TC Document

I. Basic Information

▪ Country/Region:	Colombia; Regional government of Cundinamarca, Government of the District of Bogotá
▪ TC Name:	Market pull technology transfer as a catalyst for Innovation in Colombia
▪ TC Number:	CO-T1475
▪ Team Leader/Members:	Fernando Vargas (IFD/CTI) Team Leader, Adrian Magendzo (IFD/CTI), Elias Tefarikis (IFD/CTI), Edwin Goñi (IFD/CTI), Juyoon Sun (IFD/CTI), Yohana González (IFD/CTI), Raisa Botto (CAN/CCO), María Paola Bustos (CAN/CCO), Carolina Verissimo (LEG/SGO)
▪ Taxonomy:	Client Support
▪ Date of TC Abstract authorization:	May 29, 2018
▪ Beneficiary:	Republic of Colombia; Government of the District of Bogotá and the Regional Government of Cundinamarca
▪ Executing Agency and contact name	Connect Bogotá-Región, Diana Gaviria, General Director
▪ Donors providing funding	OC Strategic Development Program for Countries – Economic Growth Priority (CTY-ECG)
▪ IDB Funding Requested:	US$600,000.00
▪ Local counterpart funding, if any:	US$50,000.00 (in-kind)
▪ Disbursement period:	42 months of execution
▪ Required start date:	December 1, 2018
▪ Types of consultants:	Firms and individual consultants
▪ Prepared by Unit:	Institutions for Development Sector / Competitiveness, Technology and Innovation Division (IFD/CTI)
▪ Unit of Disbursement Responsibility:	CTI/CCO
▪ TC Included in Country Strategy (y/n):	Yes
▪ TC included in CPD (y/n):	No
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Innovation and productivity

II. Objectives and Justification

2.1 Technological innovation at modern organizations is shifting from a closed process conducted exclusively within the organization to a model where external knowledge – available in firms, entrepreneurs, universities, public sector, etc. - can drive or complement the innovation efforts of the organization. This new paradigm of “open innovation” increases significantly the possibilities for faster growth within communities as it synchronizes the needs of local corporations - or governments - with both, the innovative capacities of entrepreneurs avid to ideate and supply solutions, and the capacities for applied scientific research of universities waiting for opportunities to put out of the lab experimental innovations with potential disruptive effects. In this sense, open innovation can generate remarkable efficiency gains in several fronts: it enables an expedited match between the demand and the supply of solutions to critical problems of firms or governments; it reduces duplicity of efforts as capacities already

existing outside the organization are used to conduct innovation instead of building up this capacity inside the organization again; it helps to reduce innovation efforts with unlikely commercial exit; it helps to define from the outset the appropriability rules of rents between entrepreneurs and corporations involved in the innovation; and, it facilitates patenting processes for smaller firms, backed-up by larger corporations.

2.2 The Organization for Economic Co–operation and Development (OECD) (2013)[1] report on Colombia's innovation policies describes the national innovation ecosystem as small[2] and lacking a strong industry and entrepreneurial base. The report also documents that technology transfer process in Colombia is very weak and incipient as solid and long-term research collaboration agreements with the industry are incipient in most universities[3]. To reverse this disconnection, a pioneering initiative of open innovation was already piloted from 2014 to 2016 in the country through Innpulsa's CO4 program. CO4 sought to encourage open and collaborative innovation between large companies and solution providers (the program was focused in two aspects; the definition of the problems or challenges and the liaison of solution demanders with the solution providers). Two key lessons emerged after the implementation of the pilot. First, expert support and monitoring is needed during the solution implementation phase. Second, funding to take the solution to prototype phase or to scale it up is also needed. This means that identification and liaising of actors is just a first – yet necessary – input to conduct open innovation. Other stakeholders' participation - usually implicated with more ecosystem - oriented approaches - proved to be necessary (experts, mentors, financers, etc.). The Technical Cooperation (TC) incorporates these lessons and take the open innovation effort started with CO4 to the next level.

