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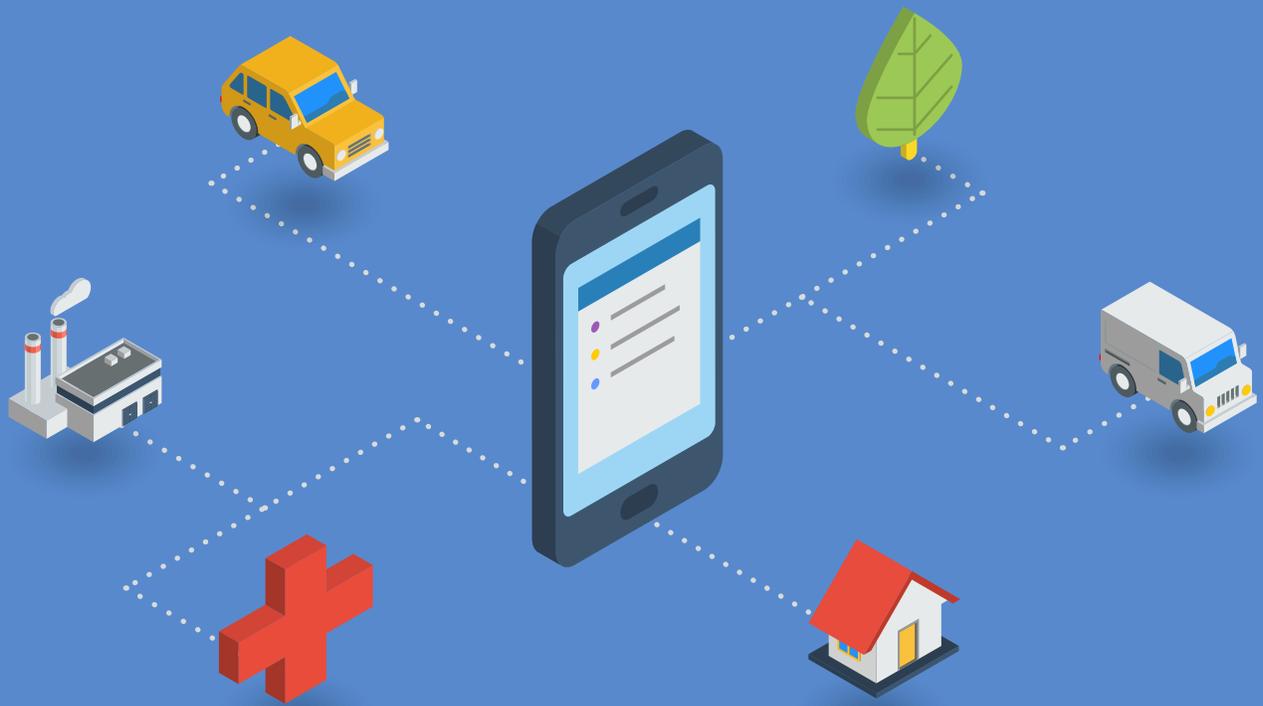
# I: What is IoT?

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## IoT: the basics

Our concept of “the Internet” has evolved over time, as networked technologies and digital services increasingly become part of our everyday lives. Depending on our professions and personal interests, we may have first encountered the Internet as a communications channel through which e-mail messages could be exchanged instantaneously, a virtual workspace in which people who might

be on opposite sides of the globe can interact and collaborate, or repository from which one can access and retrieve endless bits of information from “the cloud.” In recent years, a new facet of the Internet, “the Internet of Things” (or IoT), has emerged. Unlike most of our earlier experiences with the Internet, in the case of the Internet of Things, networked connections are made with physical *things*, not with human beings.



Thanks to new kinds of sensor technologies, in the Internet of Things, information can be gathered and transmitted in ways that make decision making processes more streamlined, or even automated. For example, a patient may wear a heart monitor that will instantly alert his doctor if his pulse rate is elevated to dangerous levels. Moisture sensors in farmland may trigger irrigation systems if the soil becomes excessively dry. Supported by technologies like RFID (electronic tagging) and GPS, manufacturers can track shipments of goods on a global scale, from factories through customs and onto retail shelves, with little or no human intervention.

## Harnessing the data revolution

Over the past decade, *things*, rather than people or processes, have become the main source of digital data, creating a new paradigm where the volume and usage of information is growing exponentially. The Internet of Things therefore is not only about collecting this endless flow of data, but also about transforming it into business value.

IoT cannot trigger a revolution by itself (for that matter, neither can any other technology). This ongoing digital data revolution has its foundation on the following three key enabling components:

- 🔗 Internet Connectivity - Through its various speeds, ranges, transmission

media, and associated technologies and standards.

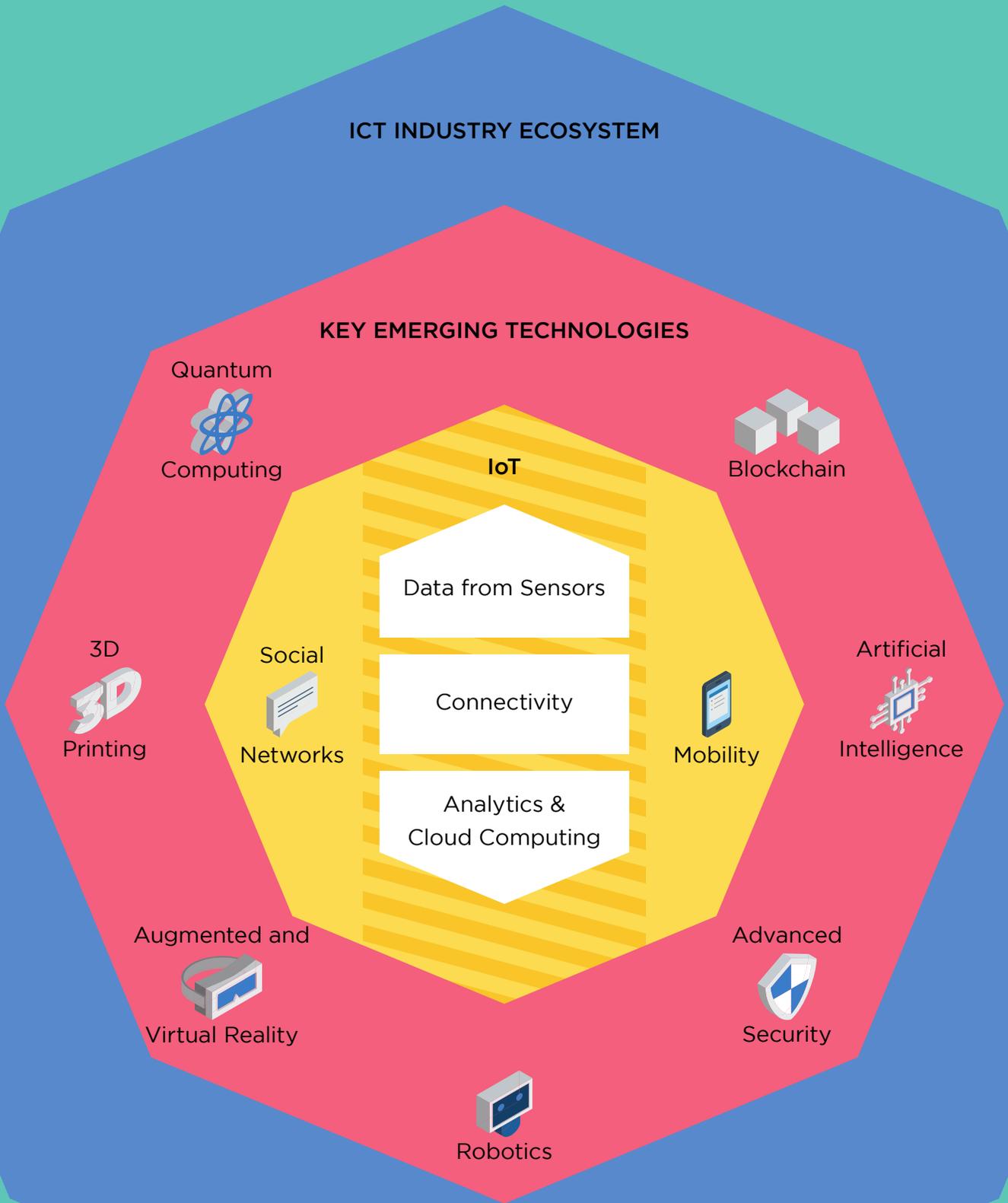
- 🔗 Data from sensors - as it adds thing data to traditional data from people and processes.
- 🔗 Analytics and cloud computing - as data volume increases, there is a need for high volume storage, big data analytics, and the capabilities provided by cloud computing.

