ an Argentine startup that applies machine learning and computer vision techniques to extract information from satellite images. Pertinently for this project, Dymaxion Labs combines its business operations with an explicit commitment to the SDGs and is committed to contributing its work to the open-source community.

¹ Cepei. 2023. SDG Acceleration Roadmap Homepage. Online at: <https://cepei.org/en/initiatives/sdg-acceleration-road-map/>, accessed 2 March 2023.

² IDRC. 2023. IDRC – CRDI Homepage. Online at: <https://idrc.ca/en>, accessed 2 March 2023.

³ LDRI. Local Development Research Institute Homepage. Online at: <https://www.developlocal.org>, accessed 2 March 2023.

⁴ COI. 2023. The Caribbean Open Institute Homepage. Online at: <https://caribbeanopeninstitute.org>, accessed 2 March 2023.

⁵ Birzeit University. 2023. Center for Continuing Education Homepage. Online at: <https://www.birzeit.edu/en/community-affairs/institutes-centers/center-continuing-education>, accessed 2 March 2023.

⁶ UN. 2023. High-Level Political Forum on Sustainable Development. Online at: <https://hlpf.un.org/sdg-summit>, accessed 2 March 2023.

⁷ UN. 2023. Department of Economic and Social Affairs: Sustainable Development. Online at: <https://sdgs.un.org>, accessed 2 March 2023.

⁸ Dymaxion Labs. 2023. Homepage. Online at: <https://dymaxionlabs.com/>, accessed 25 January 2023.

About the SDG Acceleration Roadmap Project

There is a significant shift taking place within the world of business. In recent years, environmental, social, and governance (ESG) has risen in prominence among an increasingly socially and environmentally conscious consumer base. ESG investing has attracted substantial interest with reporting on environmental, and sometimes social, metrics becoming a must-do in many companies' annual reporting and shareholder meetings. Viewed from a public policy perspective, the turn towards more socially and environmentally conscious capitalism creates opportunities for alignment between business and government; for instance, between ESG metrics and political targets such as the SDGs that center on people, planet, and prosperity as the three pillars of sustainable development.

One area of alignment is in the field of data and digital transformation. Whether framed as ESG, the SDGs, or corporate social responsibility (CSR), companies around the world are providing support to public sector institutions in ways that help to improve their capacity for evidence-based decision-making. Activities -or data actions- being taken range from the transfer of actionable data to the public sector directly, through to the provision of tools or services that help improve the public sector's ability to capture and utilize insights from data repositories.⁹

Examples of public-private data actions abound. *Our Mapping Private Sector Contributions to the Data Revolution for Sustainable Development: Insights from the Global South*¹⁰ report ("mapping report") is based on insights from 394 data actions that have been mapped across 94 countries. These data can be analyzed and accessed directly through the project website.¹¹ What our mapping work uncovered is that there is a vibrant ecosystem of public-private activity around data.

⁹ See here for a full list of 'data actions' identified within this project: https://cepei.org/wp-content/uploads/2022/09/Terminologia_Data_Actions-ENG.pdf

¹⁰ Cepei. 2022. Mapping Private Sector Contributions to the Data Revolution for Sustainable Development: Insights from the Global South. Online at: <https://cepei.org/wp-content/uploads/2022/09/Mapping-private-sector-contributions-to-the-data-revolution-for-sustainable-development.pdf>, accessed 2 March 2023.

¹¹ Online here: <https://cepei.org/en/initiatives/sdg-acceleration-road-map/>

Our Case Studies

To further explore the themes identified in our mapping report and uncover how the mechanics of public-private data partnerships operate – what the incentives for partnership are, how impact is measured, what enabling environment needs to exist, and other factors – we undertook a series of eight case studies in late 2022 and early 2023.

Our case studies showcase examples of public-private data partnerships and document how companies' data actions can help public institutions in the Global South to respond to major public policy challenges such as climate change, the promotion of gender equality, improving employment opportunities and digital literacy, among others.

We selected our case studies in a way that ensured that we covered multiple: types of data, types of partnership/partnership facilitation, types of data action, company size, and thematic area. Thereafter, each project partner independently produced their case study(ies) using a common semi-structured interview guide and desk-based research. Case study-specific methodological considerations are explored in more detail within each study.

Through our case studies, we have further developed and refined the themes identified in our mapping report and proposed recommendations based on them. Recommendations emanating from our case studies can be found here: www.cepei.org

In summary, the five overarching themes that have emerged from our case studies are:

1. There is real-world value being produced from public-private data partnerships.
2. Companies that can offer solutions to more than one data-related challenge are more attractive partners for public bodies.
3. Identifying and measuring the impact of public-private data partnerships

is challenging and it takes time and energy for processes to effectively do this to emerge.

4. Business support to public initiatives and core business operations are not mutually exclusive.
5. A significant barrier to initiating, implementing, monitoring and scaling-up public-private data partnerships is the lack of standard operating procedures to develop partnerships.

