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Revised Version. Thematic Paper: Knowledge Economy

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ACRONYMS

CMF	Connectivity, Markets and Finance Division
CTI	Competitiveness, Technology and Innovation Division
EDU	Education Division
IDB	Inter-American Development Bank
IFD	Institutions for Development Sector
INT	Integration and Trade Sector
ITE	Information Technology Department
KIC	Knowledge, Innovation and Communication Sector
LAC	Latin America and the Caribbean
LAVCA	The Association for Private Capital Investment in Latin America
LMK	Labor Markets Division
MIF	Multilateral Investment Fund
OECD	Organization for Economic Cooperation and Development
R&D	research and development
SDG	Sustainable Development Goal
STEAM	science, technology, engineering, arts, and math
VC	venture capital

Preface

In 2017, IDB Lab (then the Multilateral Investment Fund or MIF) presented to its Donors Committee¹ its approach on how to achieve impact by accelerating the development of the knowledge economy. The knowledge economy was one of three thematic focus areas developed by IDB Lab in 2016. Since then, in 2018 IDB Lab presented a three-year business plan (2019-2021)² in which it committed to update the three focus areas. This paper, the last of the three thematic papers prepared by IDB Lab, presents an update to IDB Lab's knowledge economy strategic approach, refining key concepts, learning from the experience of the last three years, and proposing opportunity for impact adapted to the Inter-American Development Bank (IDB) Group's and the region's current outlook.

While honing its strategies, IDB Lab recognizes that projects within its portfolio often address challenges described across two or even all three of IDB Lab's thematic areas (climate-smart agriculture, inclusive cities, and knowledge economy). For purposes of simplicity and ease in organizing the portfolio, IDB Lab categorizes projects and reports on its portfolio based on the which of the three thematic areas its projects' objectives are more closely related. Similarly, when presenting the opportunities for impact within these thematic papers, IDB Lab assigned them to one of the three thematic areas, recognizing there may be overlaps. When considering IDB Lab's work in knowledge economy, these overlaps will be particularly salient since the opportunities for impact of knowledge-intensive sectors deal with workforce, innovation finance, and the innovation ecosystem—cut across many objectives outlined in the other two thematic areas.

¹ "Knowledge Economy" (MIF/PP-155)

² "IDB Lab Business Plan 2019-2021" (MIF/GN-235-3)

I. Context and Objectives

A. Why the Knowledge Economy Matters

- 1.1 Today, new technologies³ are taking hold across industries around the globe at unprecedented rates. Abundant information and vast quantities of data are now more accessible than ever, and innovations that build upon digitalization and new technologies are quickly transforming the way we live. Economies around the world are being transformed, disrupting how companies do business, how governments deliver services, how labor markets function, and how people interact with each other. These trends are culminating in a global shift towards economic activities that are intense in the use of intellectual capital rather than physical capital. Economies that are driven by such activities are known as “knowledge economies.”⁴ They rely more heavily on information, knowledge, and creativity, and show dynamism in innovation, evidence of producing more sophisticated and complex products and services and have significant spillovers in other sectors. Knowledge economies spur entrepreneurial activity, economic growth, and job creation. Furthermore, innovation processes, the adoption of new technologies, and penetration of digital platforms can also be used to deploy unprecedented, cost-effective solutions to pressing social and environmental problems.
- 1.2 However, the sheer magnitude and speed of change, as well as the inevitable displacement brought by greater automation, the ongoing challenges of uneven digital connectivity, and issues of privacy and digital ethics, run the risk of increasing the divide between those able to access and effectively use these innovations, and those left on the side lines. **The poor and vulnerable may be the most impacted by these changes and may arguably have the most to gain or lose depending on how they engage with the innovations that can affect them.** Given IDB Lab’s mandate “to create opportunities for the poor and vulnerable populations in the LAC region,”⁵ it is fitting that it looks at fast-growing, knowledge-intensive enterprises as pathways for solving the most needed social and environmental problems in LAC.
- 1.3 Economies that have invested in knowledge-based sectors show that it is not only the growth of these sectors that explain economic booms, but also the significant spillovers in a variety of other traditional sectors such as agriculture. Similarly, social and environmental sectors stand to benefit greatly from the innovations and entrepreneurial ventures that rely more greatly on intellectual assets.
- 1.4 Investing in the inclusive growth of the knowledge economy in LAC offers tremendous potential for impact. Given its development mission and mandate to experiment, **IDB Lab has an important role to play in testing approaches that link the poor and vulnerable with the knowledge economy**, ensuring they are not left behind but rather benefit from the services and products offered by knowledge-intensive companies in basic sectors like education, health, finance, among others.

³ Throughout this document, the term “technologies” refers to tools (such as devices, machinery, electronics, software, etc.) as well as know-how (such as processes, techniques, blueprints, etc.) that can yield greater productivity and efficiency.

⁴ For more than a decade, the Organization for Economic Co-operation and Development has referred to the knowledge economy to describe trends in advanced economies that have a greater dependence on knowledge, information, and high skill level. (OECD/Eurostat 2005)

⁵ “Final Report on the Future of Financing of the Multilateral Investment Fund” (CA-581), paragraph 1.3.

B. Clients and Challenges

- 1.5 There are many actors involved in building a knowledge economy that is inclusive of lower-income populations and other marginalized groups. IDB Lab will work with a broad range of players, but it also recognizes that it should focus its efforts on generating opportunities for specific types of clients. The **poor, vulnerable, and traditionally excluded** populations will remain the most important clients for IDB Lab as the target end-beneficiaries of all knowledge economy projects, with special attention given to segments of these populations as described further.
- 1.6 **Entrepreneurs and early-stage enterprises** are driving change in the knowledge economy and an increasing number of them are leveraging creativity, know-how, new technologies and processes to provide market-based solutions that address pressing social and environmental issues. Recent studies point to the growing importance of entrepreneurs in having positive social and environmental impacts and measuring these impacts. (HSBC 2018) (LAVCA 2019) For these enterprises to thrive, they need critical inputs which are unfortunately scarce across LAC, namely skills, financing, and the support of key institutions that make up the knowledge economy ecosystem.
- 1.7 The challenges related to these critical inputs are described below. These descriptions also highlight key stakeholders which IDB Lab considers as main client groups.