Surrounding these three components are other emerging technologies and platforms, like artificial intelligence, virtual reality, and blockchain, which together constitute today's digital economy transformation technology layer (see Figure 1).

An influential white paper published in 2011 by the [global IT firm Cisco](#) identified the beginning of the IoT market as the moment when, for the first time, there were more things connected to the Internet than people on the planet. According to Cisco, this happened sometime during 2008 or 2009. One decade later, it is still difficult to arrive at standard definitions of what exactly the IoT market is, and what things and systems belong to it. Still, there is no doubt that it continues to grow and to increase its presence throughout the economy.

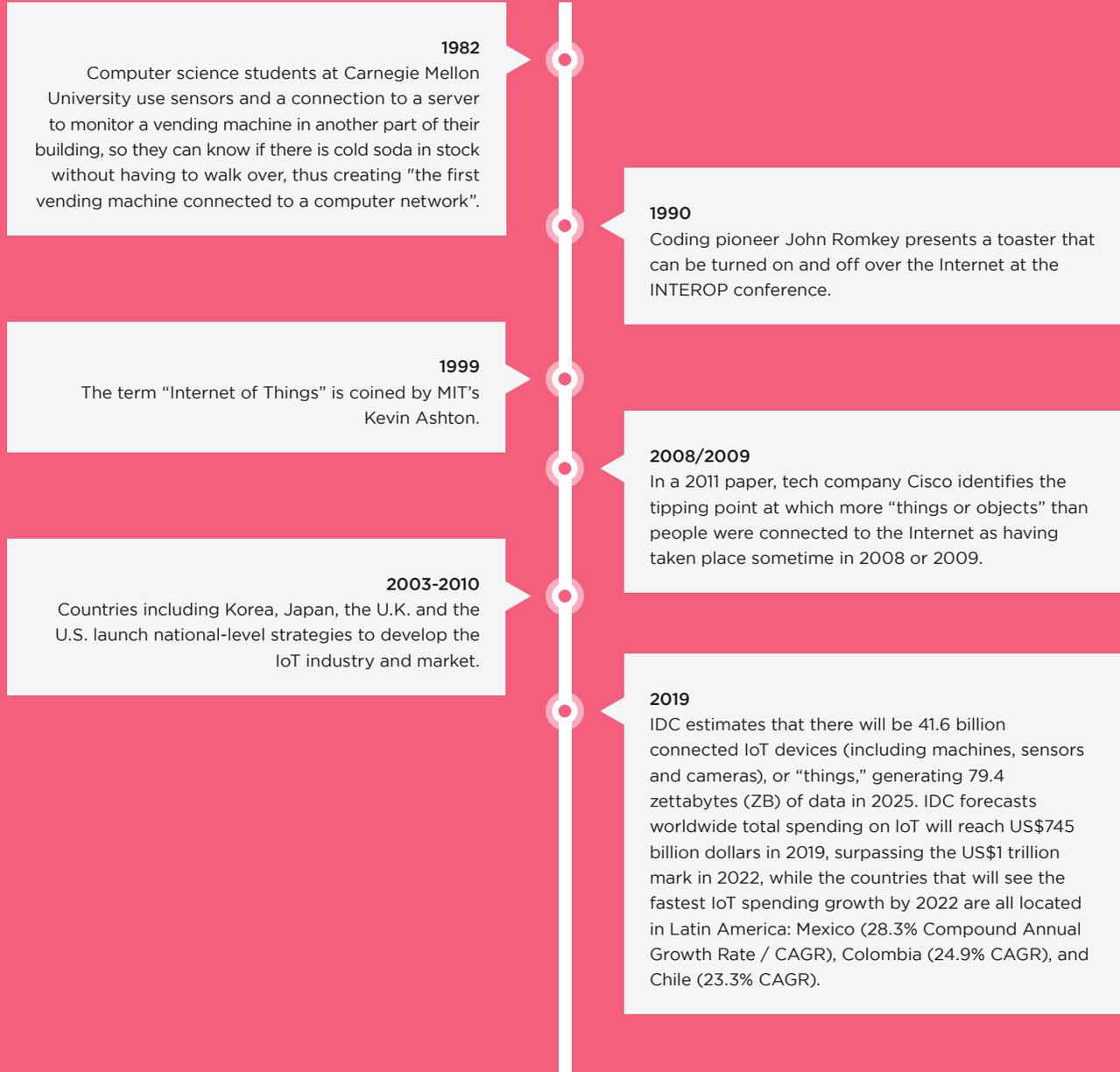
IoT's broad potential impact was recognized early by innovative countries like Korea and Japan, initiating a wave of national level efforts to gain early adopter advantages in this new market. Meanwhile,

FIGURE 1. CORE TECHNOLOGIES FOR DIGITAL TRANSFORMATION



Source: Own elaboration

## IoT MILESTONES



in Latin America and the Caribbean, no country entered the sector at the earliest stage with an industry strategy approach.

Given the potential economic and societal benefits of IoT technology, the Inter-American Development Bank (IDB) Lab

commissioned this report in an effort to assess the current state of the IoT industry across Latin America and the Caribbean (LAC) and identify the major opportunities, challenges, and strategies to drive region-wide acceleration of the sector.

# II: IoT opportunities and challenges, globally

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## IoT: Today and tomorrow

The 2019 annual Global IoT Executive Survey from Business Insider Intelligence foresees a rapid expansion of IoT worldwide. [While there were about 9 billion IoT devices in 2017 and 10 billion in 2018](#), Business Insider projects that there will be more than 64 billion IoT devices by 2025.