Dymaxion Labs - Satellite Imagery for the Public Good: Findings and Recommendations

One of the most promising sources of high-value data for public decision-making are geospatial data derived from earth observations (EO). Geospatial data generation involves gathering "information about planet Earth's physical, chemical and biological systems via remote sensing technologies, usually involving satellites carrying imaging devices."¹² In recent years, dramatic increases in the availability and accessibility of high-quality and high-frequency EO coupled with powerful cloud-based data processing solutions have made geospatial data a far more accessible and usable data source for policymakers worldwide. Geospatial data are now used by governments around the world to help track: the impact of climate change, the health of the planet's oceans, agricultural productivity, urban sprawl, and many other phenomena.

As datasets and analytic capabilities become more advanced, the ability of companies to provide bespoke, contextually specific geospatial data and insights increases. One company that has successfully managed to build a business in this space is Argentina-based Dymaxion Labs.¹³ Dymaxion Labs leverages machine learning and computer vision to analyse vast geospatial data derived from EO. The company is explicitly positioned to support governments

¹² EU. 2023. Earth Observation. Online at: https://joint-research-centre.ec.europa.eu/scientific-activities-z/earth-observation_en, accessed 13 March 2023.

¹³ Dymaxion Labs. 2023. Homepage. Online at: <https://dymaxionlabs.com/>, accessed 13 March 2023.¹⁶ Meta. 2020. Climate Conversation Map Provides Insights to Help Global Organizations. Online at: <https://about.fb.com/news/2020/04/climate-conversation-map/>, accessed March 14, 2023.

and public institutions in Latin America to “better understand the drivers of economic development.”¹⁴ Dymaxion Labs provides solutions in the fields of urban development, agricultural policy, and climate change.

One of Dymaxion Labs' most useful services for governments in Latin America, including the Government of Argentina, is the AP-Latam tool.¹⁵ The tool generates maps of probable slums and informal settlements through “the application of machine learning techniques to satellite images and other georeferenced data.”¹⁶ To date, the tool has been used in Argentina, Paraguay, Guatemala, Honduras, Uruguay and Peru. Governments are not the only users of the insights generated through the AP-Latam tool. Civil society organisations (CSOs) including TECHO¹⁷ that work in slum environments have also been provided with near-real time data on settlement boundaries and size. Organisations like TECHO can then utilize this data to optimise their own field surveys.

One of the factors that makes Dymaxion Labs stand out as a successful example of a company that has managed to build a successful business out of data generation and analysis in the Latin American region is the success it has had in establishing relationships with governments and integrating its services into their policy agendas. It has managed to successfully navigate often complex and contradictory legal and regulatory systems across numerous countries in the region, secure third-party funding for its public-good projects, including from major funders like the Inter-American Development Bank, and has drawn connections between its tools and the SDGs.

As a result of all this, Dymaxion Labs has played a key role in not only improving access to valuable data and its insights, but also showcasing their utility and persuading governments in the region that there are significant benefits to be reaped when investing in data infrastructure. What interviews underpinning this case study have shown is that often Dymaxion Labs' projects work as catalysts

¹⁴ Ibid.

¹⁵ Dymaxion Labs. 2023. AP Latam. Online at: <https://ap-latam.dymaxionlabs.com/en/>, accessed 13 March 2023.

¹⁶ Ibid.

¹⁷ TECHO. 2023. Homepage. Online at: <https://techo.org/>, accessed 13 March 2023.

for future ones. For instance, Dymaxion Labs' support to the Government of Uruguay started through a partnership with the Ministry of Social Development (MIDES) and the provision of the AP-Latam tool. Following this success, they then partnered with the Ministry of Transport to analyse the state of Uruguayan road network, and the Ministry of Energy which requested Dymaxion Labs to map residential solar panels in the country. In this latter example, the Ministry even paid for its own photogrammetric flights to establish base layer data for Dymaxion Labs to work with, highlighting the catalytic effect that the company has had on government's approaches to using data for evidence-generation.

This case study also contains an important lesson for the data revolution: **there are frameworks for action for the use of non-traditional sources where data is available, and initiatives have shown effectiveness.** It is towards this direction that the efforts of the private sector should be focused on to generate concrete impact.

The document is structured as follows: A first part describes the background and the context in which the initiative took place; a second part contains the characteristics of the company and the data initiative, as well as, the reasons why this case is relevant to understand the role of the private sector in the region; a third part contains the findings and lessons learned that emerged from the interviews; and finally a series of conclusions and recommendations for future actions. Methodological notes on how this case was built are included in Annex 1 and 2.

Part 1: Background and Context

The 2030 Agenda for Sustainable Development posed a series of challenges in terms of data needs that, in turn, represented an opportunity to make innovations and improvements, often neglected, in the supply of data for sustainable development. The use of non-traditional sources such as financial transaction data, mobile networks, satellite imagery, sensors, or Internet platforms can substantially increase the quality and reduce the cost of generating the information required for monitoring and implementing the SDGs.