Preparing for the Future of Work: Although work opportunities in the knowledge economy are on the rise, they require transversal skills which are valuable across jobs or industries, such as digital and socio-emotional skills. The poor, vulnerable, and excluded generally lack these skills since they are seldom taught at schools and vocational training centers. (Mateo-Berganza Diaz, et al. 2019)

- 1.8 Disciplines related to science, technology, engineering, arts, and mathematics (STEAM) are essential for future innovation and economic growth and are in high demand by employers. These disciplines, which impart skills such as logic, critical thinking, creativity, and problem-solving, are valuable across many industries. Alas, LAC is facing a significant talent shortage in these areas. Thirty-seven percent of companies believe “finding a workforce with the necessary training is one of their main obstacles” to growth – this proportion is higher than the global average as well as the average for other developing regions. (World Economic Forum and Deloitte 2015)
- 1.9 The prospects of the skills gap may be exacerbated by two strong trends in the region: First is the rapid rate of change in the nature of work imparted by the speed of technological adoptions. Typically, it takes years for people to develop new skills and undertake new tasks, so accelerating the adoption of new skills is crucial. Furthermore, robotics and artificial intelligence have the potential to disrupt and displace the workforce in yet unforeseen ways. Second is the demographic projection of an aging population which has profound implications on the profile of the workforce of the future.⁶ (Mariano Bosch 2018) The nature of work will need to change as

⁶ The percent of senior citizens doubled from 10% to 20% in Europe over the course of 50 to 75 years, while in LAC, this doubling happened much faster (20 years in the case of Nicaragua, 22 years in Mexico).

people will need to work later in life and employment will need to be more adapted to those aged 50 and above.

- 1.10 In this context, there is a pressing urgency to re-skill and up-skill LAC's workforce, particularly for those whose jobs are likely to be displaced. Skills that are more applicable across industries, sectors, and functions are increasingly important due to the required flexibility of switching employment. Many socio-emotional skills, for example, are less likely to be replaced by advances in technologies such as automation, robotization, artificial intelligence, or machine learning. Also referred to as soft skills, socio-emotional skills include collaboration and team work, communication, empathy, persistence, social skills, emotional intelligence, etc. Equally important to address job displacement is to increase the availability of tools that make continuous learning easier to acquire new skills. Learning to learn, to quickly acquire new skills as they become relevant in the workforce, and to routinely refresh knowledge beyond traditional school settings is a way to increase resilience to rapidly changing industries and extend the employability of an aging population.
- 1.11 In addition to supporting the skills of an aging population, another client group worth highlighting are vulnerable youths. Today, a disproportionately large number of youths in LAC are neither studying nor working, and half of those that do finish school lack basic skills for the labor market. Those that do intend to enter the workforce are generally neither afforded opportunities to participate nor to benefit from knowledge economy sectors.
- 1.12 Gender is another dimension that must be addressed when preparing the workforce for the knowledge economy. Women have limited access to knowledge economy jobs. Although LAC counts on a relatively higher share of women who study science, technology, and math compared to many parts of the world, the gap remains large and it increases when considering jobs in these sectors. There is a pressing need in the region to close this gap and to make sure that women and men are afforded equal opportunities to reap the benefits of working in the knowledge economy. Young men, especially those from lower income segments, also face strong headwinds in the labor markets, particularly for employment in the knowledge economy, due to higher school drop-out rates, lower schooling levels, and mediocre technical and socio-emotional skills.
- 1.13 If given opportunities to close the skills gap described above, these populations could help build a qualified workforce suited for the knowledge economy jobs that are in high demand and are better paying, thus promoting upward mobility.
- 1.14 ***Financing Knowledge Economy Startups:*** In recent years, LAC has seen growth in early-stage financing, including seed, late-seed, and early rounds. According to LAVCA⁷ data, startups received just under US\$2 billion in venture capital (VC) funding in 2018, almost double the amount invested in 2017. Nonetheless, the region remains very much undercapitalized compared to other global emerging markets and there is much capital that can be unlocked for entrepreneurs and startups. Financial systems in LAC need to become more sophisticated to handle the needs of "technology-based, rapid-growth new companies," and VC is "orders of magnitude" behind developed economies and China and India. (Juan Carlos Navarro 2016) As so many startups seek to solve meaningful social and environmental problems in the region, addressing these financing bottlenecks are critical. Directing capital to companies, organizations, and funds with the

⁷ LAVCA is the Association for Private Capital Investment in Latin America.

intention to generate a measurable, beneficial social or environmental impact alongside a financial return⁸ can have a profound effect in improving the lives of the poor and vulnerable in the region at scale.

- 1.15 The region lacks a critical mass of experienced leadership to sustain early stage investments, mainly in more underdeveloped ecosystems such as in Central America and Caribbean. More qualified and seasoned investors in VC and high-quality accelerators are needed to offer advice to startups so they can reach their full potential and grow.
- 1.16 The region is still characterized by limited exit opportunities for VC investments in generally illiquid capital markets. Where early-stage investment ecosystems are more developed, they mainly concentrate around a few metropolitan hubs in more developed economies such as Argentina, Chile, Colombia, Brazil, and Mexico, yet are in dire need in other parts of the region.
- 1.17 Striking gaps in access to capital are not just geographic, but also demographic. The disparity in access to early-stage financing between men and women is well documented. As an example, a recent study of 350 startups found those founded by women garner less than half the investments although they generate more revenues. (Katie Abouzahr 2019)
- 1.18 ***Building Innovation Ecosystems***: The region is also falling behind when it comes to generating research and development (R&D) and converting technology and knowledge into innovation. LAC countries currently underperform their economically similar counterparts when it comes to R&D intensity as evidenced by comparing R&D expenditures as a share of gross domestic product. Ultimately, this creates a deficit in innovation, new ideas, and solutions. The linkages between universities, research centers, and industry are also limited in most of LAC, which means that the ideas, research, and skills produced by entrepreneurs are often not well-aligned to industry needs and lack commercial applications. Many intermediaries needed to promote innovation and entrepreneurship lack sufficient capacity to effectively scale enterprises, connect them to other ecosystem actors, or work cross-border on a regional scale. For these reasons, institutions with a mission to support entrepreneurship and innovation for positive impacts need to be strengthened.