As to where these devices are or will be located, [the January 2019 Worldwide Semiannual Internet of Things Spending Guide from International Data Corporation](#) estimates that in 2019, the United States would continue to lead the world in IoT spending, at \$194 billion, followed closely by China with \$182 billion. The countries with the next highest spending levels are all highly industrialized nations: Japan (\$65.4 billion), Germany (\$35.5 billion), Korea (\$25.7 billion), France (\$25.6 billion), and the United Kingdom (\$25.5 billion). However, IDC predicts that the countries that will see the fastest IoT spending growth in 2019 are all located in Latin America: Mexico (28.3% CAGR), Colombia (24.9% CAGR), and Chile (23.3% CAGR).

The global transition to a digital economy and lifestyle is unstoppable. It is happening more slowly in less developed economies, but it is indeed happening, thanks to catalytic technologies like the smartphone. Even a basic smartphone includes multiple sensors: accelerometer, gyroscope, magnetometer, GPS, pedometer, thermometer... which in effect put IoT into everyone's hands, even people in remote corners of the world.

## IoT at work in the world

Nearly every industry has the potential to incorporate IoT technology in some manner, and most already have. Examples of how different sectors are using IoT include:

**Manufacturing:** By 2016, 35% of manufacturers in the US were using smart sensors, a number expected to grow to 53% by 2020. ([McCutcheon, 2015](#))

**Infrastructure:** Municipalities worldwide will increase their spending on IoT systems at a 30% CAGR, from US \$36 billion in 2014 to US\$133 billion in 2019. ([GrowthEnabler, 2017](#))

**Logistics:** Tracking sensors placed on parcels and shipping containers reduce costs associated with lost or damaged goods and increase the speed of order processing. In addition, robots reduce labor costs in warehouses.

**Connected Buildings & Smart Homes:** By 2030, a majority of home devices will connect to the Internet. The global IoT smart building market will approach US\$51.44 billion by 2023. ([Research and Markets, 2018](#))

**Utilities:** The IoT utility market is set to exceed US\$15 billion by 2024. Energy providers throughout the world will measure and manage rising energy demand using smart meters. ([Buthani, 2017](#))

**Transportation:** The connected car market is projected to reach US\$ 219.21 billion by 2025. IoT will be a key enabler of driverless cars and trucks. ([GrowthEnabler, 2017](#))

**Health Care:** The global IoT health care market is expected to grow from \$41.22 billion in 2017 to reach \$405.65 billion by 2026. Connected health care devices can collect data, automate processes, provide actionable insights including workout routines and much more. ([Research and Markets, 2018](#))

**Agriculture:** The global IoT market in agriculture will reach \$28.65 Billion by 2023. IoT devices are used to track soil temperature, acidity levels, and other

metrics to help farmers increase crop yields. ([Research and Markets, 2018](#))

## IoT: global challenges

Developing policy and legal frameworks around any aspect of ICT (Information and Communication Technology) policy has been a major challenge in this rapidly digitizing world. Since the early days of computing, policy has generally lagged well behind innovation, not only due to complex and bureaucratic public sector processes, but also because a full understanding of the impact and ramifications of any technology development can come only with time.

IoT technology is one of the more complex cases, given that it touches so many aspects of our lives, including devices in our homes, workplaces, schools, hospitals, and public spaces. Existing privacy, data security, health care, transportation, and technology policies will all be impacted by advances in IoT. Governments, industry leaders, and international organizations will be working together for the foreseeable future to strengthen and standardize Internet infrastructure and protect data and privacy in ways that both enable IoT development and don't endanger individuals.

## IoT Ecosystem & Value Chain

Within each industry and in each location where IoT is introduced, an entire ecosystem and value chain takes

shape for designing, producing, installing, operating, and servicing the IoT-based solution and its components. These systems require different levels of skills, from basic technical up to the most advanced digital technology and materials design, which leads to new jobs and new business opportunities.

Figure 2 represents a generic value chain model for the IoT industry. As each specific case is analyzed, market maturity will reach an evolved representation of the value chain.

In addition, the ecosystem is made up of a well-defined group of stakeholders:

### IOT STAKEHOLDERS

- ✎ Device Providers: They may furnish devices, or develop service models for longer-term engagement.
- ✎ Operators: Provide connectivity.
- ✎ Platform Providers: The platform brings together the hardware, the connectivity, service providers, and vertical

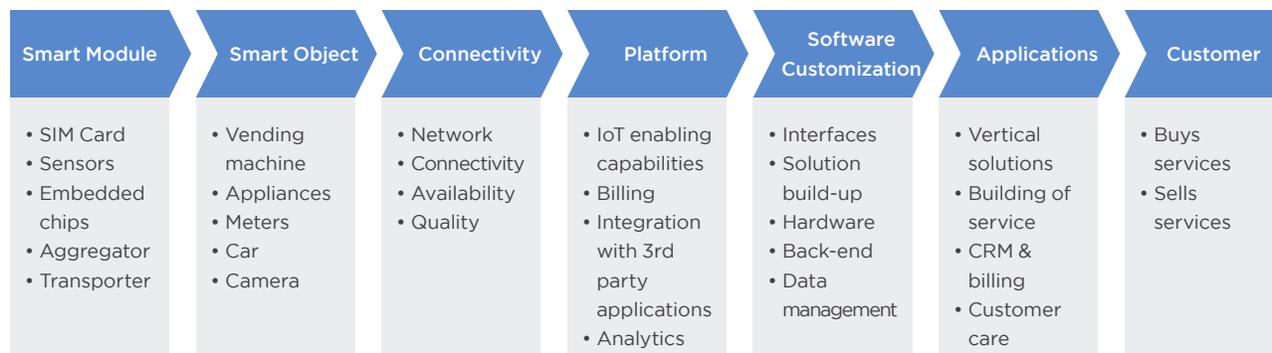
applications to provide industry-specific IoT solutions. There are different kinds of IoT platforms, such as connectivity/M2M platforms (primarily focused on connecting the devices via telecom networks/SIM cards without much focus on analytics or data processing), hardware-specific platforms (often proprietary platforms developed by device vendors), and pure IoT platforms (platforms that have been specifically developed for IoT keeping the scale, standards and requirements in mind).

- ✎ System Integrators: System integrators make the individual components of IoT work together.
- ✎ Application Providers: These are smaller players and often become perfect acquisition targets.

## IoT and Sustainability

IoT technology is saving money and boosting efficiency across industries, but it also has an impact on sustainability.

**FIGURE 2. GENERIC IoT INDUSTRY VALUE CHAIN**



Source: *Adapted from Telecomcircle, 2016*

The World Economic Forum conducted an analysis of over 640 IoT projects, considering their potential impact on fulfilling the [United Nations Sustainable Development Goals](#).