In addition, “traditional” statistical surveys and censuses can be complemented with new sources of information. This trend gained momentum during the COVID-19 pandemic, when data producers faced sudden interruptions of traditional collection sources and had to develop new methodologies for using alternative sources, thus spontaneously extending the data ecosystem.¹⁸

However, the data revolution not only implied a quantitative leap in data supply, but also a series of new unavoidable demands: greater relevance (data on new phenomena), timeliness (real-time data), and coverage, including granularity (new data sources allow high levels of disaggregation), in addition to the reduction of costs and response burden.

In this context, and to find out what the private sector is doing to make more and better data available for the SDGs in Latin America, Cepei, in the framework of a global project funded by IDRC, has mapped private sector data initiatives that contribute to strengthening data capacities to monitor and achieve the SDGs.¹⁹ On that basis, a series of case studies have been chosen that can provide relevant lessons and learning for the data community and have replicability, scalability, and co-creation characteristics.

³⁰ Data ecosystem is the name usually given to the place where the processes of production, consumption, and transfer of data are generated.

³¹ For the purposes of this report, this concept includes capacity building, skills sharing, data collection, data sharing, data analysis, data infrastructure, data governance, data mapping, funding, among others.

Based on these premises, in Latin America, we have been able to identify 42 data initiatives distributed in 14 countries, as well as some from large multinational companies with a region-wide reach. It is likely that many initiatives that are not visible or are visible, but in ways that do not fit the search methods used for this exercise, have not been captured. Most of the initiatives identified are related to data sharing, either directly or through actions such as data analysis, capacity building, or impact reports that include some levels of private data opening.

In cases where public-private partnerships have been identified, it is useful to distinguish between partnerships that seek to enhance an alternative data source to measure one-off phenomena, from partnerships that aim to measure them on a regular basis. In this sense, data initiatives that aim to measure phenomena on a regular basis require sustainable collaboration, which must be backed by enforceable rights and obligations between the parties (Cepei, 2022).

The case presented below, based on a desk review, and interviews contains lessons on how the private sector can be involved in different ways to enhance the availability of data to improve public policies. In particular, it discusses a cumulative experience with satellite imagery analysis models applied to the public good, involving multi-stakeholder partnerships.

Part 2: Dymaxion Labs – Satellite images for the public good

2.1 About the company

Dymaxion Labs is a startup that applies machine learning (ML) and computer vision techniques to extract insights from satellite images. They work with tools for urban planning, agriculture, energy infrastructure, and object detection.

²⁰ Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, México, Nicaragua, Panama, Peru, Uruguay and Venezuelat: <https://dataforgood.facebook.com/dfg/tools/social-connectedness-index>, accessed March 14, 2023.

The company was founded in 2018, in Buenos Aires, Argentina, with the aim of providing satellite imagery data services to the private sector and undertaking public good actions. It was initially financially supported -equity-free- by the UNICEF Innovation Fund and the Government of the City of Buenos Aires (INCUBATE).

Dymaxion Labs leverages ML and computer vision to analyze large amounts of geospatial data and understand the physical world. These include optical, Synthetic-aperture radar (SAR), and aerial imagery, weather data, and Internet of Things (IoT) sensors. With a grounded data science-based methodology, private companies and the public sector accelerate data-driven strategic decisions from their remote targets.

The company's vision *is to better understand the drivers of economic development in Latin America by contributing with a positive use of technology to solve the most complex problems on a planetary scale.*²¹ Dymaxion Labs has a team of professionals in data science, engineering, developers, and consultants.

The company maximizes its impact on the projects in which it participates through co-creation with different organizations in the fields of urban development, agriculture, and climate change. Among its allies are ESRI,²² Google, and Mapbox and programs of the United Nations System such as UNICEF and UNDP.

On its website the company declares itself committed to the United Nations Sustainable Development Goals, **identifying its field of action with Goals 1 (poverty reduction), 2 (Zero Hunger), 11 (sustainable cities and communities), and 13 (Climate Action).**

Also, this is a company that is an active open-source contributor: the tools of its platform, such as source code, blueprints, and documentation, are freely available to users since the value proposition of the company is rather based on data and the services they offer to implement them.

²¹ Dymaxion Labs. 2023. Homepage. Online at: <https://dymaxionlabs.com/>, accessed 13 March 2023

²² See: <https://www.esri.com/partners/dymaxion-labs-a2T5x0000084qHDEAY>, accessed 13 March 2023

Therefore, Dymaxion has a strong public good contribution, although, as we will see next, this vision is also part of a strategic component of positioning and scalability of its initiatives and tools.

The company claims that the *generation of methodologies based on advanced and emerging technologies and the opening of their results for public use can contribute to the development of the region from a framework of transparency and replicability, encouraging the creation of public policies based on data.*²³

Dymaxion's main clients are in the agricultural sector, where it provides services to companies such as Bayer CropScience, Nutrien Ag Solutions, Indigo Ag, and Syngenta based on the development of ML models to monitor the response of crops to normal and extreme situations of flooding and drought at the field level. It also maintains projects with public entities such as the Ministry of Development of Uruguay and development banks such as the Andean Development Corporation (CAF) and NGOs such as TECHO,²⁴ based on its development of an open-source algorithm to map informal settlements in Latin America.