II. Learning from Experience

- 2.1 IDB Lab has increasingly included projects in its portfolio that lever innovation and technology to reach their development objectives. Between 2016 and 2018, IDB Lab had classified 40% of its approved projects within the knowledge economy thematic area, of which 30% were dedicated to building skills, 37% were addressing financing gaps and enterprise growth, and 33% were for strengthening entrepreneurship and innovation ecosystems. The following are a few lessons and trends gleaned from IDB Lab's experiences, focusing on its more recent knowledge economy portfolio.

⁸ Note that this is the working definition of impact investing as provided by the Global Impact Investing Network (<https://thegiin.org/>).

- 2.2 ***Preparing for the Future of Work:*** IDB Lab has built upon a robust portfolio on workforce development, which over time emphasized youth employment and entrepreneurship.⁹ Within the past few years, the portfolio of projects that addresses job training and entrepreneurship has narrowed its focus to provide target populations with more transversal skills, especially digital and socio-emotional skills, as well as STEAM education and career guidance. IDB Lab is also piloting the use of technologies to modernize the delivery of training, link students with jobs, and provide support to companies undergoing upskilling and reskilling of their workforce.
- 2.3 *There is value in linking EduTech companies with more traditional or grassroots training institutions as a way to amplify impacts.* There are many startups developing new technology-based solutions to deliver educational content. While digital platforms have the potential for lowering costs per student and can reach scale quickly, often they fail to account for the particularities of their target students, especially the vulnerable and traditionally excluded youths. Adjusting curricula to local cultural contexts and complementing content with life and soft-skills is an important step in ensuring proper adoption of the training otherwise delivered through new technologies.
- 2.4 *To bridge skills gaps in the workforce, a forward-looking vision of the labor market is critical.* As companies go through digital transformations, they often struggle to reconfigure their job descriptions as to attract talent, or even how to guide education providers on updating their curricula. This is in large part due to a lack of understanding of future labor markets. Supporting companies in upskilling and reskilling their workforce becomes crucial.
- 2.5 *Structuring alliances between public and private organizations is not only essential for scaling but should be done deliberately from the onset of the project.* An example where this lesson was successfully incorporated was in the New Employment Opportunities for Youth, a program which could only succeed given its explicit activities for forging strong public and private ties. The collaboration with the Labor Markets and Education Divisions of the IDB were essential for the program.
- 2.6 ***Financing Knowledge Economy Startups:*** Increasing access to finance has been at the core of IDB Lab's work since its inception, and over decades it has helped build the region's microfinance, small and medium enterprise finance, and early-stage investment industries. Within IDB Lab's financial portfolio, most innovations have spurred from companies in early-stage funds, and an increasing number of these companies rely on intellectual assets and new technologies.
- 2.7 *Networks are becoming increasingly valuable for fund managers, making fund managers valuable ecosystem builders.* Generally, the most successful fund managers are those that lever extensive networks across countries, sectors, and types of institutions within the early-stage financing ecosystem. These connections allow fund managers to access better investment opportunities, support the international growth of portfolio companies, and increase exit opportunities for their investments. Fund managers are therefore becoming more important players themselves in building early-stage financing ecosystems.

⁹ IDB Lab flagship programs in this area include the New Employment Opportunities for Youth Initiative and the Youth Entrepreneurship Program.

- 2.8 *The significant gender gap persists in access to early-stage financing.* IDB Lab still finds an important gender gap in access to early-stage capital. While IDB Lab is well positioned to increase the provision of early-stage investments in the region, significant gaps exist for companies at later, early-growth and growth stages. To close this gap, IDB Lab is collaborating closely with IDB Invest to see how the IDB Group overall can serve this entrepreneurial growth and stimulate innovation across the region.
- 2.9 *Greater impacts are achieved alongside greater financial returns.* Increasingly, startups build their business models on new technologies and digital platforms upon which their client acquisition rates and revenue growth strategies depend. Startups seeking to rapidly amplify their social and environmental impacts are no different. FinTech, EduTech, and HealthTech startups represent a significant share of VC deals in the region.¹⁰ Beyond presenting attractive opportunities for financial returns, they are also increasing access to low-cost services for lower-income populations and smaller scale producers and merchants, ultimately generating significant positive impacts. Ultimately, the most impactful companies are also among the best financial investments.
- 2.10 ***Building Innovation Ecosystems:*** IDB Lab has had an important role in building entrepreneurial ecosystems in LAC, which implied strengthening a wide range of institutions supporting innovation and entrepreneurs. Through its early investments in venture capital and early-stage finance, its efforts to develop company builders, accelerators, its emphasis on connecting entrepreneurs with financing and connections, and its efforts to push a gender equality agenda, IDB Lab has been one of the most significant agencies in the development of early-stage innovation ecosystems in LAC.
- 2.11 IDB Lab has also acquired a significant institutional expertise on innovation ecosystems, having participated in the development of this industry since its infancy. This has allowed IDB Lab to understand the complex mapping and relationships between the main players in the ecosystem and gleaning some recent trends:
- 2.12 *There is a rising demand for technical and financial support from institutions that serve enterprises with social and environmental missions.* These institutions also seek training and experience with innovation processes and new technologies that are increasingly prevalent and valued by the enterprises they support. While the region has blossomed with initiatives promoting ideation and incubation of impact enterprises, there is still little experience and knowledge on accelerating and scaling them. In this regard, IDB Lab's recent portfolio targeting the knowledge economy includes projects that are strengthening different company builders, accelerators, and corporate venturing models that lever technology to address social challenges. It is fostering open innovation, creating knowledge hubs, and strengthening research centers for adoption, testing use cases, and scaling up use of technologies for social and environmental impacts.
- 2.13 *Corporations have untapped potential for fostering entrepreneurship and innovation ecosystems.* As corporations continuously strive to innovate for competitive edge, they are increasingly turning to younger and nimbler startups as their source of innovation. The rise in corporate venturing is a testament to this and IDB Lab has identified a rise in projects offering opportunities to forge

¹⁰ FinTech accounted for 29% of total VC deals in 2017, while AgTech and EdTech accounted for 7% and 6% respectively. (LAVCA 2018)

links between entrepreneurs and larger companies, using platforms for managing growing networks.