The World Economic Forum reported: *“84% of [the] IoT deployments [studied] are currently addressing, or have the potential to address, the Sustainable Development Goals (SDGs) as defined by the United Nations. The analysis supports the intuition that many share - that IoT has development benefits that could be maximized without compromising the commercial viability. The reason that IoT could become a game-changer for sustainability lies in its technology. At its*

*core, IoT is about measuring and remotely controlling previously unconnected ‘things,’ reaching people and objects that technology could previously not reach and in the process also supports sustainable development elements. However, the awareness of this link between IoT and sustainable development is limited. There are multiple case studies that illustrate how the prioritization of sustainability objectives could lead to increased commercial results and benefits across multiple stakeholders.”*

More specifically, the report found that out of the 640 IoT projects analyzed, 75% of the impact was concentrated in five SDGs (see Figure 3):

**FIGURE 3. KEY SDGs IMPACTED BY IoT**



Source: [Adapted from the United Nations](#)

- 9** Industry, innovation, and infrastructure (25%).
- 11** Smart cities and communities (19%).
- 7** Affordable and clean energy (19%).
- 3** Good health and well-being (7%).
- 12** Responsible production and consumption (5%).

While much of the growth of IoT to date has taken place within highly developed economies, the entire world is increasingly connected, and as sensors and digital devices are manufactured at a scale that makes them affordable in price, developing economies have the opportunity to “leapfrog” and catch up to the IoT leaders in penetration and innovation.



# III: IoT in LAC

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## Ready to connect

The Latin American and Caribbean region is poised for significant breakthroughs in the number and importance of IoT devices in its industries and economies. A 2017 report from International Data Corporation (IDC) stated that as of that time there were approximately 400 million connected IoT devices across Latin America and the Caribbean, and projected that number to reach 1 billion devices by 2023. In terms of economic value, this represented some US\$4 billion in 2017 and a projected US\$19 billion by 2023. Several factors support the possibility of rapid IoT connectivity in the region with few constraints. For example, there is a growing presence of telecommunications services in Latin America and the Caribbean, as well as available non-licensed spectrum capacity.

[A 2018 Deloitte study](#) of six key indicators (ICT infrastructure, Policy and regulations, Innovation capabilities, Economic and political stability, Business level of ICT adoption, and ICT skills) identified Chile, Costa Rica, and Brazil as the three countries most ready to participate in the IoT market and benefit from its opportunities. Another study, by IDC Research of global IoT spending, projected that the three countries

that will see the fastest growth in IoT spending between 2017 and 2022 are all in Latin America: Mexico, Colombia, and Chile.



## Policy and planning

Many countries with advanced IoT markets have national strategies that have helped facilitate industry and market development. Issues that may be addressed by such national plans include: privacy and security, standards that make interoperability between different platforms possible, and public and/or

private investment in infrastructure. Some of these plans began to take shape a decade or more ago. For example, in 2010 the Chinese central government opened a national center devoted to research and development of IoT; in 2005 Singapore unveiled a 10-year “Intelligent Nation 2015” plan to support the growth of the ICT industry; and in 2015 the United States launched a Smart Cities Initiative.

In Latin America, to date there is only one country that has adopted a national IoT strategy: Brazil. In 2017, that nation developed a matrix to help guide IoT

development over the next five years, with four priority sector “verticals” (smart cities, health, agribusiness, and manufacturing), supported in a cross-cutting manner by four “horizontal” (innovation and internationalization, human capital, regulatory safety and privacy, and infrastructure for connectivity and interoperability).

Other Latin American countries have begun to develop policies to govern IoT development to some degree. Examples include Colombia’s [“CEA-IoT” \(Centro de Excelencia para la Apropiación del Internet](#)



[de las Cosas](#), or Center for Excellence in IoT Appropriation); [Argentina's marketplace for IoT solutions](#) within its Chamber of Internet; and [a Mexican government strategy to support the industrial IoT sector](#), especially the automotive industry.

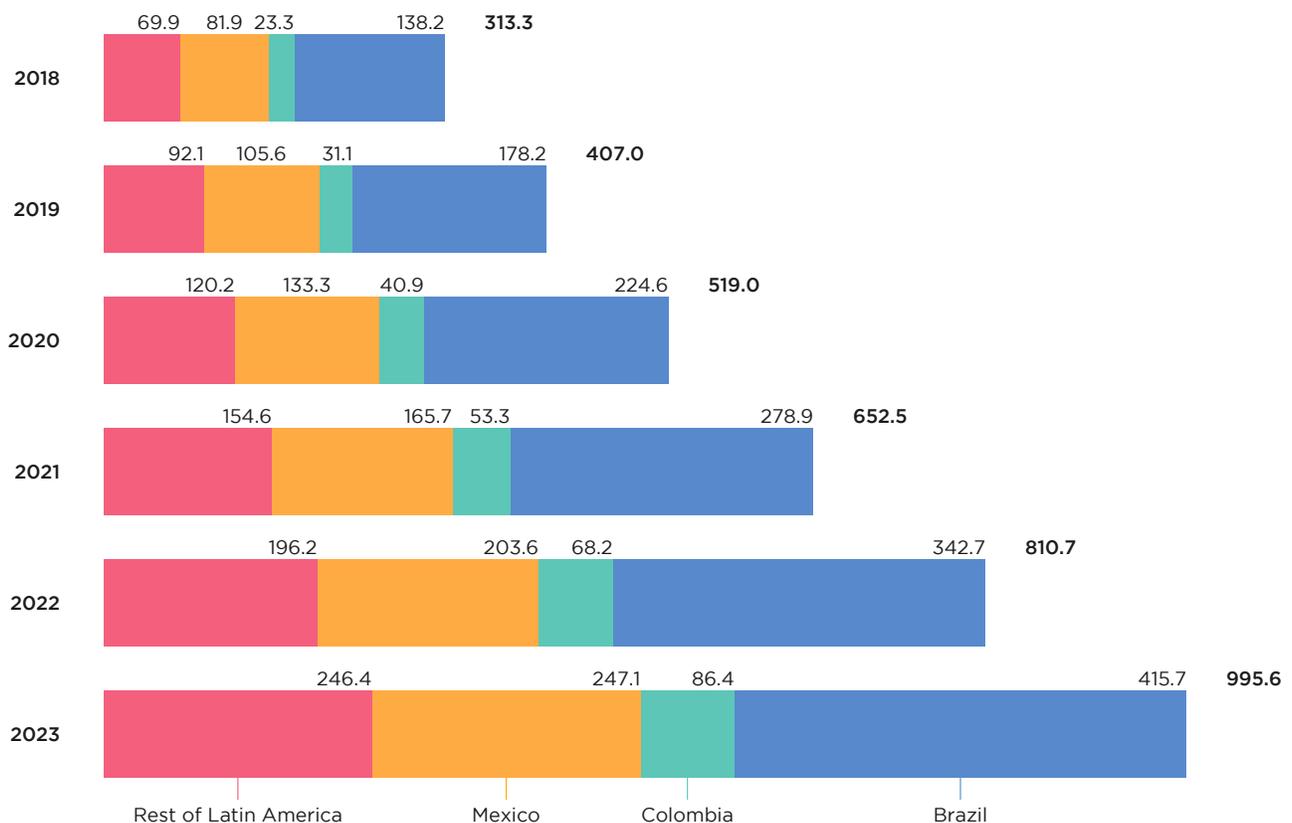
## The IoT ecosystem in LAC<sup>1</sup>

In Latin America and the Caribbean, the IoT market is highly fragmented, but

shows strong growth. Figure 4 projects growth in devices, and Figure 5 forecasts revenue growth for the short to mid-term. Compound growth forecast over 20% is strong for any market, and this is the level of expectation for LAC.