2.3 Regarding ecosystem-oriented approaches, according to Mulas et al (2015)[4], cities are increasingly emerging as the new innovation centers as they host and connect private corporations, local governments, university research centers and networks of entrepreneurs. As such, cities are natural hubs for open innovation, and Colombia has started moving into that direction, particularly in Medellín and Bogotá with the creation of Ruta N[5] and Connect Bogotá-Región[6]. Indeed, in order to promote tech transfers between universities, corporations and entrepreneurs in these (and other four) regions, Colciencias promoted in 2014 the creation of Regional Technology Transfer Offices (OTRI by its name in Spanish). Colciencias' rationale behind the creation of regional OTRI was that instead of financing and supporting tech transfer offices in individual universities, it was more effective and resource efficient to promote tech transfer hubs, which would serve universities, corporations and entrepreneurs in their respective regions. In addition, the consolidation of regional ecosystems has led both

[1] https://www.oecd.org/sti/inno/colombia-innovation-review-assessment-and-recommendations.pdf

[2] Investment in Research and Development (R&D) is only 0.2% of GDP, while comparatively Brazil's is 1,2% and that of the average OECD countries is 2,4%.

[3] Except for Medellin's EAFIT and Universidad de Antioquia, where private corporations are setting up university scientific and innovation research centers.

[4] Mulas, Victor; Minges, Michael; Applebaum, Hallie Rocklin. 2015. *Boosting tech innovation ecosystems in cities : a framework for growth and sustainability of urban tech innovation ecosystems*. World Bank Group.

[5] Ruta N is the innovation and business center of Medellín created by the Mayor's office in association with EPM and Tigo/UNE, to foster and promote inclusive and sustainable innovation activities driven by science and technology and to develop the STI ecosystem for businesses and entrepreneurship in the city.

[6] Connect Bogota-Region is a non-profit corporation established in 2011 based on the university-business-government network in Bogota and Cundinamarca. Its partners include 60 members of private, academic and public organizations. Its areas of work include entrepreneurship, innovation culture and capacity building, innovation, technology transfer, networking and partnership.

cities to conduct Regional Smart Specialization Strategies - aligned with European Commissions' strategies and methodologies - defining sectors[7] and key enabling technologies which should be actively promoted in the capital region[8]. All this institutional architecture opens already vast opportunities that the TC will use to spur innovation directed from entrepreneurs and universities to corporations with high regional growth potential.

2.4 One of the biggest challenges Colombia has nowadays is firm's low productivity, so it is important to stimulate innovation and business productivity and development, as it is stated in IDB strategy 2014-2018 for Colombia (GN-2832). Besides, this project is also aligned with the Update to the Bank Institutional Strategy 2010-20120 (GN-2788-5), specifically with the development challenge of innovation and productivity, and with the objectives of the Ordinary Capital Strategic Development Program for Countries (GN-2819-1), by reducing constraints for business growth and productivity.

2.5 The division of IFD/CTI will facilitate possible complementarities with the activities to be developed in the TC "Strengthening Transfer and Technology Entrepreneurship in the Pacific Alliance" (RG-T3098) and in general with the projects supported by IDB to strengthen the innovation ecosystem of the Pacific Alliance (for instance AcelerAP). The two TC pursue the same objectives, therefore synergies can be created, even if the scope and strategies of the two TC are different (regional, national, and subnational).

2.6 The general objective of the project is to implement a market – pull technology transfer and innovation acceleration program which responds to the needs of companies and the markets and helps to catalyze the knowledge economy in Colombia. More concretely, the project seeks to: (i) increase the success rates of technology transfer from universities and increase the economic and social impact of the universities by generating research aligned with industry needs; (ii) accelerate innovation in large companies through engagement with entrepreneurship capabilities; (iii) generate new products and services through open innovation processes. In the medium term, this project will help to generate employment from new science and tech-based firms and ventures and business models.

III. Description of activities/components and budget

3.1. **Component I. Market pull innovation, identification of market needs and open innovation challenges (US$114,000).** This component of the project will involve the identification of innovation challenges and needs of companies, which can be solved through open innovation processes. The results obtained so far in the Regional Smart Specialization Strategy for Bogotá, including the technological roadmaps already defined for Biopole, will be the basis for identifying subsectors, companies and needs. The Biopole is oriented to the development of life science including technologies and productive activities related to agriculture and agroindustry, fine chemistry and health,

[7] For instance, the Smart Specialization Strategy for Bogotá and Cundinamarca led by the Chamber of Commerce of Bogota and Connect Bogota (https://www.ccb.org.co/Transformar-Bogota/Especializacion-Inteligente-Bogota-Region, defines two cross-cutting themes (knowledge hub and sustainable city-region), and three key sectors (bio, creative industries, business services).