- 2.14 *Ecosystems maps can evolve into more dynamic networks.* Entrepreneurship and innovation ecosystems benefit greatly from identifying their key players and mapping their interconnections. But to turn these mapping exercises into more valuable and actionable tools, digital technologies are being used to develop entire platforms that can be more frequently updated, can expand limitlessly, can facilitate navigation, and more importantly, forge links between its players. IDB Lab-supported Finconecta, for example, is a marketplace that links financial institutions with FinTech startups.
- 2.15 *Increased connectivity produced by digital technologies may lead to shifts in geographic concentration of innovation ecosystems.* Today's entrepreneurs, companies, funders and innovators are increasingly able to source ideas, finance, and services necessary for innovation globally. As the ways in which economic agents can connect continue to multiply, geography may take a more limited role in shaping innovation ecosystems. It is possible that in the near future, geographic innovation hubs will no longer have to rely on the local availability of financing, research, and entrepreneurship to flourish. This can have significant implications in the development of secondary innovation hubs in LAC, either in smaller cities, or in countries that before could not compete on a global scale in the innovation industry.
- 2.16 *Entrepreneurial and innovation ecosystems continue to need supportive policies, regulations, enforcement agencies and rule of law.* To this end, IDB Lab will look towards and work closely with several divisions across the IDB Group, such as IDB Invest, the Competitiveness, Technology and Innovation Division (CTI), the Labor Markets Division (LMK), the Education Division (EDU), and others. A coordinated approach to address binding constraints that impede the development and scaling of innovations that can have a social or environmental impact is necessary to accelerate the opportunities that are made available for the poor, vulnerable and those who are excluded. The IDB Group has a tremendous comparative advantage to take on this role, given the breadth of financial instruments it deploys, the innovation mandate of IDB Lab, the knowledge and expertise that the IDB Group can draw on, and the public dialogue that the IDB enjoys.

III. Opportunities for Impact

- 3.1 IDB Lab's work will parallel the challenges described above: preparing for the future of work, financing knowledge economy startups, and building innovation ecosystems. Although there are numerous ways in which the knowledge economy can work to the benefit of disadvantaged populations across LAC, there are sectors in which IDB Lab can add more value based on its experience and predictions for future opportunities. The following sections describe how IDB Lab will work to address the challenges of skills, financing, and institutions that makeup the ecosystem, and finally will highlight those fields within the knowledge economy with great opportunities for impact.

A. Preparing for the Future of Work

- 3.2 IDB Lab will target segments of the region's populations for the future of work, contributing to a highly demanded workforce which is better prepared for the knowledge economy. These

segments include vulnerable youth, workers in displaced industries, workers at older stages of life, people with disabilities, and women in STEAM, among others. It will help foster a workforce that is more adapted to the rapidly changing landscape of the future, in large part due to the fast pace of technology trends and automation.

- 3.3 Within its portfolio, IDB Lab will pilot new models for delivering training and skills. In many cases, this means looking beyond traditional partners in education such as school systems and other academic institutions. In other cases, IDB Lab will partner with more traditional institutions that are seeking to explore how to modernize their content and service delivery models. *Fundación Forge*, for example, is an organization with extensive experience preparing vulnerable youth for their school-to-work transition. It will develop a digital platform to teach soft and digital skills. In conjunction with the EduTech ecosystem, Forge will codevelop or adopt digital solutions that use technologies such as machine learning or artificial intelligence to provide vocational guidance, coaching, and job placement services, hence multiplying by ten the number of students reached. Kuepa, an IDB Lab investment, is another new company that exemplifies this model. It is blending personal interactions with distance learning technologies and machine learning to tailor curricula and make learning more effective.
- 3.4 Another example of a low-cost alternative to traditional university education programs, particularly in coding and information technology, are bootcamps, or intensive training programs for digital skills which generally last less than a year. The intention is to place students with no knowledge or work experience with these skills in highly-demanded information technology jobs over a relatively short period of time. IDB Lab has supported pioneering bootcamps in LAC, including Laboratoria in Peru and Valentina in Guatemala. IDB Lab, the Social Sector (SCL), and the Institutions for Development Sector (IFD) of the IDB are launching the “Bootcamps for Tech Fans” challenge, soliciting project proposals for incipient or mature bootcamps across the region.
- 3.5 IDB Lab also will support partnerships to develop technical skills associated with emerging technologies alongside industry initiatives in select countries. As an example, IDB Lab is supporting the Parque Cibernético de Santo Domingo in the Dominican Republic to develop the first virtual and augmented reality center in the region, which among other things is helping develop training programs that will reach over 3,000 youths over three years. The project plans to scale by adjusting curricula alongside the ministries of education as well as science and technology, and is identifying partners in Panama, Guatemala, and Costa Rica to establish similar digital hubs.
- 3.6 Underpinning its projects, IDB Lab will seek to establish lasting partnerships between key stakeholders, including innovators and entrepreneurs in education, training providers in the civil society and public sectors, and knowledge economy industries looking to hire talent with the appropriate skills.