Another aspect to consider is the status of the LAC region's IoT value chain, especially in comparison to the generic value chain model presented earlier.

**FIGURE 4. LAC IoT DEVICES FORECAST**  
Number of IoT devices, by million units



<sup>1</sup> Data and charts used in this section are based on a report from the analyst firm Frost & Sullivan, appointed by IDB Invest and presented at the IDB Invest IoT Summit event in Mexico City on June 6, 2019.

**FIGURE 5. LAC IoT REVENUE FORECAST**  
(By billions of US dollars)

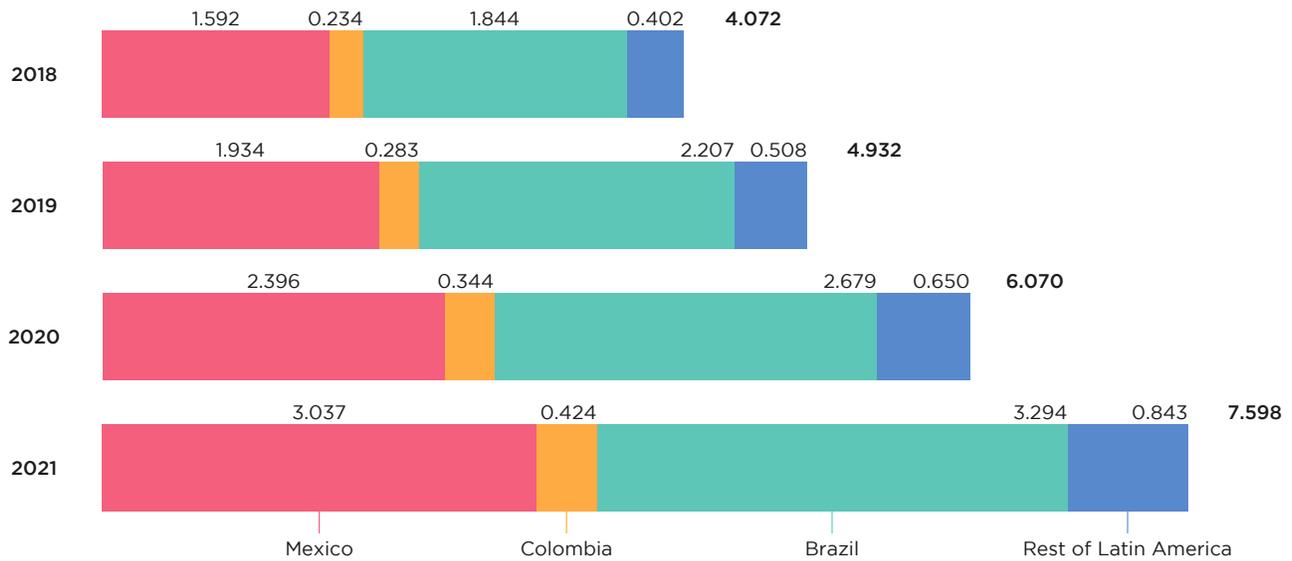


Figure 6 shows that some consolidation has been achieved, creating solid lower and upper layers with dominant players. In the lowest level, network and security, the dominant players are large companies like Intel, Cisco, Telefónica, and IBM. On the next layer up, where solutions are created within different application areas, fragmentation still rules. Here, multiple players compete for market share, creating the most complex layer of the value chain, with five key vertical specialized blocks, as shown. As we go deeper into the country’s ecosystems this second layer is much more complex, since in addition to the global and regional players we will find a large group of local and regional initiatives also fighting for their space in this new market. The topmost layers are achieving consolidation. The storage, data, and analytics layer is responsible for storage provision and specialized

software analytic engines needed to run applications. Here we see global players like IBM, Dell, and Cloudera also achieving market positions in LAC. And highest up is the cloud layer: responsible for scaling application execution to the needed level of capacity at any given time. The global key players, Amazon Web Services, Google, and Microsoft, are also leading in LAC.

## LAC IoT value chain and layers

In Figure 6, the colors green, yellow and red represent the traditional indicators: red is not mature, yellow means in process, and green means mature and stable. The chart brings a perspective of opportunity, since the majority is green or yellow. The red section is still in a “tower of Babel” stage, with multiple players—small,

medium, large, local, regional, global—all trying to operate without a common language or standards to guide their interactions. This data will help to focus interventions intended to accelerate the value chain maturity process. Research also identifies three main drivers within the LAC IoT market:

- 🔗 Boosting customer service/marketing.
- 🔗 Collecting usage data from clients.
- 🔗 Automating manual processes.

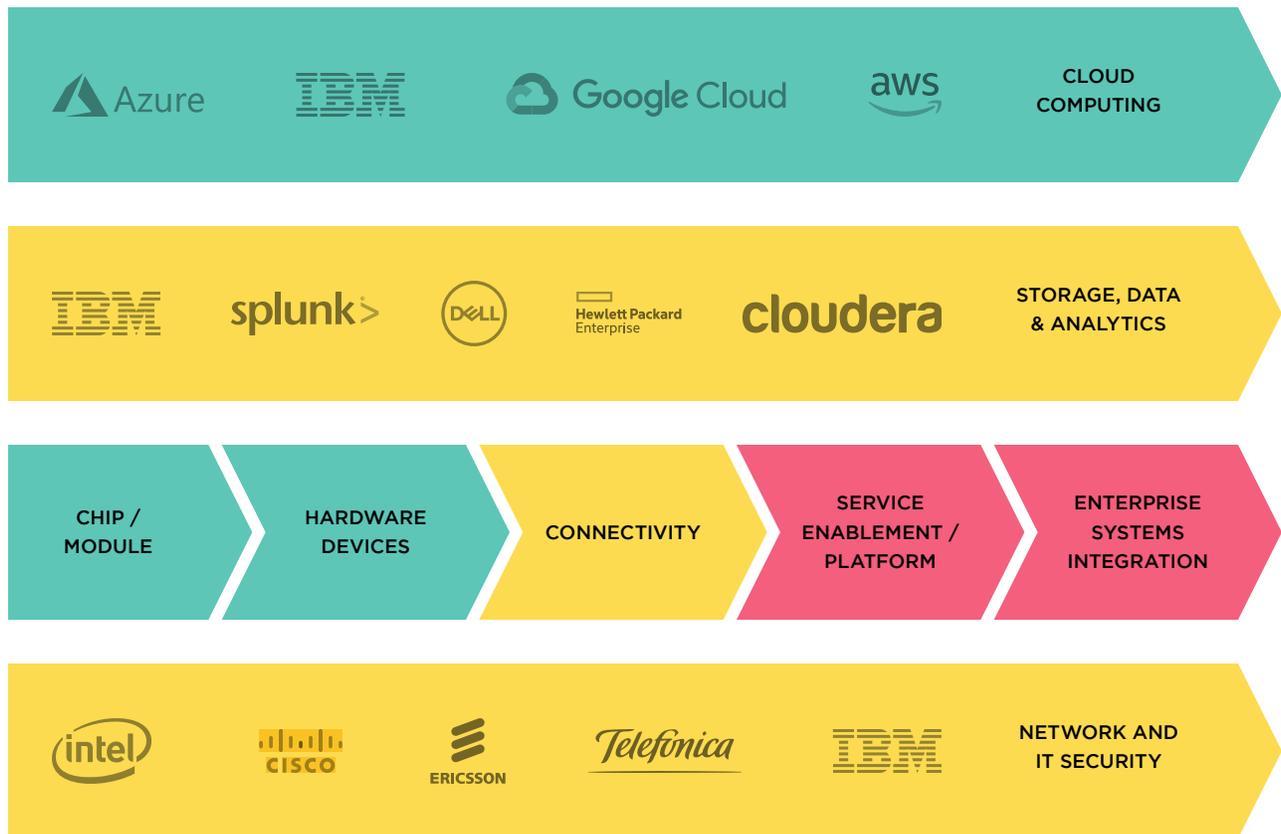
These drivers are in line with ongoing digital economy transformation, suggesting strong synergies, validating