[8] The Chamber of Commerce of Bogotá has other several cluster initiatives, some of them aligned with the key sectors prioritized (e.g. health, cosmetics, business tourism, creative industries, communications and graphic industry).

more specifically the following subsectors or products: advanced health services[9], natural and functional foods[10], natural cosmetics,[11] and pharmacogenomics[12]. The main activities of this component are: (i) analysis of technological routes for the Biopole sector; (ii) call to companies; (iii) identification of challenges, bets and needs within companies; and (iv) technical and strategic validation of documented challenges. Connect Bogota will work with the Chamber of Commerce of Bogotá (CCB) and Asociación Nacional de Empresarios de Colombia (ANDI) to identify companies that could participate in the program. Despite having developed similar programs in the past, it is known that sensitization campaigns are needed in order to convince large companies to open up to knowledge and creativity coming from outside the firm.

3.2. **Component II. Identification of resources, research results, technologies, solutions and startups with tech transfer and innovation potential (US$85,000).** After structuring and selecting innovation challenges within the participating companies, Connect Bogotá will begin to search for solutions within universities, national and international research centers and startups. This component will also help to identify applicable research projects that universities are trying to commercialize and potential market failures inhibiting their entrance into markets. This search will be conducted primarily within the network of 25 partner universities of Connect Bogotá as well as other partners. The main activities of this component are: (i) development of a technology forecasting in primary and secondary sources; (ii) launching of challenges and calls for the identification of solutions with partner universities, entrepreneurships, startups and other allies; (iii) prioritization of technologies and capabilities that can be used in their current state or even incorporated into a co-development process; (iv) initial preparation of researchers and entrepreneurs for the presentation of their proposals. The active scouting of technologies is a major difference with former open innovation programs implemented in Colombia.

3.3. **Component III. Acceleration of technologies and startups that solve innovation needs of participating companies (US$404,500).** In this phase, selected research groups will be prepared so they can transfer and commercialize their research results and/or technologies to the companies. Likewise, selected startups identified in the previous component will be accelerated so that they can work with the companies that defined innovation challenges. The main activities of this component are: (i) generation of alliances with other companies or research centers to adopt and scale solutions; (ii) development of proof of concept tests and prototypes; (iii) assistance to accelerate technologies, capabilities and solutions into new products and services; (iv) connection between the company and the solvers to agree on commercial, strategic and intellectual property issues; (v) support in preparation of terms and negotiation processes; and, (vi) follow-up to the formalization of agreements/alliances/contracts/investment. Startups will be accelerated by mentors and experts in the following areas: business model, market potential, financing model, scaling, intellectual property, financing model and negotiation. In this component is

[9] Development of specialties such as oncology, regeneration of tissues with stem cells, ophthalmology or odontology in which Bogota Region can achieve excellence. Includes the development of innovative medical devices.

[10] Development of foods with healthy properties, of vegetable or animal origin based on native products of the country.

[11] Development of beauty products or improvement of the personal image and toiletries based on natural materials.

[12] Development of medications and personalized treatments according to the genetic characteristics of each person.

where a greater differentiation happens with former programs, closing the cycle: challenge definition, searching for solutions, scouting for technology, and finally, support for the acceleration of technology and the formalization of agreements.

3.4. **Component IV. Diffusion of results (US$13,000).** Although the main coverage of the executing agency is the Bogota region, the project aims to generate a model that can be replicated to other regions of the country and other countries in Latin America (LAC). Therefore, Connect Bogota will produce a final report with policy recommendations to Colombian government agencies, such as Colciencias and Innpulsa, on tech transfer best practices and instruments needed for acceleration of technologies and start-ups. For diffusion of results, dissemination workshops/seminars with stakeholders including OTRI, government, universities, will be organized. During the execution of the TC several communication campaigns will be developed to look for a good participation of firms, start-ups, researchers and entrepreneurs.