B. Financing Knowledge Economy Startups

- 3.7 Financing is an essential factor for bolstering innovation and testing entrepreneurial ventures serving the region’s disadvantaged populations. IDB Lab will work to democratize access to financing to a new generation of entrepreneurs in the knowledge economy that are increasingly focused on solving pressing social and environmental problems, always with a perspective to lever

their innovations for commercially viable and rapidly scalable models. Leading by example, IDB Lab sends signals to markets on the viability and impact potential of such deals, crowding-in other private investors. Due to the observed gender gaps in accessing capital, IDB Lab will continue to support funds with clear approaches to address gender and diversity gaps and by building support networks that better link women entrepreneurs to capital.

- 3.8 IDB Lab will finance startups in the knowledge economy mainly by investing in early-stage funds. These funds will concentrate on a portfolio of companies that rely more heavily on intellectual assets such as innovation processes, know-how, and new technologies. And to link these innovations for the benefit of the poor, vulnerable, and excluded in the region, they will favor specific industries that are providing much needed services and products to disadvantaged populations, such as in education, health, financial inclusion, clean energy, and environmental services. IDB Lab will seek out fund managers who, along with financing, can provide guidance and mentorship so they can quickly get new ventures off the ground, find sound business models and financial strategies, put together strong teams, find product-market fits, and help scale businesses. An example of a recently approved IDB Lab project is CARAO Ventures Fund, headquartered in Costa Rica and operating in Central America and the Andean regions. This early-stage fund intends to provide equity investments to up to 35 startups seeking social and environmental solutions through technology-driven solutions, particularly in the areas of FinTech, BioTech, HealthTech, and sharing economy models.
- 3.9 IDB Lab sees a great opportunity in directing capital from large companies towards ventures in the knowledge economy with significant social and environmental impacts. Many larger companies recognize that their sheer size and longer history make it difficult to innovate and be agile from within. Corporate venturing is thus becoming more popular among well-established corporations. They are therefore looking instead to the entrepreneurial activities that happen in their close orbit of business or even in their own value chains, and a great opportunity exists for IDB Lab to target these investments towards addressing pressing social and environmental issues. As an example, Grupo Sancor Seguros, a cooperative focused on insurance products and health services, launched its innovation center, CITES. IDB Lab is investing in CITES's fund which will in turn invest in science and technology-driven companies, particularly those working in BioTech, nanotechnology, engineering, and information and communications technology.
- 3.10 In addition to funds, IDB Lab will consider direct financing to companies when they clearly provide social and environmental benefits and show great potential for scaling to many clients. In most cases, IDB Lab will consider co-investments and lever its wide network of fund managers and investors. The Colombian FinTech company, Sempli, offers a good example of an IDB Lab direct investment. In 2017, the founders raised a US\$3.6 million seed round which included IDB Lab's participation. This was followed on by a more recent investment of US\$5.7 million of which IDB Lab also participated alongside long-time strategic partner and impact investor, Oikocredit. The investment is very much based on the significant impact and scale potential of Sempli, which offers working capital loans to small and medium enterprises and managed to grow its portfolio 572% in just over a year to a portfolio US\$7 million since its 20 months in operation. Sempli is on track to help over 4,000 small and medium enterprises and support 40,000 jobs in five years' time, providing a valuable example on how technology can help reach scale in short periods of time.
- 3.11 In nascent or emerging early-stage ecosystems such as Central America, the Andean region, and the Caribbean, IDB Lab will emphasize supporting first-time fund managers and building

important networks of investors as part of establishing solid foundations for innovation and entrepreneurship. In these contexts, technical assistance for improving the capabilities of key organizations and institutions, building networks, landscape studies, market and investment know-how, etc., continues to be in need. In areas where early-stage ecosystems are more established, IDB Lab will work with more seasoned and sophisticated investors that show potential for extraordinary impact at scale by boosting key industries in the knowledge economy. IDB Lab still has an important role to play by sending signals to investors and mobilizing private capital. Opportunities still exist to support innovative entrepreneurs seeking positive impacts, sometimes through new financing instruments, and by improving impact measurement.

C. Building Innovation Ecosystems

- 3.12 For enterprises to start-up, disrupt, access financing, access talent, scale, and create jobs, a supportive, well-connected network of organizations which make up the enabling environment is crucial. IDB Lab will work to strengthen the institutions that provide support services directly to knowledge-driven entrepreneurs. Emphasis will be placed on building the support systems for enterprises that are solving social and environmental challenges, which face the dual challenge of starting and growing a commercially viable business, while often at the same time creating a new market for their innovative solution to an ongoing social problem that other private actors and governments have not addressed effectively. IDB Lab will also mobilize its own portfolio of investments in early-stage funds, enterprises, and ecosystem players to promote a more connected, dynamic, and impactful innovation ecosystem.
- 3.13 IDB Lab will support accelerators and company builders in the region that help entrepreneurs turn ideas into market-ready business models, and business models into investment-ready companies. In Paraguay, for example, IDB Lab is supporting Koga, a company that provides a wide range of services to entrepreneurs and early-stage enterprises explicitly looking to have positive social and environmental impacts. Among many activities, they offer trainings and workshops; conduct business plan competitions; incubate and accelerate startups; and forge networks of entrepreneurs, strategic partners, mentors, suppliers, and investors.
- 3.14 IDB Lab will also explore new ways to link science, technology, and engineering research with startups and entrepreneurs, to help generate business models that are market-based and can scale, thus amplifying its impacts. At CITES, for example, shared laboratories and co-working spaces combined with business development services allow startups to grow so they can become investment ready, highlighting important non-financial benefits or corporate venturing. Another example is that of Panama Flying Labs, an innovation hub in Central America around robotics technology which brings together local universities, incubators, businesses, and government to pave the way for development of technology-driven, market-based solutions to social and environmental problems. Panama Flying Labs was co-created by the Technological University of Panama and WeRobotics, and funded by IDB Lab.

