

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT

EL SALVADOR

INNOVATION PROGRAM FOR COMPETITIVENESS

(ES-L1058)

LOAN PROPOSAL

This document was prepared by the project team consisting of: Galileo Solís A. (CTI/CPN), Project Team Leader; Ezequiel Tacsir (CTI/CCR); Pedro Sáenz (IFD/CTI); Gustavo Crespi (IFD/CTI); Ismael Guillermo Villacorta (MIF/CES); Mario Castañeda (FMP/CES); Santiago Castillo (FMP/CES); Ma. Cristina Landazuri-Levey (LEG/SGO); and Sandra Ortega (IFD/CTI).

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ELECTRONIC LINKS	
REQUIRED	
1.	Plan of activities for the first disbursement and the first 18 months of execution (AWP) http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967717
2.	Monitoring and evaluation plan http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967716
3.	Procurement plan http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36974477
OPTIONAL	
1.	Program Operations Manual http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37157247
2.	Plan of conditions precedent to the first disbursement http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36972840
3.	Itemized budget http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967287
4.	Five-year development plan 2010 - 2014 http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967327
5.	Innovation, Science, and Technology Plan http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967426
6.	National Innovation, Science, and Technology Policy http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=37006759
7.	Review of science, technology, and innovation policies in El Salvador http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967554
8.	Innovation management tools http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967563
9.	Self-Discovery in a Development Strategy for El Salvador http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967573
10.	Constraints Analysis: Partnership for Growth-El Salvador http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967591
11.	Joint Country Action Plan 2011-2015. El Salvador – United States http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967625
12.	Estimation of the demand for enterprise innovation support tools in El Salvador http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967646
13.	Cost-effectiveness analysis. Component I http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967686

14. Cost-benefit analysis. Component II
<http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967693>
15. Characterization of El Salvador's national innovation system
<http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36967700>
16. Safeguard Policy Filter (SPF) and Safeguard Screening Form (SSF)
<http://idbdocs.iadb.org/wsdocs/getDocument.aspx?DOCNUM=36974305>

ABBREVIATIONS

AWP	Annual work plan
CIICT	Comité Interministerial para la Innovación, Ciencia y Tecnología [Interministerial Committee for Science, Technology, and Innovation]
CDC	Comité de Coordinación [Coordination Committee]
CITP	Complejo de Innovación Tecnológica y Productiva [Technological and Productive Innovation Complex]
CONACYT	National Science and Technology Council
FONDEPRO	MINEC Productive Development Fund
GCI-9	Ninth General Capital Increase
GDP	Gross domestic product
MINEC	Ministry of the Economy
MINED	Ministry of Education
OSICT	Observatorio Salvadoreño de Innovación, Ciencia y Tecnología [Salvadoran Innovation, Science, and Technology Observatory]
PEU	Program executing unit
ICT Plan	Plan Nacional de Innovación, Ciencia y Tecnología [National Innovation, Science, and Technology Plan]
PQD	Plan Quinquenal de Desarrollo 2010 - 2014 [Five-Year Development Plan 2010 - 2014]
R&D	Research and development
RICYT	Red de Indicadores de Ciencia y Tecnología [Science and technology indicators network]
SAFI	Sistema de Administración Financiera Integrado [Integrated financial management system]
STP	Secretaría Técnica de la Presidencia [Technical Secretariat of the Office of the President]
TFP	Total factor productivity
UACI	Unidad de Adquisiciones [Procurement Unit]
UFI	Unidad Financiera Institucional [Institutional Financial Unit]
UNCTAD	United Nations Conference on Trade and Development
VCYT	Vice Ministry of Science and Technology of the Ministry of Education

PROJECT SUMMARY

EL SALVADOR INNOVATION PROGRAM FOR COMPETITIVENESS (ES-L1058)