3.5. **Component V. Evaluation and audit (US$33,500).** An evaluation team composed of external consultants and IFD/CTI specialists will be conformed at the beginning of the TC in order to document and analyze the implementation and the results of the program. Two main aspects will be addressed: First, in the spirit of Cohen et al (2018)[13], a thorough qualitative evaluation based on case studies and in-depth interviews will document differences in the scientists' and academics' motives for engaging in commercial activities. It will assess if the TC affected incentives of researchers in universities, and innovators in firms, in such a way that idea creation and the development phase of firms' innovation efforts is more likely to occur in the presence of upstream, commercially engaged and motivated partners. It will also assess whether the commercialization phase of Investment in Research and Development (R&D) in universities is more likely to occur in the presence of correctly paired downstream partners.

3.6. Second, and being aware of the limitations of sample size due to the reduced scale of the pilot, a more quantitative approach will be followed: baselines and follow up lines will be collected for participants (firms and universities) and comparable (statistically matched) non-participants of the Open Innovation pilots. Based on the quality of the data an number of observations available at the end of the monitoring process, quasi-experimental and regression-based approaches will be assessed to measure the impact for at least two sets of outcomes: likelihood of the commercialization of universities' inventions and performance of firms participating in the open innovation pilot vis a vis comparable universities and firms conducting closed R&D and innovation efforts.

3.7. These two approaches will shed lights on market failures that block tech transfer from university to firms, the incentives deployed to attend those market failures, the characteristics of innovations obtained in open innovation processes, and the obstacles faced by the various actors (Connect Bogotá, large firms, providers of solutions, etc.); with the final objective of providing empirical evidence on this new innovation policy instrument and to produce policy recommendations.

3.8. The total amount of needed resources for this TC is US$650,000 from which US$600,000 have been requested to IDB, Bank funding is being provided from the Ordinary Capital Strategic Development Program for Countries - Economic Growth Priority (CTY-ECG). The executing Agency will provide US$50,000 for administrative,

[13] Cohen, W., Sauermann, H. and P. Stephan (2018); "Academics' motives, opportunity costs and commercial activities across fields" NBER Working Paper 24769.

operational, and managerial activities of the TC. The required funding for each component is described below:

Indicative Budget (US$)

Component	Description	IDB Funding	Counterpart Funding	Total Funding
Component I	Identification of market needs and open innovation challenges	$107,000	$7,000	$114,000
Component II	Identification and selection of technologies and startups	$77,000	$8,000	$85,000
Component III	Acceleration of technologies and startups for tech transfer and innovation	$377,500	$27,000	$404,500
Component IV	Diffusion of results and communications	$8,500	$4,500	$13,000
Component V	External evaluation and audit	$30,000	$3,500	$33,500
TOTAL		**$600,000**	**$50,000**	**$650,000**

IV. Executing agency and execution structure

4.1 Connect Bogotá-Región, is a non-profit organization created in 2011, with a network of 60 private[14], academic[15] and public organizations which work together in a collective impact model to transform the capital region into an innovation hub in Latin America. Because it was founded by an alliance between universities and companies, Connect Bogotá-Región has hold a unique position as the lead domestic knowledge intermediary between science and industry in Bogota. While the closeness to the private sector eases the access to the productive challenges, its expertise in open innovation, technology transfer, and technology-based start-up acceleration programs, applying the Connect San Diego´s model (www.connect.org), increase the efficiency in development of high-tech projects. Partner government agencies in the implementation of this project are Cundinamarca Regional Government and Bogotá City Government. And the government allies are: Colciencias, Innpulsa, the Ministry of Information and Telecommunications Technologies and the Ministry of Commerce, Industry and Tourism. A strategic partner is the Chamber of Commerce of Bogotá. All

[14] Partner private companies and other organizations: Alianza Team, Apiros S.A.S, BEL-STAR S.A, Carboquímica, Casa Editorial El Tiempo, Clarke, Modet & Co, Compensar, Organización Corona, Daxa de Colombia, Espumlatex S. A., Federación Nacional de Cafeteros, Totto, Levapan, Fresenius Medical Care, Grupo Bolívar, IBM, Inbival S.A.S, Ladrillera Santafé, NALSANI S.A.S, Suramericana, Zona Franca de Bogotá S. A., ANDI, Maloka, Chamber of Commerce of Bogotá, Invest in Bogotá and Tecnalia.