D. Expected Target Sectors

- 3.15 In helping steer the knowledge economy to address social and environmental issues, IDB Lab sees great opportunities to test new business models and mobilize entrepreneurship in particular sectors:

- 3.16 Since its inception, IDB Lab has worked to increase access to finance across LAC. Its work to leverage technology for financial inclusion began many years ago, clustering projects and managing region-wide challenges to identify technology entrepreneurs offering broad solutions to financial institutions and its clients. IDB Lab's work in FinTech will continue, but its investments will be more narrowly focused on finding opportunities for individuals and enterprises excluded from financial services today. In addressing the financially excluded, IDB Lab will support innovations that enable formal savings, mobile payments, transfers and remittances, lending, insurance, personal financial management and financial education, among others. It will support business models and innovations which are deepening the impact of FinTech and other financial innovations for the poor and excluded. As an example, an IDB Lab-supported fund is investing in the Brazilian FinTech company Bom Pra Credito, a company that uses a digital platform to reach 35,000 low and middle-income people credit at lower interest rates alongside financial education. To address gaps that companies face in financing, IDB Lab will seek projects that leverage technologies for solutions such as improved credit scoring, digital banking, electronic invoicing, factoring, and smart contracts through blockchains. Another IDB Lab supported fund is investing in CLIP in Mexico, a digital payment solution reaching over 100,000 SMEs to help them accept credit and debit card payments anytime and anywhere, converting smartphones and tablets into bank terminals. As mentioned above, IDB Lab invested in SEMPLI, a pioneering online lending platform for startups and scale-ups in Colombia that uses a novel scoring tool to offer quickly deployed venture debt.
- 3.17 In education, technologies are rapidly evolving to deploy content more efficiently and to reach greater masses of people. Educational platforms are improving learning outcomes, increasing student engagement, reducing education costs, and opening doors for new offers in vocational training and life-long learning. New technologies in artificial intelligence, distant learning tools, virtual and augmented reality, etc., are giving way to more pilots in pedagogical methods and delivery of content. The field of EduTech has great potential for reaching the poor and vulnerable as it offers opportunities for low-cost solutions to education challenges, including preparing them for the workforce of the future. IDB Lab will actively seek EduTech investment opportunities, will work with education institutions, and help steer these educational solutions to address the challenges in the future of work. Some relevant EduTech areas may include coding and programming; science, technology, engineering, and math curricula; technology-enabled delivery of socio-emotional skills; and learning management systems. Companies like Lab4U based in Chile, for example, are selling subscriptions to curricula tied to mobile applications that turn cellphones and tablets into instruments for science experiments by using their built-in sensors, empowering teachers to improve their physics and chemistry lessons. The company is reaching more than 120,000 across the globe. In Brazil, Passei Direto offers an open online platform with educational content to help students collaborate in the learning process as well as find job opportunities. As of December 2018, they had 3 million active users of which 2 million are from vulnerable populations and 90% of users consider that the platform was fundamental for passing their exams or obtaining higher grades.
- 3.18 The healthcare sector offers some of the greatest opportunities for leveraging technologies to reduce costs and democratize access to quality care to vulnerable populations. LAC entrepreneurs are becoming increasingly relevant, providing local insights and seizing opportunities to launch HealthTech startups. IDB Lab has seen a rise in such companies in the region and sees health as an important opportunity to focus its work. There are abundant

opportunities for HealTechs to generate significant impacts in the region, leveraging new technologies for low-cost, quick, accessible, quality care. Examples of solutions HealthTech companies are providing include distance treatment including telehealth and mobile health apps; enhanced insurance services using big data analytics and artificial intelligence; precision treatments that reduce costs and increase efficacy; electronic medical record management; and electronic prescriptions that incorporate smart contracts. As an example, Memed in Brazil offers electronic prescription solutions used by 55,000 doctors, aimed at reducing medical errors while checking drug interactions and allergies. Memed is also addressing an acute accessibility gap to pharmacies since 80% of Brazilian pharmacies are concentrated in 20% of municipalities. (Lemos 2018) Another example is Clinicas de Azucar, a direct loan by IDB Lab in Mexico. This company manages 14 retail clinics specialized in diabetes care for lower-income populations. Its use of technologies and process innovations, including offering a pay-as-you go membership arrangement, allows them to offer treatments at prices averaging 70% less than other private clinics, enabling them to diagnose 60,000 and treat 25,000 patients, 73% of which are middle and low income.

- 3.19 With rapidly rising energy needs in LAC and an urgency to preserve the region's natural capital, the opportunities to support innovations in clean and efficient energy continue to grow. Off-grid and smart-grid solutions, renewable energy innovations, solutions for resource efficiency, etc., have an enormous potential to address dire problems of energy access to lower income people while preserving the ecology, making IDB Lab's already established presence in the CleanTech space an opportunity for continued work. IDB Lab has supported Kingo, for example, a Guatemalan company that provides off-grid residential solar energy services worldwide, innovating by pairing solar photovoltaic installations with affordable and flexible payment plans in which users pay for daily, weekly, or monthly codes to energy access. In Haiti, IDB Lab is supporting Sigora International, an energy utility management company designed for challenging environments and frontier markets. They offer clean, reliable, and fair-priced energy services incorporating technologies for smart metering, revenue and demand management software, remote monitoring, mobile pre-payment plans, and integrated anti-theft capabilities.

E. Instruments for Innovation

- 3.20 Today IDB Lab can strategically deploy a variety of new products and financial instruments to provide capital, financing and foster the development of entrepreneurship ecosystems. Many of these innovative instruments are mostly deployed in KE projects, due to the higher incidence of technology-focused businesses and companies testing disruptive business models in this thematic area. However, IDB Lab deploys all instruments across all three of the thematic areas. These instruments are deployed for different purposes at different stages of the development of a company and of an entrepreneurial ecosystem.
- 3.21 Non-reimbursable financial products are used for the development of ecosystems, which spans a wide variety of activities, and for piloting innovative solutions with public good characteristics, or those too early to be considered for an investment. Some example include: (i) direct financing of different partners providing innovation services, such as company builders and accelerators; (ii) working with governments to provide the appropriate regulatory frameworks, connection products, and targeted financing to address the high degree of risk in early-stage finance; (iii) efforts to bring private actors together to address common innovation industry challenges.