2.2 About the data initiative

Dymaxion Labs has developed a satellite image processing and analysis model to detect the location of informal settlements in cities. Through algorithms in Python language using Tensor Flow -an open-source framework for ML- Dymaxion has developed a model that has been replicated in several countries in various combinations of collaborative schemes involving the Public Sector, Civil Society, and International Organizations.

The global coverage of satellite imagery together with the predictive power of artificial intelligence allows for efficient analysis of large territorial extensions in a short time and at a low cost.

²³ Ibid.

²⁴ TECHO is a non-profit organization with presence in Latin America and the Caribbean, founded in 1997, which seeks improvements in housing and habitat conditions. See: <https://techo.org/>

Both NGOs and governments need updated maps and data to provide evidence for the development of urban public policies related to these areas. However, conducting the necessary data surveys to understand the needs of informal settlements could entail high operational and logistical costs. Censuses take place every 10 years, so it is not possible to have updated data on a constantly changing urban phenomenon during intercensal periods.

Thanks to advances in satellite and drone technology, it is possible to generate data in image format and create visual information. Therefore, NGOs and governments can leverage existing technologies and open data to obtain such information. This, together with advances in artificial intelligence techniques to process these images automatically, allows them to convert pixels into public knowledge, useful for observing and monitoring the use of the earth's surface as never before.

For this to happen, tools must be used to enable the process. This is where Dymaxion Labs comes in, creating the enabling link to take full advantage of these data sources. Artificial intelligence uses algorithms to enable machines to learn from experience and perform tasks in the same way that humans do. Among the various fields into which artificial intelligence is divided, computer vision analyzes the processing of digital images by using mathematical algorithms to deduce what content is displayed. High-resolution satellite images combined with neural networks are used to address the issue of informal settlements.

Thus, "AP-Latam",²⁵ the tool that allows for estimating the growth of informal settlements in Latin America, was created. The tool can detect the location of these places through satellite images and drones, and then visualizing them on a map. Slum patterns, such as texture and roof morphology, are detected by the tool, which is already calibrated to detect informal settlements in the capital cities of Argentina, Honduras, Paraguay, Guatemala, and Uruguay. The data captured by the tool is then validated in the field. The results can be freely

²⁵ Dymaxion Labs. 2023. AP Latam. Online at: <https://ap-latam.dymaxionlabs.com/en/>, accessed 13 March 2023.

downloaded as a vector layer in GEOJSON format. Therefore, it is a public tool that any municipality with enough imagery can use.

This project supports not only governments but also civil society organizations such as TECHO that work in slums. The tool provides them with real-time updated information on settlement boundaries and size, with which TECHO optimizes its own field surveys, to better carry out its work and improve lives.

The increasing availability of open spatial data, high-resolution satellite images and open-source tools allows the mapping of these areas in different cities in Latin America.

2.3 Rationale for the case selection

This case study features replicability, scalability, co-creation, and contains a key lesson on how a company can strategically use a public good contribution to increase its visibility and enhance its business.

Likewise, the Dymaxion case represents a case where a relatively small company has a substantive impact not only due to the application of innovative technologies but also due to the synergies produced by the co-creation of a virtuous combination of allies from the private sector, government, civil society, and international organizations.

In this regard, it should be noted that Dymaxion was born as a company as a result of a public incentive, since it was part of the seedbed of technological startups supported with initial capital from the government of the City of Buenos Aires in Argentina.²⁶ Its project consisted of developing the satellite image identification model that was initially implemented in Argentina -with the support of UNICEF²⁷- and later in other countries in the region. But it also became a flourishing business providing services to the agricultural sector, which allowed the company to continue contributing to the public good thanks to the resources obtained by this private activity.

²⁶ Buenos Aires City Government "IncuBate" initiative: <https://buenosaires.gob.ar/innovacion/emprendedores/capacitacion-e-incubadoras> , accessed 13 March 2023

²⁷ UNICEF Innovation Fund: Dymaxion labs: <https://www.unicef.org/innovation/stories/unicef-innovation-fund-graduate-dymaxion-labs> , accessed 13 March 2023.

Therefore, the company currently has a co-creative business model aimed at the public good, which also pursues strategic positioning and asset-building purposes. This initiative also has lessons learned in terms of concrete incentives for the private sector to become collaboratively involved in sustainable development.

Another reason that makes this a relevant case study has to do with the use of a simple-to-implement technology to leverage non-traditional data sources. This contains an important lesson for the data revolution: there are frameworks for the use of non-traditional data sources that have shown proven effectiveness and have made it beyond the experimental stages, such as the use of satellite images, the interoperability of administrative databases or others such as the use of scanner data for price collection. Efforts should focus on these areas if they are to have an impact in the short term.

