Technical Cooperation Abstract

I. Basic project data

▪ Country/Region:	Uruguay (UR)
▪ TC Name:	Support to developing a Master Plan for a TECHNOPARK in Rivera's UTEC Campus
▪ TC Number:	UR-T1141
▪ Team Leader/Members:	Team Leader: Gustavo Crespi (CTI/CUR). Team Members: Veronica Adler (FMM/CUR); Pablo Angelelli(CTI/CUR), Carolina D'Angelo (CSC/CUR), Gaston Rodriguez (CSC/CUR),Adriana Oreamuno (IFD/CTI), Carolina D'Angelo (CSC/CUR), Legal (TBD)
▪ Indicate if: Operational Support, Client Support, or Research & Dissemination.	Client Support
▪ Date of TC Abstract:	03/13 /2017
▪ Beneficiary (countries or entities which are the recipient of the technical assistance):	Uruguay
▪ Executing Agency and contact name (Organization or entity responsible for executing the TC Program) {If Bank: Contracting entity} {If the same as Beneficiary, please indicate}	UNIVERSIDAD TECNOLOGICA (UTEC)
▪ IDB Funding Requested:	US$660.000.-
▪ Local counterpart funding, if any:	-
▪ Disbursement period (which includes execution period):	32 months for disbursement and 24 months for execution
▪ Required start date:	07/01/ 2017
▪ Types of consultants (firm or individual consultants):	Firms and Individual Consultants
▪ Prepared by Unit:	Competitiveness, Technology and Innovation Division (IFD/CTI).
▪ Unit of Disbursement Responsibility:	CSC/CUR
▪ Included in Country Strategy (y/n):	Yes
▪ TC included in CPD (y/n):	Yes
▪ GCI-9 Sector Priority:	Priority Area 1: Equity and Productivity Priority Area 3: Growth and Welfare

II. Objective and Justification

2.1 Despite recent institutional reforms, Uruguay's national innovation system (NIS)[1] still faces serious challenges. Perhaps the most dramatic one is the regional inequality that seriously threatens the development perspectives of the inhabitants of the countryside[2]. The country as whole has a scarce supply of human capital especially in the areas of engineering and technology (STEM), which heavily contrasts with an excess of demand in those fields[3].

[1] A National Innovation System might be defined as "*the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies*" (Freeman, 1995).

[2] Per the latest census of population about 60% of the total population of Uruguay (3.2 million people) lives in the countryside (INE, 2011).

[3] Uruguay lags other Latin American economies in terms of supply of STEM workers. For example, in terms of graduates with a bachelor degree in STEM careers, Uruguay shows a graduation rate of around 22 per 100,000 inhabitants, which is almost four times less than Chile (OECD, 2014).

However, this gap is particularly more pronounced outside the metropolitan area of Montevideo. Indeed, while only 10% of the youth in the 17-25 age cohort complete higher education in the countryside, in Montevideo the same figure is 30%.[4] On the other hand, great part of the dynamism of STEM demand is in the countryside, where the most competitive sectors are based and foreign investment has arrived. So, there is a clear territorial unbalance between supply and demand of technological and engineering human capital.

2.2 Most of the technological higher education and research institutions are based in Montevideo; this lack of institutional development in the countryside also means that public policy ends up allocating most of the public resources for STI in the metropolitan area making the geographical unbalance worse. Indeed, more than 80% of national research capacities and research and development (R&D) public investments are allocated to Montevideo (BID, 2015). To tackle these problems, the Uruguayan Government established the Technological University (UTEC) in 2013 - Law Nº 19.043 - with two main goals: (a) to generate a more equitable access to technological educational opportunities in the countryside and (b) to support the supply of technological knowledge for local productive needs, so encouraging the economic development perspectives in the regions. To these ends, UTEC has been designed as a decentralized university managing a network of Regional Technological Institutes (ITR).

2.3 One of these ITRs, currently under development, is located at the northern city of Rivera (near the border with Brazil) a region strongly dominated by the forestry value chain, renewable energy generation (solar, wind and biomass), logistics and trade support services. This ITR shares a 55 hectares' campus with Uruguay's Polytechnic University (UTU) and the local branch of the generic public university (UDELAR)[5]. Based on a survey of local demands, UTEC degrees in this ITR will focus on logistics (technical and engineering levels), mechatronics[6] (technical and engineering levels) and information technologies (technical and BA levels). The expected enrollment will be of 750 students by 2020 with an annual take up of about 400 students since 2021. Given the proximity to the Brazilian city of Santa Ana do Livramento, bi-national educational and research collaboration programs with Brazil are also envisioned. Rivera has good infrastructure connectivity and an important supply of support services. An industrial free zone is also