Prototype grants can be used to finance technologies that are still unproven, and where the objective is to learn about the potential of the technology.

- 3.22 High-risk instruments, such as simplified agreements for future equity (SAFE), conditionally reimbursable grants, and royalties or revenue sharing can be used to finance companies and in certain cases specific technologies or solutions. But these are typically companies which too early to receive equity, with business models which have yet to find an appropriate market fit. And finally, loans and equity are used to finance companies in an advanced seed or even early growth stage. This means that they have a track record of revenue and have typically already raised early rounds of financing from friends, family or angel investors. Lastly, for investments in companies, the preferred instrument for IDB Lab is to rely on third-party investment selection according to pre-defined investment thesis, such as venture capital funds. The advantages of investing through venture capital funds – rather simply investing directly - is that with limited capital IDB Lab can gain access to a portfolio of innovative and potentially transformational companies.

IV. Knowledge Agenda

- 4.1 IDB Lab must share the knowledge and lessons gleaned from its experiences in order to increase the reach of the models that it is testing. As such, it has been developing a knowledge agenda for its knowledge economy portfolio. Central to this agenda are research questions and hypotheses to be tested with the projects IDB Lab funds. Answers to these questions provide content to share and know-how to transfer to other key stakeholders within the IDB Group and beyond, so our partners can effectively scale projects, initiatives, programs, and adapt policies. A mix of communications products and efforts will be developed to disseminate experiences and lessons gleaned from IDB Lab-supported projects. These could include evaluation reports, case studies, or methodological guides, as well as building communities of practice or sponsorship of knowledge sharing events. IDB Lab will largely encourage these activities be led by its partners, which has implications in assessing the profile of partner institutions while building its pipeline of projects.
- 4.2 IDB Lab intends to identify which innovative opportunities have the most significant social and environmental impacts. Its existing portfolio already includes several experiments underway and increasingly will become a source of lessons on the knowledge economy.¹¹ Another important source of lessons is expected to be found in the entrepreneurial ventures supported by accelerators, company builders, seed and VC funds, and other organizations backed by IDB Lab. To this end, IDB Lab intends to access more data on the companies supported by its seed and VC portfolio. IDB Lab's portfolio in workforce development, particularly its flagship youth employment and entrepreneurship programs, has also generated vast amounts of data which can greatly benefit research on the future of work.

¹¹ Unpublished analyses of IDB Lab portfolio conducted by IDB Invest's Development Effectiveness Division show that the percentage of projects approved in 2018 that intend use technology for the deployment of solutions was 95.3%, up from 37.9% in 2016. In addition, 95.3% of projects are introducing improved products and service in 2018, up from 68.9 % in 2016.

4.3 Below are a few questions which will guide the knowledge economy learning agenda:

- Which innovations or technologies are the most effective and better suited to address specific problems? Which factors can improve the adoption of new technologies for increased impact?¹²
- What learning platforms, mediums, or education providers are the most effective in preparing knowledge economy employees and entrepreneurs, and why?
- What are the most effective ways to incorporate cognitive, socio-behavioral, and transversal skills into these learning platforms?
- What are the key technology trends that combine market traction, promising financial returns, and positive impacts; and are there gaps IDB Lab should address in its investment portfolio?
- Beyond venture capital, are there gaps in the types of financing instruments available to knowledge economy startups in LAC, such as venture debt or mezzanine financing?
- What lessons can be drawn from the most developed entrepreneurial and innovation ecosystems, and can they inform ecosystem building initiatives in other parts of the region?
- For entrepreneurs in the knowledge economy, what are the most valuable tools – such as mentorship, business development services, technology transfers, networks and connections, market intelligence, research centers and labs, etc. – offered by key players in the ecosystem?

V. Measuring our Impact

5.2 In a broad sense, the impact sought by supporting the knowledge economy is to serve as a catalyst for the adoption of cost-effective, innovative, tech-driven solutions that help the region increase its productivity and accelerate growth. IDB lab will define success in the thematic area based on the share of knowledge economy projects that propose innovative solutions, the extent to which these solutions reach the poor and vulnerable, and the extent to which social and environmental impacts are scaled in a cost-effective way.

5.3 Each project will develop its most appropriate monitoring system and evaluation plan, which will include specific learning objectives. They will also include the selection of the relevant indicators for success, including outcome indicators for key beneficiaries (such as sales growth rates for supported enterprises, employee growth rates, share of people trained inserted in knowledge economy workforce, etc.). So that we can learn from our portfolio and track IDB Lab's overall achievement of its objectives, when applicable, project-level indicators will be linked to broader IDB Lab objectives, the IDB Group's Corporate Results Framework,¹³ as well as the United Nations' Sustainable Development Goals (SDGs). An indicative list of key indicators can be found in the table below.

¹² For example: What are the perceived advantages over existing solutions? How easy are these technologies to use? How compatible are they with existing routines, beliefs, demographics, etc.? Does observation, peer or social network interactions influence adoption? BID Lab will also explore how to address bottlenecks to adoption of new technologies.

¹³ Note that throughout 2019, both IDB Lab and the IDB Group are reviewing their results frameworks. A broad effort will ensue to align the indicators for each of IDB Lab's three thematic areas with the IDB Lab's broader Key Performance Indicators, and the IDB Group's Corporate Results Framework. Note also that for all indicators, disaggregation will also be made by gender and whenever possible by other demographic categories (age, ethnicity, etc.).