Financial Terms and Conditions					
Borrower: Republic of El Salvador Executing agency: Ministry of the Economy			Flexible Financing Facility*		
			Amortization period:	25 years	
			Original weighted average life:	15.25 years	
			Disbursement period:	5 years	
			Grace period:	66 months	
Source	Amount	%	Inspection and supervision fee:	**	
IDB (Ordinary Capital)	US\$30 million	100	Interest rate:	LIBOR-based	
Local	0	0	Credit fee:	**	
Total	US\$30 million	100	Currency:	U.S. dollars from the Ordinary Capital	
Project at a Glance					
Project objective/description: The program’s general objective is to help increase competitiveness and productivity in El Salvador by strengthening public agencies responsible for innovation policies and supporting innovation activities in the productive sector (paragraph 1.11). The program will finance the design and implementation of an institutional framework to coordinate efforts to support innovation in El Salvador, improving the management capacities of the government agencies involved, and ensuring their sustainability over time. It will also stimulate innovation and productivity growth in the productive sector, deploying new instruments to promote investment in innovation and technological development activities; and it will provide human capital training to support such activities.					
Special contractual conditions precedent to the first disbursement: (i) to have created an ad hoc program coordination committee (CDC), with one representative each from the Ministry of the Economy (MINEC), the Vice Ministry of Science and Technology (VCYT) under the Ministry of Education, and the Technical Secretariat of the Office of the President (STP), with functions as described in detail in the program’s Operations Manual; (ii) to have the program’s Operations Manual establishing procedures, roles, and responsibilities of the different units and agencies participating in the program, and the mechanism for evaluating and awarding its nonreimbursable cofinancing approved by the CDC; and (iii) to have created the Program Executing Unit (PEU) in MINEC, with the selection of at least a coordinator general, a procurement specialist, a financial accounting specialist, and an administrative assistant (paragraph 2.2).					
Special contractual conditions precedent to the disbursement of funds for the Salvadoran Innovation, Science and Technology Observatory: An agreement will have been signed between MINEC and the National Science and Technology Council (CONACYT) for execution of this component and the information needs for program evaluations (paragraph 2.2)					
Other special contractual execution conditions: The terms and conditions governing public requests for proposals to finance projects, fellowships, or training under component II of the program, must have the Bank’s no objection before the respective request for proposal (paragraph 2.2)					
Exceptions to Bank policies: None					
Project qualifies as:					
	SEQ []	PTI []	Sector []	Geographic []	Headcount []

* Under the Flexible Financing Facility (document FN-655-1) the Borrower has the option to request modifications to the amortization schedule as well as currency and interest rate conversions, in all cases subject to the final amortization date and original weighted average life (WAL). In considering such requests, the Bank will take into account market conditions and operational and risk management considerations.

** The credit fee and inspection and supervision fee will be established periodically by the Board of Executive Directors as part of its review of the Bank's lending charges, in accordance with the applicable provisions of the Bank's policy on lending rate methodology for Ordinary Capital loans. In no case will the credit fee exceed 0.75% or the inspection and supervision fee exceed, in a given six-month period, the amount that would result from applying 1% to the loan amount divided by the number of six-month periods included in the original disbursement period.

I. DESCRIPTION AND RESULTS MONITORING

A. Background, problem addressed, rationale

- 1.1 As part of a consultation process with the business and academic sectors, the Government of El Salvador has negotiated and implemented several public-private agreements to stimulate growth and national development. More specifically, this public-private-academic partnership has given rise to several policy documents including: the National Innovation, Science, and Technology Policy (ICT Policy), the National Innovation, Science, and Technology Plan (ICT Plan), and the 2011-2024 Industrial Policy. These documents represent a coordinated response to the problems faced by the productive sector, particularly low productivity stemming from its lack of capacity to adopt technologies and innovate.
- 1.2 The government has requested Bank support to implement the actions identified in the aforementioned documents, targeting the needs of the productive sector, with special emphasis on the ICT Plan, which was designed jointly by the Ministry of the Economy (MINEC) and the Vice Ministry of Science and Technology (VCYT). With implementation over a five-year period, the central action of this plan involves promoting the adoption, dissemination, and generation of knowledge required by the productive sector to enhance its competitiveness.
- 1.3 **Weak growth.** Economic growth in El Salvador has been below the Latin American average over the last few decades. Between 2000 and 2008, gross domestic product (GDP) grew by an average of 2.6% per year, compared to 3.6% in Latin America as a whole (CEPALSTAT, 2011). The global economic crisis made the situation worse: the domestic economy contracted by 3.1% in 2009, before a modest recovery in 2010 and 2011 (growth of 1.4% and 1.5%, respectively, according to data from the Central Reserve Bank). In terms of the composition of growth over a longer period (1990-2005), total factor productivity (TFP)¹ has contributed just 0.5% to the average GDP growth of 3.8% in that period, compared to physical capital which accounted for 1.8%, and labor, 1.5%, (Zegarra, 2007).
- 1.4 This weak contribution of TFP reflects poor performance in adopting technology and innovation, as shown in the standard indicators for measuring this. In general, El Salvador invests little in research and development (R&D)—just 0.08% of GDP in 2009.² According to data from the science and technology indicators network (RICYT), firms contributed just 0.9% of total R&D expenditure in 2009, which is very low compared to 27% in Colombia, 38% in Uruguay, 45% in Brazil, and 37% as an average for Latin America and the Caribbean.³ El Salvador's productive sector has few alternatives for financing its innovation activities. Moreover, the efforts to innovate that are made are generally very poorly coordinated with key