[4] Of those that completed higher education in the countryside a quarter had done by migrating to Montevideo. In the capital, higher education is skewed towards generic disciplines that do not necessarily match local labor market needs, as a consequence the migration of the youth from the countryside to the capital does not revert and the human capital unbalance at the regional level deepens. Baptista B (2013): *Relevamiento de Capacidades relativas a la Formación Terciaria en áreas claves para el Desarrollo de la Universidad Tecnológica del Uruguay (UTEC).*

[5] UTU offers two years' technical level education, while the local office of UDELAR focuses on providing for health sciences, business administration and agronomy degrees. It is expected that most of the students graduating from UTU will pursue technological higher education programs at UTEC. The premise is to not duplicate infrastructure with these other institutions by sharing accommodations, common spaces and research labs.

[6] Mechatronics is an emerging discipline integrating mechanical engineering, electronic engineering, industrial engineering and informatics, its objective is to provide for better products, processes and systems by intensive interaction among the different areas of engineering.

located nearby -3 km from UTEC campus - and around 5 km from the Brazil-Uruguay border there is also a regional airport. However, despite that the region has the highest graduation rates from high school; it also shows very high levels of poverty and unemployment.

2.4 As the Korean experience shows, Technological Parks (TECHNOPARKS) can be key instruments for local economic development becoming important centers for the retention of high skills labor, the nurturing of technology based enterprises and for knowledge transfer to locally established industries (OECD, 2013)[7],[8]. The challenge for UTEC is how Rivera's ITR can evolve towards a model that, on the top of meeting, with a supply of flexible contents, the needs of technological human capital in the territory, it also becomes a center of knowledge generation, technology transfer and local development. Moreover, learning from this experience will be critical as the Rivera's ITR will be a pilot case from which lessons and best practices could be later applied to other ITR's regional campuses (Fray Bentos and Durazno)

2.5 **Industrial Profile:** Rivera has a high forest-timber specialization industrial profile, forming a productive chain, which is articulated around several actors (including large companies) in the department itself and into Brazil and other regions of Uruguay. Although this is a rather mature sector, the high quality of the biomass and recent advances in plant genetics makes feasible the development of new activities based on cellulose processing (such us bio-refineries, bio-polymers and bio-plastics). The other major industrial specialization is trade (with a high component of informality), reflecting the border condition and, certainly, the boost of Free Shops. Emerging sectors are renewable energy and logistic services. The economic data shows that although its capital city is of sizable importance, it is in a very disadvantaged region. The lack of diversification of the department's economy is one of the causes of its underdevelopment. Uruguay's way into the 4th industrial revolution and out of rural underdevelopment will come hand in hand with the development of these industrial experiences.

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[7] Key central characteristics of a successful TECHNOPARK are: (a) linkages to a major research center (to provide knowledge), (b) presence of knowledge-intensive firms (to absorb knowledge), (c) a management team that supports technology transfer (fostering U-I research collaboration) and (d) incubation of new technology based firms (as a vehicle for innovation). Previous evidence suggests that these four characteristics must be in place to maximize impacts on local economic development (IDB, 2013). TECHNOPARKS are normally situated near urban centers and about 40% of TECHNOPARKS are located inside a university campus (ASP, 2013).

[8] In the case of Korea, policies for regional development have evolved through different phases starting with the industrial complex (1960's – 1970s), for the location of export-oriented industries, followed by science parks (since 1973), for the location of large research capabilities, and finally TECHNOPARKS (since 1998) for the promotion of regional industries. TECHNOPARKs became a central piece in the institutionalization of the regional STI policy process that began under DJ KIM's administration (1999-2003), and continued with some changes during Roh's (2004-2008) and Lee's (2009-2013) administrations. Under these policies TECHNOPARKS were key tools to vitalize local economies and regional competitiveness though agglomeration of businesses, university and research institutes. Currently there are 18 TECHNOPARKS in operation throughout Korea each one them supporting regional strategic industries selected in cooperation with the regional government. TECHNOPARK deployment in Korea was also accompanied by the establishment of the New University Regional Innovation Model (NURI) to guarantee the supply of specialized human capital per the local needs (STEPI 2016 and OECD 2013).

2.6 **Objectives.** The objective of this project is to carry-out a feasibility study to deploy a TECHNOPARK infrastructure in the site of the Regional Technological Institute of Uruguay's Technological University (UTEC) in Rivera. *Specific Objectives* are: (i) to learn from the Korean experience with the development of TECHNOPARKs; (ii) to build capacity in domestic counterparts to implement a TECHNOPAR infrastructure in Rivera; (iii) to assess the background conditions for the deployment of such infrastructure in Rivera and, (iv) to design the Master Plan to guide implementation.