IoT as part of a larger process and not an isolated sector. At the same time, there are key concerns blocking or delaying IoT adoption in LAC. Research also finds these in line with global trends. These top concerns in LAC over IoT adoption are:

- 🔗 Security risks.
- 🔗 Data protection and privacy.
- 🔗 Integration costs.

Not having a clear return on investment also emerged frequently in direct interviews with industry experts and influencers. In terms of application scenarios, while nearly all typical scenarios are currently

**FIGURE 6. LAC IoT VALUE CHAIN & LAYER MATURITY**



finding ground across LAC, the analysis identified the four most mature areas with higher revenue potential for the short to mid-term (see Figure 7). The most mature is transport and mobility, followed by smart manufacturing, smart cities, and utilities.

In addition to these top areas, we also identified agro-industry and mining as areas of key potential for LAC, given its economic relevance and strategic value for the region's future.

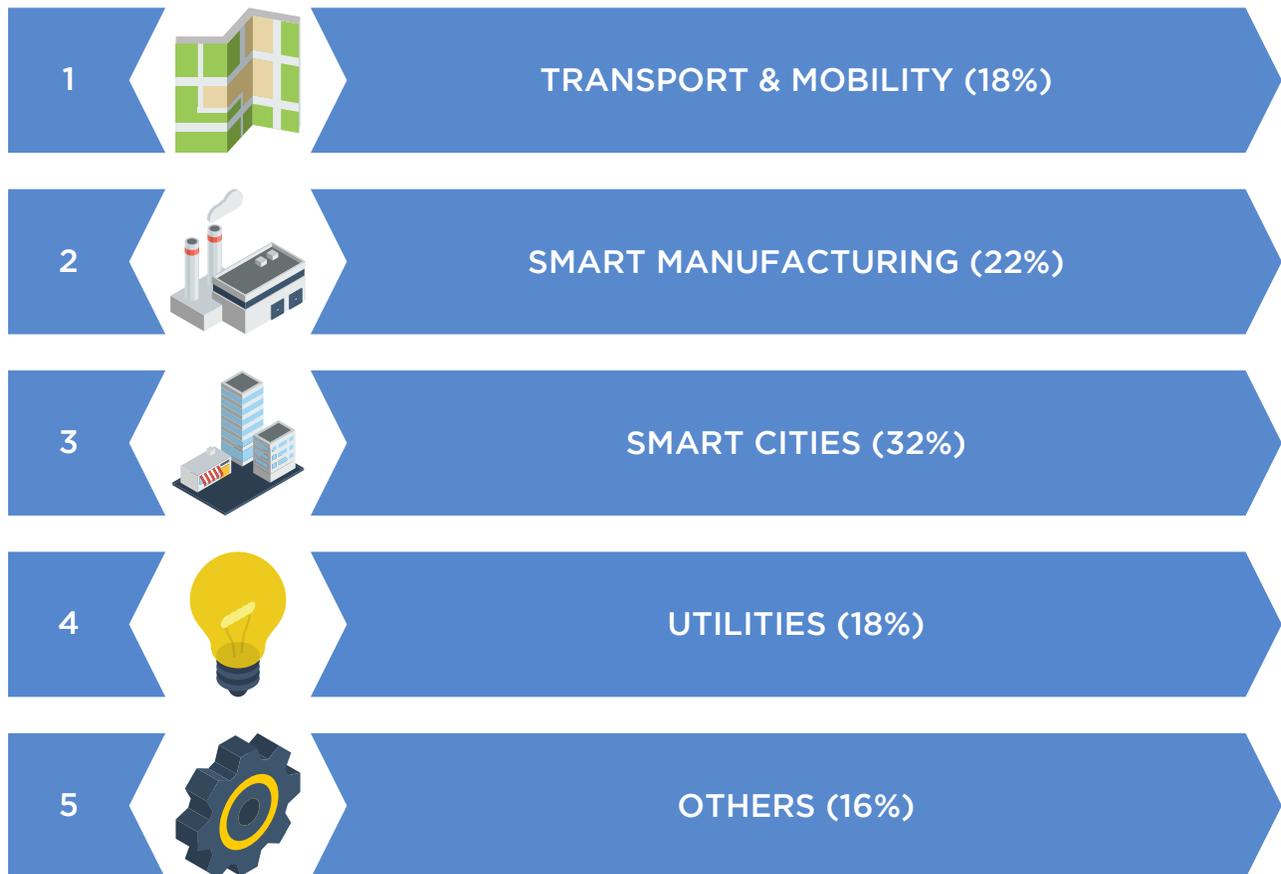
## IoT at work in LAC

Selected examples of IoT technology investment already underway in Latin America include:

### SMART CITIES IN ARGENTINA

“Smart cities” IoT encompasses technologies that improve urban life, from public transportation to security measures to parking solutions. According to IDC, Latin America's Smart Cities IoT market will grow from US\$2.15 billion in 2017 to over US\$6 billion in 2021.

FIGURE 7. APPLICATION SCENARIOS MATURITY LEVEL AND POTENTIAL GROWTH (CAGR 2018-2021)



Argentina contains several examples in which municipalities are using IoT solutions. One is [Tigre City, in greater Buenos Aires](#), which is combating a rise in crime with safety solutions such as cameras that help security officials track criminals and stolen cars. Vehicle theft rates in Tigre have decreased by 80% since the cameras were installed in 2011. Meanwhile, in Buenos Aires itself, a public-private partnership between the city and Philips Lighting yielded a “smart lighting” system that uses data from multiple city departments to optimize use of street lights in such a way that is expected to result in power use being halved.