5.4 Strengthening the knowledge economy in LAC is indeed highly aligned with the SDGs. The positive spillovers of knowledge-based sectors can yield significant impacts across all SDGs, but beyond this cross-cutting characteristic, there are specific SDGs to which this work is fully aligned: SDG 4 on Quality Education emphasizes (beyond childhood education) the promotion of lifelong learning opportunities for all, including ensuring access to quality technical and vocational education as well as strengthening “information and communications technology, technical, engineering and scientific programmes” with particular emphasis in least developed countries including small island developing states (4.3, 4.4, 4.B, 4.C). SDG 8, for example, addresses Decent Work and Economic Growth. Within this goal, several specific objectives are laid out including (i) increasing productivity through “technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors” (8.2); (ii) the promotion of policies that support “entrepreneurship, creativity and innovation,” (8.3); increasing youth employment (8.6); and strengthen the capacity of financial institutions (8.10). SDG 9 on Industry, Innovation, and Infrastructure is another goal to which knowledge economy projects are highly aligned. It explicitly states objectives to “enhance scientific research” and “upgrade the technological capabilities of industrial sectors, [...] encouraging innovation and substantially increasing the number of research and development workers.” (9.5).¹⁴

Indicator	SDG Alignment
Number of people trained, re-skilled, or up-skilled for knowledge economy jobs	4, 8
Percent of people trained inserted into the knowledge economy workforce	4, 8
Number of enterprises created in knowledge economy sectors	9
Number of early-stage enterprises financed or accelerated	8, 9
Percent of early-stage enterprises with improved business performance	4, 8, 9

VI. Working as a Group

6.1 Strengthening the knowledge economy is not only engrained in IDB Lab’s mandate, but also tied to the IDB Group’s overall strategies. Its Updated Institutional Strategy 2020-2023 makes the case for focusing its efforts on technology and innovation, embracing the future of work, and directing more private capital towards development challenges.¹⁵ Consequently, when supporting the knowledge economy in the region, there is great potential for collaboration across the IDB Group, and IDB Lab is uniquely positioned to add value particularly when piloting ventures to address the region’s challenges, tapping more directly into the innovations driven by entrepreneurs. Although IDB Lab has ample opportunities to work closely across the IDB Group, there are particular areas of synergies worth highlighting:

6.2 One of the clearest opportunities to collaborate on the knowledge economy is with IDB Invest, both in their work with corporations and with their expanding agenda on innovation finance. IDB Invest is developing a portfolio on technology-based companies in a later stage of development, typically late venture and private equity. IDB Lab can actively work with IDB Invest to promote subsequent funding rounds for IDB Lab investments, both through funds and direct investments.

¹⁴ <https://sustainabledevelopment.un.org/>

¹⁵ “Update to the Institutional Strategy 2020-2023. Development Solutions that Reignite Growth and Improve Lives” (GN-2933)

Given the joint interest on developing the innovation finance industry in LAC, IDB Lab and IDB Invest can collaborate on knowledge initiatives, particularly those that focus on the potential for innovation to generate opportunity for the poor, vulnerable, and excluded. IDB Lab can collaborate with IDB Invest on matters of financial inclusion, taking advantage of IDB Invest's portfolio on financial intermediaries and focusing more specifically on those with an explicit interest on expanding financial services to the excluded. IDB Lab can also engage with IDB Invest to explore synergies in leveraging third-party funds, as well as potential initiatives to promote innovation in the use of financial instruments for development. Together, IDB Invest and IDB Lab will continue to combine efforts to close key demographic gaps in early-stage financing, as they have done through the Women Entrepreneurship Program and developing the Gender Gap Analysis Tool.

- 6.3 There is a natural alignment between IDB Lab and the Competitiveness, Technology and Innovation Division (CTI). CTI is a crucial player in building innovation ecosystems through government support by providing funding, technical assistance, and research to emphasize training in science and technology; strengthen the scientific, technological, and innovation infrastructure; and design public policies. IDB Lab complements this work by identifying and engaging key private sector actors to increase their investment in innovation, promote high-growth entrepreneurship, and strengthen the environment for innovation. IDB Lab experiences can also inform CTI's operations in areas of innovation financing and support for technology-based startups with high potential for growth and impact. IDB Lab and CTI have already been collaborating on many fronts, including in sourcing projects and co-authoring strategies for technology and innovation for the IDB Group.
- 6.4 With the Connectivity, Markets and Finance Division (CMF), IDB Lab has several opportunities for collaboration, particularly testing innovations in small and medium enterprise financing and leveraging technologies for financial inclusion. IDB Lab and CMF have been working together on several FinTech-related projects and together can continue to promote public-private sector collaborations to develop innovative business models, services, and applications in the new digital economy. IDB Lab can also facilitate access to FinTech networks, accelerators, and funds that invest in these sectors while CMF can help guide IDB Lab on sound regulatory practices and environments to foster needed innovations in financial markets.
- 6.5 The Labor Markets Division (LMK) and the Education Division (EDU) have been and will continue to work closely with IDB Lab to bolster the human capital in the knowledge economy and open opportunities for the future of work. Together, these offices can promote conditions to support demand-oriented and cost-effective training policies and programs that are more adapted to tomorrow's landscape. IDB Lab will continue to work with LMK, for example, on piloting innovations in new deploying cost-effective ways for the unemployed and underemployed to participate in the knowledge economy workforce, as employees or entrepreneurs. With EDU, IDB Lab will continue to strengthen the provision of skills training for the 21st century across curricula leveraging technologies.
- 6.6 The Information Technology Department (ITE) has imparted thought leadership and support to project teams across the IDB, and IDB Lab is no exception. More specifically, they have helped projects incorporate technologies such as artificial intelligence, blockchain, and internet of things. They have also identified the development potential and provided support in areas such as

unmanned aerial vehicles (drones), virtual and augmented reality, big data, voice assistance, mobile apps, data visualizations, and robotic process automation.

- 6.7 The Knowledge, Innovation and Communication Sector (KIC) has already been working closely with IDB Lab, featuring innovators across LAC and engaging with the region's prominent entrepreneurs and private sector leaders to discuss and share innovations, such as with Demand Solutions. As KIC better defines an innovation agenda, IDB Lab will explore potentials for collaboration to extend the benefits of this agenda to IDB Lab clients.

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