2.7 The support to UTEC is consistent with the Ninth (9th) IDB Capital Increase guidelines (GCI-9) as it will strengthen equity and productivity for young graduates. Furthermore, UTEC and its graduates will contribute to the growth and welfare of the country and the region in general. This project will contribute to the competitiveness and productivity pillar the Bank's strategy with the country and to the indicator of private investment in research and development (GN-2846). The project is also included in the Country Program Document 2017 (UR-P1147). This project is also related to the new Memorandum of Understanding (MOU) signed between the Bank and Korean Ministry of Science, Information Technologies and Future Planning (MSIP) regarding collaboration in science and technology.

III. Description of activities and outputs

3.1 **Component I. Knowledge Sharing on Korean TECHNOPARKS development:** This activity will study the rational, institutional design, governance, policy framework, funding and implementation regarding Korean TECHNOPARKS. Korea's policies for regional development have evolved through different phases starting with the industrial complex policies (1960's – 1970s), for the location of export-oriented industries, followed by the science parks policies (since 1973), for the location of large research capabilities, and finally by TECHNOPARKS policies (since 1998) for the promotion of regional industries, which implies integration between research and industry in collaboration between the central and regional governments. Over time different regulations were enacted and different agencies made responsible for policy implementation. Nowadays key roles are played by INNOPOLIS (MSIP agency for Science Parks) and the Korean Institute for the Advancement of Technology (KIAT – a MOTIE agency for TECHNOPARKS). This activity will start by a field mission by Korean consultants to Uruguay to assess knowledge needs before the selection of (up to three) Korean TECHNOPARKS relevant for Rivera's case (there are currently 18 TECHNOPARKS in Korea, each one with different sector specialization). A report describing the Korean experience will be produced and discussed in Uruguay in a workshop with local counterparts (not only with UTEC leaders but also with representatives from Ministries of Finance and Industry and with the national economic development agency). A related product will be the preparation of a methodological guideline for the implementation of the feasibility study.

3.2 **Component II. Upgrading Uruguayan Capabilities for TECHNOPARK development:** The focus of this component will be on capacity building of Uruguayan authorities regarding TECHNOPARK development and management. More specifically participants in the capacity building program will be able of acquiring know-how in relation to the development, operation and management of Korean TECHNOPARKS. The training curriculum should include, at least: (i) Korean initial conditions, (ii) Policy Phases: From Industrial Complexes to TECHNOPARKs, (iii) TECHNOPARK development (organizational functions and key features), (iv) On-the-spot-study (visit to key reference TECHNOPARKS), (iv) TECHNOPARKS operation support activities, (v) Presentation and assessments. It is expected that the material produced during component 1 will be used as reference reading list this component. It is expected that the training program will last for two weeks and at least 10 Uruguayan officers will be involved from UTEC and related organizations. As before INNOPOLIS and KIAT are suitable partners for the development of this activity.

3.3 **Component III. Assessing Background Conditions for a TECHNOPARK in Rivera.** Following the guidelines developed from component I, this component will assess the structural conditions for the development of a TECHNOPARK in Rivera. This report will include at least a demand survey plus the evaluation of the regulatory framework for TECHNOPARKs (with focus on the fiscal incentives provided by Uruguay's Investment Promotion Regime) and it will make suggestions for reforms if needed. The assessment will also identify infrastructure gaps to be filled during the implementation (with a focus on broadband connectivity, logistics and research infrastructure) and gaps in the institutional capacities of the main organizations in charge of leading the project (UTEC, UDELAR, UTU and Municipality of Rivera), with a focus on the institutional model and human capital needs for successful management of the park. During this assessment particular care will be made about identifying relevant industries at each developmental stage (i.e. from forestry, logistics towards BT, IT and mechatronics) and the potential for collaborative research and business development projects with neighboring regions (including Uruguayan regions (Cerro Largo and Artigas) and Brazil (Rio Grande do Sul)) and global companies or foreign countries as way to increase the regional spillovers of the TECHNOPARK promoting globalization and industrialization as well. The outputs of this component will be an assessment and gap analysis report for the deployment of a TECHNOPARK in Rivera.

3.4 **Component IV. Master Plan Proposal.** Following the guidelines and the results of the assessment of background conditions, this component will develop a master plan for a TECHNOPARK in the ITR Rivera's site. The plan will include the institutional model (including the design of the management organization), the main functions to be covered by the park (research, technology transfer, business incubation, local economic development promotion, scope of strategic industries); the personnel needed for implementation, the business model and sustainability approach (a critical component will be the commercialization plan aimed at attracting the types of tenants needed to guarantee the financial sustainability of the park. This should consider not only diffusion

activities but also a strategy to make a better use of the available fiscal incentives). The master plan will also include a phased development strategy or roadmap, strategies for demand side stimulation (e.g. demand aggregation of development challenges faced by several local municipalities in the region) and the pre-specification of the infrastructure investments required (with a focus on broadband connectivity, logistics and technological services infrastructure). It is expected that this plan will be implemented either through currently active lending programs in Uruguay or the development of a new lending program for 2019. The main output of this component will be Master Plan for Rivera's TECHNOPARK.