2.4 Regional context for the use of private sector data

From the mapping exercise carried out in the framework of this project, together with a recent diagnosis conducted by Cepei on data ecosystems in the region (see [6]), we can conclude that few private initiatives have been systematically incorporated into data ecosystems for the SDGs in the countries. Currently, the involvement of the private sector to strengthen data ecosystems is rather focused on individual and isolated actions by companies, with a greater or lesser degree of partnership with the public sector and that in general do not have guarantees of continuity.

Likewise, we have found that efforts to contribute to the public good through the use of non-traditional data sources from the private sector are, in general, in exploratory stages and are often diluted over time. Therefore, the sustainability of these types of initiatives is still uncertain. The generation of reliable and sustainable information within data ecosystems requires

²⁶ Buenos Aires City Government "IncuBate" initiative: <https://buenosaires.gob.ar/innovacion/emprendedores/capacitacion-e-incubadoras> , accessed 13 March 2023

²⁷ UNICEF Innovation Fund: Dymaxion labs: <https://www.unicef.org/innovation/stories/unicef-innovation-fund-graduate-dymaxion-labs> , accessed 13 March 2023.

an enabling environment, understood as all the resources, processes and systems, legal norms, incentives, and information on the actors involved in the data generation processes. Many of the current challenges must be resolved through the generation of incentives and legislation that promotes public-private partnerships.

In this regard, it has been identified in the region that regulatory frameworks, in general, must evolve in order to support this practice. The development of laws that enable the reuse of privately owned data is a fundamental aspect for the future of publicly available data. Likewise, the intensive use of administrative records and geospatial data are among the strategic priorities of official data producers, such as national statistical offices (See [5]).

In the region, there are two major determinants that affect the participation of the private sector in the data agenda for the SDGs, such as a possible loss of momentum and interest in the 2030 Agenda by the private sector, as well as the lack of an enabling environment conducive to public-private initiatives. That is, there is data and there are initiatives related to the SDGs, but there is a lack of data initiatives: Companies, in general, are leaning towards reporting their own impact on the SDGs through data collection and analysis. But this does not necessarily imply a strengthening of the data ecosystem for monitoring and implementing the 2030 Agenda.

Part 3: Findings and lessons learned

3.1 A roadmap for similar initiatives

Key findings of this case study refer to its replicability and scalability, understood as the possibility of repeating the experience in other countries and growing in scope and domains. Dymaxion Labs built on previous work with TECHO in

²⁸ TECHO. Collaborations with Dymaxion Labs: <http://datos.techo.org/organization/dimaxion-labs> , accessed 13 March 2023.

Argentina, and then replicated the experience in Paraguay, and Guatemala.²⁸ In the case of Uruguay, Dymaxion started in a collaboration with the government through the Ministry of Social Development (Mides)²⁹ based on the previous informal settlement mappings carried out in Argentina and Paraguay. Then, thanks to the support of a Regional Public Good of the Inter-American Development Bank, they made a data analysis of the City of Montevideo and worked along with Mides technicians in the identification of the settlements. This work allowed Dymaxion to gain visibility and attract the attention of the Ministry of Transportation, which called them to analyze the state of the roads, as well as the Ministry of Energy which requested to carry out the detection of residential solar panels.

For this, a key element was a photogrammetric flight, which was acquired by the Uruguayan State and managed by their Spatial Data Infrastructure -later published in the form of open data-, but was not being fully exploited. To leverage this input, which many public offices were not using mainly due to lack of capacity, the Andean Development Corporation (CAF) launched an initiative (See [10]) to promote the intensive, efficient, and secure use of data within the State. The initiative scaled up and branched out to include the participation of multiple actors. This speaks of the potential of this kind of initiative to catalyze projects that require different components that often do not engage. The initial collaboration with MIDES for mapping informal settlements resulted in two profitable initiatives:

- A tool for the detection and quantification of solar utilization equipment
- A tool to determine road categories in the Uruguayan road network.

The training that the tool was acquiring with the data obtained in each of the new countries, allowed it to face increasingly challenging environments, such as providing a concrete solution in Honduras, where there was little official data and field operations faced adverse conditions. Due to the lack of previous census

²⁹ See: <https://dymaxionlabs.medium.com/mapeo-de-%C3%A1reas-vulnerables-en-montevideo-uruguay-68b17a36ba6e>

and public data on informal settlements in Tegucigalpa, Dymaxion Labs partnered again with TECHO (See [9]) to help them map potential areas to survey.

The AP-LATAM ML algorithm proved useful for application in Honduras (See [9]). The implementation of the transfer learning methodology to map informal settlements in Tegucigalpa helped map dangerous areas that field surveyors should avoid. TECHO was thus able to plan its survey fieldwork and conduct a Census of Informal Settlements in 2018. The results were published as open data and the maps can be used immediately by public policymakers to eventually relocate people living in at-risk areas.