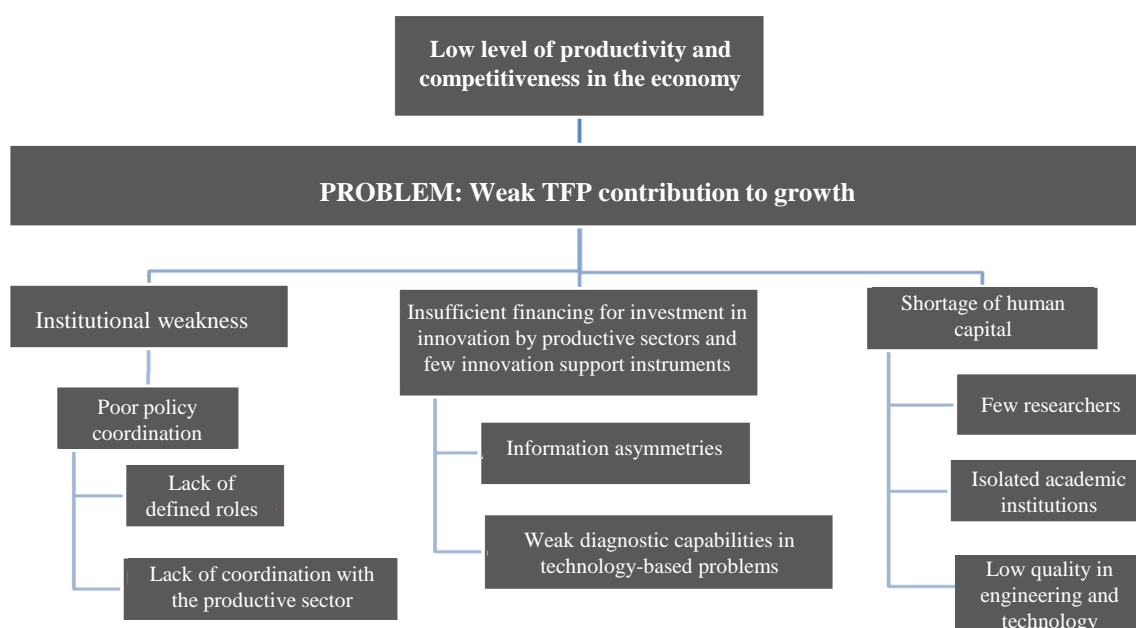
¹ Total factor productivity (TFP) is the indicator that usually reflects the contribution of innovation to economic growth. For example, for desired growth of 6.5%, an adequate level of TFP might be 2.5%.

² In 2009 the equivalent figure was 0.5% in Costa Rica and 0.21% in Panama.

³ IDB (2010): Science, Technology and Innovation in Latin America and the Caribbean: A Statistical Compendium of Indicators.

stakeholders in the innovation system (universities and technological and training centers). This means that many potentially innovative ideas ultimately are not put into practice, because firms do not have the necessary human resources or access to appropriate technological knowledge. In short, the low productivity and scant innovation in El Salvador's productive sector are explained by: (i) institutional weakness with a lack of instruments to support innovation and low capacity to coordinate the different public and private sector stakeholders; (ii) insufficient financing for investment in innovation by productive sectors, and few instruments to support innovation; and (iii) lack of human resources with quality training in engineering and technology careers.