#### **LOCAL SOLUTIONS FOR SMART CITIES: VIKUA IN VENEZUELA**

There is strong evidence of growth in the smart cities market segment across the LAC region. Increasingly, local companies are partnering not only with large global corporations to implement IoT-powered solutions to urban challenges, but with other LAC-based firms, establishing the beginnings of a regional IoT value chain. For example, [Venezuelan software company Vikua](#) has developed a smart cities platform, and has projects not only within Venezuela (a “smart semaphores” system for Chacao and a transport route system for Maracay), but also in neighboring countries (a transport management system in Cartagena, Colombia).

#### **INDUSTRIAL IoT IN MEXICO**

“IIoT” — industrial IoT, also known as Industry 4.0 — refers to the use of IoT technologies

in manufacturing, transportation finance, utilities, and other business verticals. According to the research firm Frost & Sullivan, Mexico is positioned as one of the region’s best-prepared countries for IIoT. The firm projects that Mexican IIoT will reach almost US\$4 billion in revenues in 2022, up from some US\$1.3 billion in 2017.

This is due, in large part, to the previously mentioned investment Mexico’s government is making in IIoT, especially in the automotive industry. Frost and Sullivan believes that Mexico will be Latin America’s second largest connected car market by 2023, with a fleet of over 1.6 million vehicles.

#### **CONNECTED AGRICULTURE IN BRAZIL**

Agriculture is a massive part of the Brazilian economy: in 2015, agricultural products accounted for 46.2% of Brazil’s total exports, and 21.5% of its GDP. It stands to reason, therefore, that [agriculture is one of the “verticals” prioritized in Brazil’s national IoT plan](#). IoT technology can help increase the efficiency of this labor-intensive sector, with sensors helping detect the need for more irrigation, changes in weather conditions, and crops’ harvest readiness. Brazil’s IoT action plan estimates that adoption of these technologies could lead to a productivity increase of up to 25% in Brazilian farms by 2025, not to mention a drop of up to 20% in the use of pesticides and artificial fertilizers.

For example, the international technology firm [Bosch has developed a “Precision](#)

[“Livestock Farming” system](#) for cattle farmers that is currently in use in the central state of Goiás, Brazil. It uses scales embedded near feed troughs and transponders attached to bulls’ ears to allow farmers to closely monitor their animals’ weight without having to take time to weigh them individually. This boosts the ranchers’ productivity, as they can easily identify bulls ready to send to market.

## The IDB and IoT

Uniquely placed to work with both the public and private sectors of Latin America and the Caribbean, the Inter-American Development Bank is increasingly interested in supporting projects that will bring IoT to its full potential in the region. Examples include:

### PILOTING “SMART CITIES IN A BOX” IN CHILE

[A pilot initiative](#) launched in 2017 in Temuco, Chile is supporting software developers to create solutions for an open “smart city” technology platform, initially developing four application scenarios: air quality monitoring, virtual bus stops, garbage collection management, and city incident management. 4,500 families will benefit from improved urban services; at least 140 new jobs will be created; 50 companies will develop Smart Cities solutions; and 11,500 people will use the technology solutions developed. After the project is completed in 2021, its model and software platform will be made available for replication or adaptation by

interested cities across the region. The pilot initiative is supported by the IDB, CORFO (a Chilean government agency for economic development), the Municipality of Temuco, the University of La Frontera, and key technology partner Everis.

### “SMART INNOVATION” FOR BUSINESS OPERATIONS

[IDB Invest’s](#) “Smart Innovation Program,” sponsored by the Korea Private Sector Development and Innovation Fund, is organizing a series of workshops in Mexico and Korea, to bring Latin American and Korean IoT companies together to compare experiences and explore collaborations. Not limited to any specific sectors, the workshops are designed to help participants understand IoT markets, enhance their IoT business capacity, and create new business opportunities.

### DATA-DRIVEN RICE FARMING IN COLOMBIA

There was a time when a scarecrow would have been considered the height of agricultural technology. Now a Japanese firm has developed [“e-kakashi,”](#) named for the Japanese word for scarecrow. The e-kakashi service combines IoT, big data analysis, artificial intelligence, and more to optimize rice farming with information such as weather conditions and the farming practices in use. It is designed not only to boost crop yields, but also to reduce greenhouse gases which are a byproduct of traditional rice farming practices. IDB Lab, in collaboration with the International Center for Tropical Agriculture (CIAT), and

SoftBank Corp, is sponsoring the first use of e-kakashi outside Japan in a pilot project in Cali, Colombia. Over 150 small-scale rice producers will participate and an additional 70 agronomists will be trained, and following the pilot's completion the model hopes to expand commercially.

### **IMPROVING WATER RESOURCE MANAGEMENT THROUGH SIMULATION**

Managing water resources is a global challenge, and the worsening effects of climate change are making the need for better data more and more urgent. To help countries in the LAC region, the IDB has

created [Hydro-BID](#), a system that simulates various change scenarios (e.g. climate, land use, population) and their effects on water resources, to assist governments to better assess the quantity and quality of available water and infrastructure needs, as they design strategies and adaptive projects in response to these changes. The tool gets data from different sources, including IoT devices and platforms, so the development of IoT in the region also improves the tool's effectiveness. Hydro-BID is currently being piloted in Argentina, Peru, Ecuador, Brazil, and Haiti.



# IV: Looking to the future for IoT

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## The experts believe

In preparing this report, we have consulted global and regional industry players, international organizations, and government officials, and reviewed a comprehensive selection of published reference materials (find a list of sources at the end of this report). We've encountered a clear consensus across the board about the current state and the future of the IoT industry and market.

For the first time ever, the development of the IoT industry is allowing data to be captured from processes and things in a manner that was, not long ago, impossible (or just very difficult). IoT is advancing thanks to better connectivity, an increasingly affordable sensor industry, and perhaps most importantly, entrepreneurs creating new applications and platforms that use data on a massive scale.

The IoT market will continue to grow, driving economic growth, business opportunities, and quality of life. The experts point to the burgeoning list of applications and use cases for IoT, and to new and more advanced innovations in prescriptive analytics, artificial intelligence, and augmented reality, which increase the

usage and value of things data collected by IoT devices.

At the same time, IoT as an industry and market is still in an emerging stage, still confronting challenges and not yet having passed the tipping point to reach maturity and stability.

## The outlook for LAC

In Latin America and the Caribbean, although the IoT market has lagged behind from a global perspective, there are encouraging signs, like the revenue growth projected for coming years, and ongoing development trends. Throughout our research, we observed that across LAC, not only are IoT platforms and solutions being imported from other regions, but there is also an emerging sector of LAC-based IoT device designers and vertical application developers working on innovative local products and services. This regionalization of locally developed products and services could have significant job creation impact, as throughout the IoT value chain there are demands for a diverse set of skills: design, manufacturing, installation, maintenance, software development, consumer and industry sales, etc.

IoT's challenges in LAC are not isolated to that sector, but are part of the larger, regionwide delays in accelerating the ICT and innovation industry overall. A more holistic approach to IoT industry development, such as establishing national strategies (like Brazil) or setting policy priorities (like Mexico), would boost IoT and ICT alike. Brazil's national strategy resulted from a major collaborative effort between government, academia, civil society, and industry, and established clear priorities based on the four highest-potential applications: cities, health, rural, and IIoT. This approach of streamlining and focusing on impact can be effective in other contexts as well.