IV. Budget

4.1 **Indicative Budget**

Activity/ Component	Description	Activities	IDB/Fund Funding	Counterpart Funding	Total Funding
Component I	**Learning from Korean experience**	International Firm Consultant Domestic Workshop Uruguay	100.000	 13.000	**100.000** **13.000**
		Sub-Total	**100.000**	**13.000**	**113.000**
Component II	**Upgrading Uruguayan capabilities**	International Firm Consultant Training Travel to Korea	45.000 55.000		**45.000** **55.000**
		Sub-Total	**100.000**		**100.000**
Component III	**Assessment initial conditions**	International Firm Consultant Individual Consultant Domestic Workshop	120.000 60.000	 13.000	120.000 60.000 13.000
		Sub-Total	**180.000**	**13.000**	**193.000**
Component IV	**Master Plan Proposal**	International Firm Consultant. Individual Firm Consultant Domestic Workshop Dissemination Activities	160.000 60.000	 14.000 20.000	160.000 60.000 14.000 20.000
		Sub-Total	**220.000**	**34.000**	**254.000**
TOTAL			**600.000**	**60.000**	**660.000**

V. Executing agency and execution structure

5.1 UTEC is directed by a transitional board appointed by the executive to manage the institution. The transitional board will remain in office until March 2019. Nevertheless, it is expected that by 2020 UTEC will be directed by a Central Board integrated by a rector (elected by faculty, students and alumni), two representatives of faculty, two representatives of the students, one representative of the workers, one of industry (appointed by trade and business associations), and the directors of the Regional Technological Institutes.

5.2 In addition, the transitional Board defined the institutional design and organization structure. Currently, the institution has a Secretary-General, and, to monitor and develop the proposed activities in the five-year plan 2016-2020, the Management Area includes three Directions: Corporate Services, Education and Research and University

outreach. The University Outreach Direction together with the Secretary General will be direct counterpart for this project.

5.3 The development of the institutional model of UTEC strongly based on the support from the Korean Advanced Institute of Science and Technology (KAIST). Collaboration between UTEC and KAIST has continued in areas related to on-line education and flipped learning models. This TC will allow UTEC to start new venues of collaboration with Korean organizations such as INNOPOLIS and KIAT, strengthening its capabilities for local socio-economic development

5.4 UTEC has developed capabilities to manage external funds and donations. In this regard, in February 2015, UPM (a lead Finish pulp and paper multinational corporation) and UTEC signed an agreement in which UPM funded the university with US$ 4 million that contributed to building the ITR in Fray-Bentos. The agreement was based on a cooperative model between industry and the University, maximizing mutual benefit from each other's capabilities and enabling students to participate in internships and hands-on training in the industrial sector. Additionally, UTEC is also managing donations from non-government organizations.

5.5 The IDB though the CTI division will contribute to the discussion of the terms of reference of the consultants, assists the consultants during their visits to the country side and participate in the monitoring of the products and deliverables of each consultancy[9].

VI. Project Risks and issues

6.1 A challenge with the execution of this operation will be the coordination of the UTEC with the other educational institutions, especially with the Uruguay's Polytechnic (UTU) and the public university (UDELAR). The coordination between UTU and UTEC already exists, while UTU offers tertiary non-university training UTEC offers a university alternative for those graduates of UTU to pursue a professional engineering degree. Regarding the UDELAR, UTEC will be a complementary alternative. In fact, while UDELAR provides graduates with a generic profile, the formation of UTEC is aimed at graduates with technical and applied skills usable in each location of intervention. Moreover, there will be an important cooperation area with UDELAR regarding sharing infrastructure and research staff. UTEC's team is already making progress to improve collaboration with UDELAR. This will be taken into account while designing the executive projects.

[9] The bank supported UTEC though UR-T1115 which provided the managers of the new institution with key knowledge regarding similar technological universities around the world. The TC also supported a series of consultancies leading to the design of the university, its institutional model, careers development and academic contents.

VII. Environmental and Social Classification

7.1 This TC does not have environmental issues. Regarding Social strategy, this project will be designed addressing gender and minorities' social inclusion concerns. The TC has been qualified by ESG as category "C" which confirms an environmental, social and / or cultural minimum or no impact (see Safeguard Policy Filter and Safeguard Screening Form).