PROBLEM TREE (causes and effects)



- 1.5 **Institutional weakness.** The Salvadoran government does not have well-developed institutions for its national innovation system. Unlike other countries, such as Chile or Finland which are often held up as examples, it has no system that is coordinated and consistent with economic development, financial, scientific, technological, and innovation policies. The government has five institutions that are involved in the design and implementation of public policy to support innovation: the Secretaría Técnica de la Presidencia [Technical Secretariat of the Office of the President] (STP), MINEC acting through the Vice Ministry of Trade and Industry (VCI), and the Productive Development Fund (FONDEPRO), which implement policies to support enterprise innovation; the Ministry of Education (MINED) acting through the VCYT, which was created in 2009; the Ministry of Agriculture, which executes funds for innovation and technology transfer; and the National Science and Technology Council (CONACYT), which is engaged in an internal reengineering

process to turn it into a public policy implementation agency within the VCYT structure. The roles of these institutions are not well defined within the innovation system; they are poorly coordinated with the productive sector, and have limited capacities for prospecting changes in technology and policy design. Furthermore, there is a lack of an institutional design that integrates the visions of the public, private, and academic sectors, to forge the consensus needed to give long-term sustainability to the country's innovation, science, and technology policies.

- 1.6 **Insufficient funding for investment in innovation by the productive sector and few innovation support instruments.** El Salvador suffers from inadequate investment in innovation, particularly by the private sector. Investments in scientific and technological activities amount to just US\$750,000, while firms spent just US\$150,000 on R&D in 2009 (RICYT). According to the *Enterprise Surveys* (World Bank, 2011), over 80% of Salvadoran firms finance their innovation activities out of their own resources, which are usually limited. This lack of private investment reflects market failures affecting both supply and demand. On the supply side, the typical problems of information asymmetries⁴ are exacerbated in an economy where the financial system has mostly focused on financing short-term commercial activities, to the detriment of higher-return, but highly risky, innovation projects. On the demand side, i.e. opportunities to innovate, although potential innovation ideas exist in the private sector, the shortage of locally available technological knowledge and a small human capital base reduce the capacity of firms to diagnose basic technological problems, seek appropriate solutions, adopt them, and, ultimately, formulate good innovation projects that arouse the interest of the private financial sector. El Salvador is in a vicious circle in terms of innovation; there is little demand for innovation in the private sector, owing to a lack of capacities and knowledge which hinders the development of greater private financing. This is compounded by a very limited supply of financing, which in turn prevents firms from building capacities. This situation calls for public policies to act simultaneously on the supply and demand sides, to free the country from this trap.
- 1.7 **Lack of human capital.** El Salvador suffers from a severe lack of human capital in the engineering and technology domains. This is not the result of a low enrollment rate in the corresponding higher education courses (22% according to the MINED Educational Statistics Unit, in 2009), but their poor quality. In terms of the availability of engineers, the relevant subindex of the 2011-2012 Global Competitiveness Index published by the World Economic Forum, ranked El Salvador 132nd out of 142 economies.⁵ Professional education in El Salvador is

⁴ Information asymmetry refers to decisions made in transactions where one party has better information than the other. In this case, the problem arises when the project owner has better information on the project's chances of success than the investor or the bank. In particular, the difficulty for banks to distinguish good projects from bad ones limits access to credit with the result that profitable projects are not undertaken.

⁵ The "Availability of scientists and engineers" subindex of the Global Competitiveness Index should be considered as a compound or synthetic indicator of both the quantity and the quality of the supply of this category of professional labor.

provided through 24 universities, nine specialized institutes, and six technological institutes. The bulk of the training is given at the undergraduate level, and fewer than 2% of students attend a postgraduate program of any kind. The country has just 134 full-time researchers, of whom just 16 have doctorates and 32 hold master's degrees.⁶ The low quality of professional training in engineering and technology disciplines reflects supply constraints caused by the lack of a critical mass of professionals and researchers with postgraduate degrees and doctorates in these areas. Moreover, higher education institutions, both public and private, generally operate independently of the needs of the productive sector, and without specific incentives for linkages.