From a replicability standpoint, having a technical team is critical not only to train and apply the algorithm but also to help validate the mapping results. With more frequent field validations, more iterations can be made to the algorithm and greater accuracy can be achieved in the final map. This is a virtuous scalability feature of the initiative.

But the development of this tool also allowed Dymaxion to scale AP-LATAM tool to other types of actions to put data at the service of the public good, for example, in cases of disasters. In early 2022, during the fire that affected the Province of Corrientes, Argentina, using high-resolution satellite images taken by Sentinel-2 of the European Space Agency and NASA Firms, it was possible to identify the areas that burned and compare them against the previous five years, thus collaborating with the generation of alerts and monitoring over time. At this time, the alliance with the DataLab of La Nación newspaper, one of the largest circulation in Argentina, raised awareness of the importance of having timely data and of caring for the environment in general.³⁰

A final finding refers to co-creation, reflected in the existence of partners of different characteristics and types in each case. All these experiences show that different actors contributed significantly from different spheres. A private company such as Dymaxion, initially allied with an NGO such as TECHO, later led

³⁰ See the analysis of La Nación Data and Dymaxion Labs from satellite images at: <https://www.lanacion.com.ar/sociedad/incendios-en-corrientes-en-enero-y-febrero-se-quemo-seis-veces-mas-superficie-que-en-los-cinco-nid25052022/>

to the involvement of public organizations such as MIDES Uruguay, development banks such as CAF and IADB, media key players such as La Nación, amplifying the messages, and UNICEF and the Government of the City of Buenos Aires providing seed capital.

3.2 Challenges and opportunities

An initiative of this type helps to close the data gap between census rounds every 10 years. The census, in turn, serves to train the algorithm, because it shows past data from places where there were settlements. Therefore, the non-traditional sources complement traditional data and at the same time, they get nourished from it. Also, there is an opportunity for statistical offices to take advantage of this new data to calibrate their own statistical operations (See [9]).

In cases where public-private partnerships have been seen, it is useful to distinguish between partnerships that seek to identify the potential of an alternative data source to measure specific phenomena and partnerships that aim to measure them on a regular basis. The open data model in the case of Dymaxion is oriented to generate that regular use and expansion of the tool to all those locations that have images. But a constraint in this sense is the availability of updated high-resolution images. The exploitation of this type of tool for the common good requires the acquisition of batches of images by the governments.

Federico Bayle, CEO of Dymaxion Labs, said: "The biggest challenges are focused on two key points: scale and representativeness of the sample. The Dymaxion Labs API solves the scale issue efficiently. Taking a sample of data from the geography you want to analyze ensures representativeness. But having higher resolution imagery would improve the results, allowing smaller areas to be detected."

Also, these types of technically intensive start-up projects are usually resources constrained and have no knowledge of how to access the donor agenda. In the case of Dymaxion, it was able to leverage its public good activities with the services it provides to companies in the agricultural sector. In that sense,

partnering with organizations with different missions, scales, and areas of expertise was key for amplifying its impact and outreach. Without these alliances, it would have been impossible to access logistical issues that require a larger scale of business, such as the validations of the field surveys carried out by TECHO or the access to the images acquired by the Uruguayan government. Co-creation with other organizations also opened up opportunities to obtain more funding for the initiative.

According to Dymaxion's CEO, the market for satellite imagery in LAC is not yet as developed and they still encounter many problems in accessing this input. A small company does not have the scale and scope to access image sources that should be available in public image banks. This is one of the main limitations for scaling up the initiative.

Also, the difficulty of finding technological and human resources in the counterpart represents a constant challenge. However, from the private sector, the interviewee believes that there could be greater involvement in donating capabilities. Companies such as Google or Microsoft could help advance this type of initiative by donating "developer/computer hours".

Finally, the lack of sustainability of public policies over time is one of the biggest problems Dymaxion faced. For example, in 2018, it was working with the Secretariat of Habitat in Argentina to expand the tool, but since they lost quality in the images due to the collapse of an agreement between the Argentine State and the company Airbus, the work they were doing had to be terminated.

Dealing with the public sector may be sometimes complex. The capacity for coordination between public entities varies from country to country and the possibility of success is closely related to this. For example, in Argentina, they were never able to work with Arsat, the public satellite imaging company, which has computing power. On the other hand, in Uruguay, they found Agecic -the public agency that manages digital assets- to be very easy to articulate, dispensing with excessive paperwork, which allowed them to act quickly with the other entities. Agecic is a single entity that guarantees data privacy and has

simple data-sharing protocols.

Dymaxion's CEO also mentioned that certification as a Digital Public Good ³¹ was key to open many doors. In fact, Dymaxion believes that if there was also some kind of certification on data protection and data quality, it would be very important as a business card when presenting projects on data-driven public goods. Certifying good data practices should be a condition for being on a short list of eligible companies, it would reduce the time required by legal bodies to approve a public-private partnership and would be crucial to boosting cooperation. Although Dymaxion currently uses open data at a resolution that does not involve privacy risks, if they were to use very high-resolution images, as for example, Google does, the requirements would multiply to the point of discouraging collaboration.