[15] Partner universities: Pontificia Universidad Javeriana, Universidad de los Andes, Universidad Militar Nueva Granada, Universidad Jorge Tadeo Lozano, Universidad del Rosario, Universidad de la Sabana, Universidad Nacional de Colombia, Universidad El Bosque, Universidad de la Salle, Universidad Central, Unipanamericana Fundación Universitaria, Universidad Antonio Nariño, Escuela Colombia de Ingeniería Julio Garavito, Universidad EAN, Universidad Sergio Arboleda, Universidad de Ciencias Aplicadas y Ambientales U.D.C.A, Universidad San Buenaventura, Universidad Piloto de Colombia, Politécnico Gran Colombiano, Universidad Católica, CTB Corporación Tecnológica de Bogotá, Colegio de Estudios Superiores de Administración –CESA, Universidad Católica, and Universidad Santo Tomás.

[16] Prior to the commencement of the activities provided for in this TC, the non-objection letter from the Bank's official liaison entity in Colombia will be obtained.

these organizations will support Connect-Bogotá Región during the lunching of call for innovation challenges, and for innovative solutions, by facilitating to reach larger audiences.

4.2 This TC will indirectly benefit from change in frameworks conditions for digitalization, driven by the CO-L1233. An improvement in conditions for adoption and deployment of digital technologies should increase the supply of new solutions based on these technologies. On top of that, the implementation of the CO-M1148 will likely create demand for new technological applications to provide E-Health services from Medellín to rural areas. Some of these challenges can be met by the knowledge producer's community of the Bogota region.

4.3 IFD/CTI will be in charge of the activities of monitoring and supervision of this CT. More specifically, the Team Leader will oversee the processes and activities executed by Connect-Bogotá Región, working closely with the director of the agency and having monthly or bimonthly meetings, depending on the estimated workload of the stage of the CT. The hiring of individual consultants and / or consulting firms will be done in accordance with the policies and procurement procedures of the Bank, respectively, Policy for the acquisition of services and goods (GN-2349-9) and for the selection and contracting of consultants and consulting firms (GN-2350-9).

V. Major Issues

5.1 Some risks can be anticipated such as not finding suitable solutions for the firms, and coordination risks that come from the need to work with many different actors. On the first case to coordinate actions with the Pacific Alliance projects will reduce this possibility. There are also risks with the executor, since Connect has never executed a TC funded by the IDB group, although it does have experience coordinating projects for the Colombian government and some of its team members have been involved in IDB operations. To mitigate these risks, Connect is providing dedicated administrative resources to this TC, which will also be trained in Bank policies and procedures by the IDB.

VI. Exceptions to Bank policy

6.1 No exceptions to Bank policy are considered.

VII. Environmental and Social Strategy

7.1 Given the nature of the project, there are no associated environmental or social risks. Based on the Environment and Safeguards Compliance Policy (OP-703) this operation is classified as "C", meaning that no environmental assessment studies or consultations are required for this category (see Safeguard Policy Filter and Safeguard Screening Form).

Required Annexes:

- Annex I: Request from the client [16]
- Annex II: Results Matrix
- Annex III: Terms of Reference
- Annex IV: Procurement Plan

Market Pull Technology Transfer as a Catalyst for Innovation in Colombia

CO-T1475

Certification

I hereby certify that this operation was approved for financing under the **OC Strategic Development Program for Countries (CTY)** through a communication dated July 30, 2018 and signed by David Margolis (ORP/GCM). Also, I certify that resources from said fund are available for up to **US$600,000** in order to finance the activities described and budgeted in this document. This certification reserves resource for the referenced project for a period of four (4) calendar months counted from the date of eligibility from the funding source. If the project is not approved by the IDB within that period, the reserve of resources will be cancelled, except in the case a new certification is granted. The commitment and disbursement of these resources shall be made only by the Bank in US dollars. The same currency shall be used to stipulate the remuneration and payments to consultants, except in the case of local consultants working in their own borrowing member country who shall have their remuneration defined and paid in the currency of such country. No resources of the Fund shall be made available to cover amounts greater than the amount certified herein above for the implementation of this operation. Amounts greater than the certified amount may arise from commitments on contracts denominated in a currency other than the Fund currency, resulting in currency exchange rate differences, representing a risk that will not be absorbed by the Fund.

Certified by: Original signed — 11/16/2018

Sonia M. Rivera
Chief
Grants and Co-Financing Management Unit
ORP/GCM

Date

Approved by: Original signed — 11/19/2018

Gonzalo Rivas
Chief
Competitiveness, Technology and Innovation Division
IFD/CTI

Date