- 1.8 **Innovation system coordinating agency.** To address these challenges, the Salvadoran government has accepted the recommendations shared by the United Nations Conference on Trade and Development (UNCTAD),⁷ the USAID Partnership for Growth Initiative (Asocio/PfG),⁸ and the IDB on the need for an entity that defines the innovation strategy, integrates it with the national development strategy, and provides leadership in implementing it. These recommendations, which are backed by international experience, suggest that any such coordination should be at a very high level of the executing agency to ensure effectiveness and agility in fulfilling the provisions and guidelines to promote innovation in agreement with the business sectors; and up-to-date and reliable information for decision-making and for monitoring policy implementation. To fulfill this function, the government has decided to set up an Interministerial Committee involving at least MINEC, the STP, and the VCYT, chaired by these institutions on a rotating basis.
- 1.9 **The Bank's country strategy and the GCI-9.** The program's objective is consistent with the first pillar of the Bank's country strategy with El Salvador (2010-2014) (document GN-2575).⁹ In particular, the strategy stresses that in line with the government's plans to improve economic growth and debt sustainability, the Bank could support productive development, promoting micro, small, and medium-sized enterprises, and technological innovation. Under the Ninth General Increase in the Resources of the IDB (GCI-9) framework (document AB-2764), this project supports a small and vulnerable country (a Group C and D country) and also contributes to regional development targets by financing small and medium-sized enterprise with the aim of stimulating its innovation and technology transfer effort. At the same time, this operation is aligned with the Bank's Institutions for Growth and Social Welfare strategy (document GN-2587-2), of which one priority area is improving innovation and productivity for growth and social welfare by

⁶ CONACYT (2010). Science and technology indicators, 2009. Table 4, page 26.

⁷ Science, Technology, and Innovation Policy Review: El Salvador (UNCTAD, 2011).

⁸ Constraints Analysis: Partnership for Growth-El Salvador.

⁹ See document IDB: Country Strategy with El Salvador (2010-2014), paragraphs 3.5 and 3.6.

strengthening countries' institutional capacities to design and implement policies that stimulate innovation and technological development (see Table 1).

- 1.10 **Rationale.** The activities designed under the program are the first effort in the country to leverage the returns on innovation activities promoted by the public sector. The program's sustainability is expected to be achieved by means of the returns shown by the evaluations designed as part of the program. The proposed component structure has been designed to achieve outcomes that will have a demonstration effect. These outcomes will, in turn, encourage the government and private sector to allocate additional resources to these investments after the program has ended.

B. Objectives, components, and costs

- 1.11 The program's general objective is to help increase competitiveness and productivity in El Salvador by strengthening public agencies responsible for innovation policies and supporting innovation activities in the productive sector. The specific objectives are to: (i) lay foundations for the institutional framework needed to coordinate innovation in the country; (ii) stimulate innovation activities in firms; and (iii) increase the quantity and quality of human resources needed to meet the demand for innovation activities in the private sector. To achieve these objectives, the program will have the following two components:
- 1.12 **Component I. Strengthening the institutional framework to support innovation (US\$3.58 million).** Financing will be provided for activities to create and implement a high-level interministerial coordinating mechanism with public legitimacy and capacity to mobilize the other ministries and agencies involved. This mechanism will be set up in a new institutional management framework to coordinate national efforts, integrate them into the national budget and the five-year development plan 2010-2014 (PQD), and perform evaluations to assess the need for corrective actions or additional financing to make them sustainable. The component will include:
- 1.13 **Creation of the Interministerial Committee for Science, Technology, and Innovation (CIICT).** Funding will be provided for consensus-building workshops to define the nature and scope of the management and functions of the CIICT. The result is the governance architecture that will coordinate the innovation system to guarantee fluid interaction between ministries, agencies, and public and private stakeholders, targeting innovation policies. The technical support will be identified and procured to fulfill the envisaged functions.
- 1.14 **Capacity-building for the design and management of public policies to support innovation and the establishment of an information system for institutional management and decision-making support.** Services will be contracted to define the innovation indicators, and to expand and modernize data collection methods. In addition, the design of an information platform to monitor and evaluate innovation policies will be contracted. Two business innovation surveys will be conducted as a

follow-up to the current survey financed by the Bank, which will serve as a baseline and a source of learning for subsequent surveys during program execution.