Part 4: Conclusions and recommendations

This case study shows the possibility of replicability, scalability, and incentives that can be generated by private sector data initiatives for the common good. Dymaxion was born from a concrete project aimed at the common good that paved the way for a sustainable business model that continues until now. The company thus found an identity, which it used strategically to grow in co-creation with relevant partners.

However, the road to success in these types of initiatives contains many challenges that must be addressed, especially about the availability of resources and inputs, as well as the establishment of cooperation agreements.

One recommendation in this regard is for the companies to have a complete institutional architecture, particularly the certifications and standards required to access projects that require access to private data, as well as, to establish agreements with large donors and long-standing partners. This also allows you to enter different communities that you would not be able to enter. It is important, therefore, to have very well-documented processes and projects, a requirement

³⁰ The Digital Public Goods Standard is a set of specifications and guidelines designed to maximize consensus on whether a digital solution meets the definition of a digital public good: open source software, open data, open AI models, open standards, and open content that adhere to privacy and other applicable best practices, do no harm by design, and are highly relevant to achieving the SDGs. See: <https://digitalpublicgoods.net/>

of certain donors or development funds.

Another recommendation that emerges from this work is that a private initiative can include a component on open source and open data, as long as it does not affect the business equation, but it highly contributes to the visibility of the tools developed and the company in general. Publishing in open source and open data has opened many doors to Dymaxion. For example, when working with governments, after showing how the tool works, the beneficiaries themselves act as promoters of the tool.

And what is the added value of the Private Sector to the data agenda for sustainable development? There are multiple views in this regard. In the case of Dymaxion, it brings to the public good a very specific know-how, which is currently aimed at providing services mainly to the agricultural sector, despite the experience being born as a public good. In other cases, it could be possible that this technological specificity never reaches the public arena and, therefore, the opportunity to have tools that could contribute to having more and better data is lost.

This case also contains an important lesson for the data revolution: there are frameworks for the use of non-traditional data sources that have shown proven effectiveness and have managed to overcome the experimental stages, such as the use of satellite images, the interoperability of administrative data or others such as the use of scanner data for price surveys. These tend to be the uses in which the private sector can most easily become involved in the production of data for sustainable development. This is where efforts should be focused if we want to generate impacts in the short term.

Another recommendation is related to the enabling environments for private sector data initiatives to flourish. In Latin America, in general, data ecosystems are disjointed and lack a legal framework that facilitates agreements based on incentives and responsibilities. It is necessary to advance in the modernization of the legal frameworks for private sector data to be enhanced.

Finally, a conclusion that emerged from the regional mapping of private sector data initiatives is that, although most of them have an impact on the SDGs, they have not been designed as contributions to the 2030 Agenda. This would indicate a need to strengthen the visibility of the SDGs in the private sector. In the case of Dymaxion, its website specifically refers to the 2030 Agenda and how this type of actions for the public good contribute to and impact, mainly, on goals 1 (poverty reduction), 2 (Zero Hunger), 11 (sustainable cities and communities) and 13 (Climate Action). In this regard, Dymaxion has paved the way in showcasing how successful data driven business models can be explicitly connected to global development objectives including the SDGs.

References

[1] United Nations Independent Expert Advisory Group. 2014. "A world that counts--Mobilising the data revolution for sustainable development". Available at: <https://www.undatarevolution.org/wp-content/uploads/2014/11/A-World-That-Counts.pdf> , accessed 10 January 2023.

[2] United Nations. 2013. "A new global partnership: eradicate poverty and transform economies through sustainable development. The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda".

[3] United Nations. 2020. "The Age of Digital Interdependence, Report of the United Nations Secretary-General High-Level Panel on Digital Cooperation". Available at: https://www.un.org/en/content/digital-cooperation-roadmap/assets/pdf/Roadmap_for_Digital_Cooperation_EN.pdf , accessed 10 January 2023.

[4] United Nations Secretary-General. 2020. "Road map for digital cooperation: implementation of the recommendations of the High-level Panel on Digital Cooperation: report of the Secretary-General".

[5] Cepei. 2022. "The state of Data Ecosystems in Latin America". Available at: <https://cepei.org/documents/estado-ecosistemas-datos-america-latina/> , accessed 10 January 2023.

[6] G Brent Hall, Neil W Malcolm, and Joseph M Piwowar. 2001. Integration of remote sensing and GIS to detect pockets of urban poverty: The case of Rosario, Argentina. *Transactions in GIS* 5, 3 (2001), 235–253.

[7] Neal Jean, Marshall Burke, Michael Xie, W Matthew Davis, David B Lobell, and Stefano Ermon. 2016. Combining satellite imagery and machine learning to predict poverty. *Science* 353, 6301 (2016), 790–794.