Some specific niches in which LAC has either major challenges or opportunities are also becoming sweet spots for the IoT industry and market. One example is in smart city applications, where innovative solutions to issues like traffic, parking, security, or pollution result in high political visibility and short-term return on investment, in both political and economic terms. Latin American and Caribbean cities in small and large countries alike are experiencing very positive results from IoT-driven projects.

Success is less evident across the board in agriculture, one of the largest economic sectors in LAC. Agroindustry in highly competitive sectors like cattle in Uruguay or winemaking in Chile and Argentina is embracing IoT technologies to sustain and gain global competitiveness within

large enterprises. But, at the same time in other parts of the region, there is a large segment of struggling small producers. Modernization and adoption of new technologies like IoT is a major challenge for them due to the level of investment needed, limited skills, and a need for a strong return on investment case. But much as technology has transformed financial services in rural and low-income areas, IoT applications may yet be found to support smaller-scale farmers.

Industrial IoT also offers a major opportunity for LAC. World-class enterprises exist in the region, but on average the industrial sector is lagging in terms of modernization. For this sector, IIoT represents a “leapfrog” opportunity to make the region competitive on a global scale.

The main conclusion of our research is that helping to accelerate the IoT industry and market in LAC is a strategic bet for the region, because IoT is both an enabler of overall digital transformation and an engine of job creation, economic growth, sustainability strengthening, and quality of life improvement.

There are multiple ways to approach this, but any perspective should start with a thorough understanding of the ubiquitous nature of IoT technology and its complex web of intersections and implications within our society, economy, and lifestyles. This should include a comprehensive assessment of both its development

impact and the associated risks that should be addressed responsibly.

Due to its unique characteristics, accelerating the IoT sector in LAC will require a more comprehensive approach. IoT requires innovative approaches and multi-stakeholder action to reach its full potential. The data revolution is not really about technology, but about disruptive business models with implications across multiple layers of society. Going forward, IoT will enable the fulfillment of the data revolution, so it is imperative that everyone, from individuals to private sector leaders and public sector authorities, becomes aware of IoT's presence and power. We believe that effective ways to guide IoT development in LAC in a positive direction include:

- Prioritizing the IoT sector within countries' strategic technology and innovation agendas.
- Addressing key challenges like privacy and personal data protection, impact on sustainability, and ethical business models.
- Embedding IoT development within diverse sectors and industries, perhaps

through establishing co-innovation spaces that allow sectors (e.g. manufacturing, healthcare, agriculture, etc.) to interact with local and global IoT innovators.

- Documenting and reporting on IoT's progress, experience, lessons learned, and impact, so as to share stories that might serve to inspire others and to position LAC's IoT developments within the global industry map.
- Cutting the costs of doing business internationally and creating an enabling environment for IoT development (e.g. reducing taxes on importing sensors).

The cross-cutting nature of IoT requires a flexible approach to ensure that industry leaders, government public officials, and other stakeholders are connected to IoT innovators within the LAC region and all over the world. This report offers a few suggestions on how to accelerate IoT adoption in LAC in a way that encourages this exciting innovation to permeate across countries and industries. The task is not easy, but the time is ripe.



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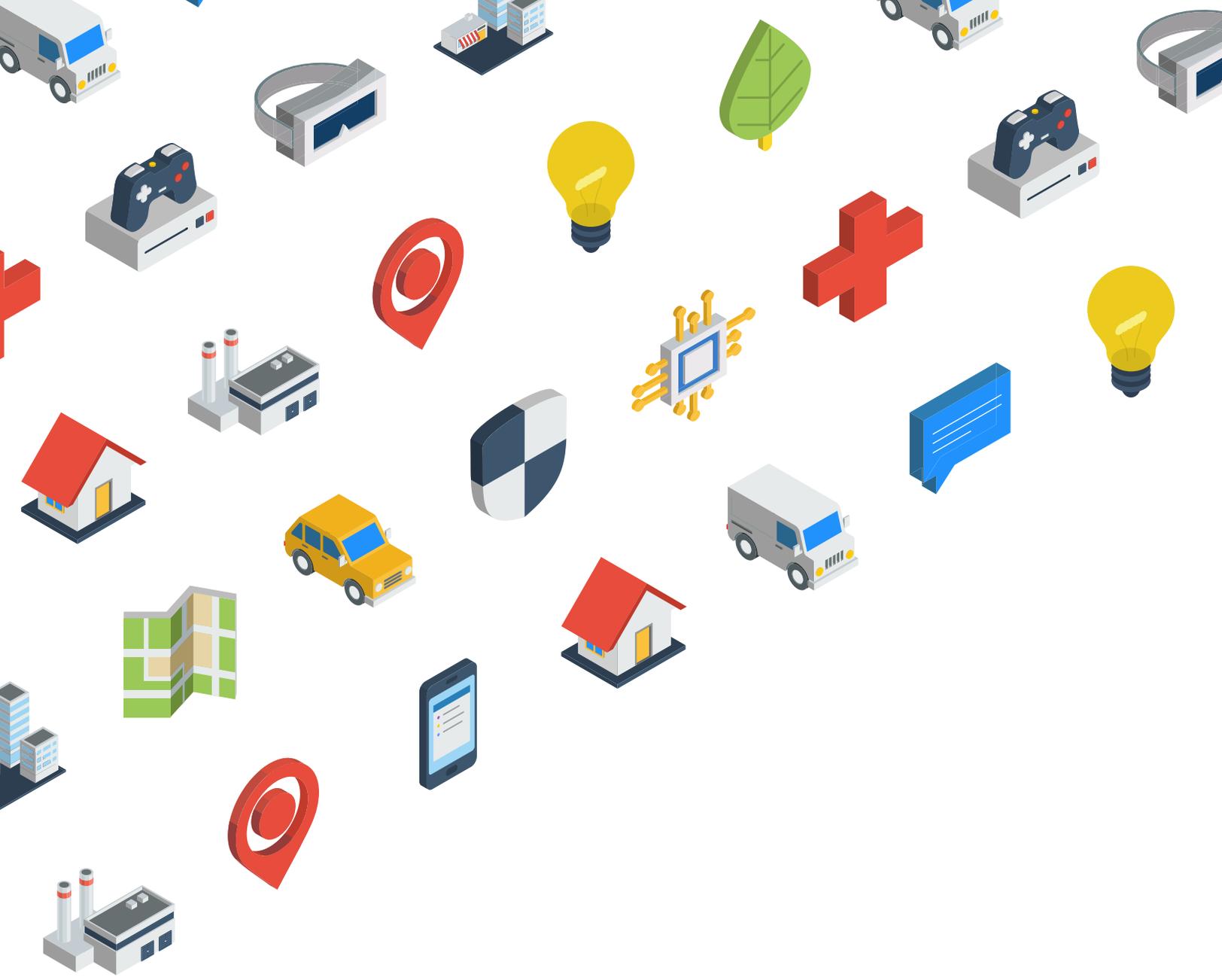
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