[8] Dymaxion Labs. 2017. AP-Latam. Available at: <https://ap-latam.dymaxionlabs.com/>

[9] TECHO. 2018. Informe: Censo de Asentamientos Informales, Casco Urbano Distrito Central 2018. (2018). <http://datos.techo.org/ne/dataset/honduras-censo-de-asentamientos-informales-casco-urbano-distrito-central> , accessed 13 March 2023

[10] Andean Development Corporation (CAF). 2020. Blog "First result of hands in the data in Uruguay". Published on December 14, 2020. Available at: <https://www.caf.com/es/conocimiento/visiones/2020/12/primeros-resultados-de-manos-en-la-data-en-uruguay/> , accessed 13 March 2023.

[11] La Nación. Media article "Fires in Corrientes: six times more area burned in January and February than in the five previous summers combined. This is the result of an analysis by LN Data and Dymaxion Labs based on satellite images.". Published on May 22, 2022. Available at: <https://www.lanacion.com.ar/sociedad/incendios-en-corrientes-en-enero-y-febrero-se-quemo-seis-veces-mas-superficie-que-en-los-cinco-nid25052022/> , accessed 13 March 2023.

[12] Baylé, Federico. 2016. "Detection of slums and informal settlements in the Partido de La Matanza using remote sensing and geographic information systems". (Master thesis. University of Buenos Aires. Faculty of Exact and Natural Sciences). Available at: http://hdl.handle.net/20.500.12110/tesis_n6172_Bayle , accessed 13 March 2023.

[13] Gómez Mont, C., May Del Pozo, C., Martínez Pinto C. and Martín del Campo Alcocer, A.V., 2020, "Artificial Intelligence for Social Good in Latin America and the Caribbean: The Regional Landscape and 12 Country Snapshots". IADB. Available at: <https://publications.iadb.org/publications/english/viewer/Artificial-Intelligence-for-Social-Good-in-Latin-America-and-the-Caribbean-The-Regional-Landscape-and-12-Country-Snapshots.pdf> , accessed 13 March 2023.

[14] IADB. Code for Development. Apps and tools available at: <https://code.iadb.org/en/node/11> , accessed 13 March 2023.

Annex I - Methodological Note

This Case study is part of a larger research project that is seeking to understand how far the private sector's data-related contributions to public policy in the Global South extend, especially as it relates to the Sustainable Development Goals (SDGs). The primary research question is: what is the private sector doing to contribute to more effective data ecosystems that help to achieve and monitor the SDGs in the Global South?

The Research has examined examples of private sector support to public institutions across Latin America and the Caribbean, The Middle East and North Africa (MENA), Sub-Saharan Africa, and Southeast Asia, initially through the structured mapping of a range of public-private data partnerships. In the second phase of the study, emerging insights from this mapping have been examined in more detail through the production of eight in-depth case studies of public-private data partnerships. Dymaxion Labs data initiative on informal settlements detection through satellite imagery has been selected as one of the two Latin American case studies.

The elaboration of this case study was based on a review of documentation on the initiative, media articles, and a series of interviews with the protagonists. In that sense, four interviews were held with the CEO and founder of Dymaxion Labs, Federico Bayle, between July and September 2022, and e-mail consultations with the company were held at later stages. The below listed triggering questions were used in the interviews.

Annex II - Interview guide

A) Introduction to the project...

- *Description of the company – This is a small local company that fills a specific national gap. How did it start? What was your value proposition? What is your vision?*
- *Description of the thematic area – What is the state of the art of this technology? What made you different from other initiatives?*
- *Description of the data action – Describe the main features of the data initiative and how it contributes to the public good.*

B) Impact on the SDG Agenda...

- *How relevant is the Sustainable Development Agenda in your company's vision?*
- *Which SDGs goals are most impacted by this initiative?*
- *How do you think your initiative can scale up its impact on the SDGs?*
- *Why do you think this case study is important for showing the Private Sector's role in the SDGs?*

C) Findings and lessons...

- *Why is this particular data action important – what gap is it filling?*
 - *What are the main challenges and opportunities for this particular type of data action? E.g., privacy concerns on the data, government bureaucracy, copyrights of the data satellite imagery, and technology gaps.*
 - *Are there any general thematic guidance documents, policies, corporate standards, etc that are relevant to the particular data actions?*
 - *What were your incentives/strategic vision for getting involved in this initiative?*
 - *What worked? What didn't? Why? What is replicable and what is not?*
- Enabling environment..*

D) What does the local enabling environment look like?

- *Are there domestic laws, policies, favorable political statements, etc. that support this particular data action/case study?*
- *What characteristics of the local environment support or constrain a program like this?*

E) Partnerships...

- *How did you look for partners? What were you looking for?*
 - *Who are the main partners in the public sector and civil society for these types of initiatives?*
 - *Where did the funding come from?*
- What are the lessons learned from the engagements that might be useful in future programs of this nature?*
- *Highlight specific points as relevant to the case study itself*



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