- 1.15 In addition, training services will be contracted to improve capacities in the following areas: (i) anticipation and preparation for technological change with a view to exploring its viability in various sectors; (ii) strengthening of policy-making capacity through scholarships to attend short-term courses in policy-making and innovation management; (iii) programmed visits to El Salvador by international experts to give short courses aimed at the design of innovation policies and programs. These will benefit 100 people, with eligibility restricted to employees of the public sector, business chambers and business associations, and university staff.
- 1.16 **Creation and implementation of the Salvadoran Innovation, Science, and Technology Observatory (OSICT).** Based on the outputs resulting from the World Bank technical assistance program “Support for institutional capacities for strategic planning of the science, technology, and innovation system,” which aims to set basic guidelines for a future OSICT, experts will be hired to set in motion the system for evaluating and monitoring the performance of the national innovation system under CONACYT. The specific aim will be to integrate evaluation and monitoring mechanisms and the formulation of policies, instruments, and programs to determine their effectiveness and/or identify necessary adjustments. The financing will also include the strengthening of CONACYT; equipment for OSICT; procurement of a platform for data collection, monitoring, and evaluation; and training of the staff of ministries, agencies, and stakeholders involved in the selected evaluation methods. CONACYT, acting through the OSICT, will perform the evaluations and obtain the information needed to evaluate the program, under the terms described in the monitoring and evaluation plan.
- 1.17 **Component II. Investment in innovation (US\$25.74 million).** With the aim of stimulating innovation in productive sectors, new instruments will be designed and implemented to promote investment in innovation and technological development. The productive sector support instruments planned under this component will be implemented via nonreimbursable cofinancing awarded through competitive requests for proposals requiring a high degree of transparency, with evaluation criteria based on the quality and merit of the project proposals. In the case of the fellowships and training, awards will be based on the candidates’ profile of excellence and merit. Three subcomponents will be financed:
- 1.18 **Subcomponent II.1. Support for business innovation (US\$2.66 million).** This subcomponent has two objectives: first, to strengthen the capacities of enterprises to design and effectively implement innovation projects; and second, to promote the creation of dynamic enterprises in technology-based sectors. To achieve the first objective, nonreimbursable cofinancing structures will be created between firms and the public sector, in the form of incentives to undertake innovation projects, while setting up structures in which support decreases over time to build staff capacities to manage innovation projects in firms. For the second objective,

financing will be provided to implement enterprise incubation systems¹⁰ both in El Salvador and abroad, as well as support for angel investor networks.¹¹

- 1.19 **Nonreimbursable cofinancing for innovation projects targeting the private sector (US\$1.1 million).** To strengthen knowledge production for innovation, activities such as the following will be cofinanced: (i) research projects in both public and private research centers; and (ii) projects aimed at solving productive problems in priority areas.¹² With these aims, cofinancing will be provided to develop sector innovation agendas. The program will finance 50 innovation projects with participation by firms, along with 10 innovation alliance-building projects (at least five firms) and 55 projects in priority areas.
- 1.20 **Training of technology managers to coordinate quality innovation proposals (US\$280,000).** The objective of this instrument is to build enterprise capacities to design and implement innovation projects in priority areas. To this end, technology managers will be trained to generate innovation and/or technological development projects. Nonreimbursable cofinancing will also be provided to encourage the continuity of the managers in the firms, business chambers, and private sector associations for the ongoing generation of projects. A total of 100 persons are expected to be trained as managers, and 100 firms will benefit from the temporary presence of the aforementioned outreach workers.
- 1.21 **Support for start-ups with rapid growth potential and high value added (“dynamic enterprises”)¹³ (US\$1.28 million).** This program aims to promote the creation of dynamic firms in technology-based sectors, using the following instruments: (i) nonreimbursable financing for the operation of incubators under performance contracts with institutions selected through public competitive processes; (ii) design and execution of a pilot incubation program for technology-based enterprises abroad,¹⁴ with firms chosen competitively; (iii) support for angel

¹⁰ An incubator supports the successful development of new technology firms through a wide range of business support resources and services, developed and organized by a manager, and supplied on-site and through a wide network of contacts.

¹¹ An angel investor is an individual who has sufficient personal financial resources to invest in start-up enterprises, in exchange for convertible instruments of debt or equity in the new firm.

¹² The priority areas of the ICT plan are food and nutrition, health, energy, and the environment. The priority areas of the industrial policy are: food and beverages, chemicals/pharmaceuticals, garments and textiles, plastics, paper and paperboard, and machine tools.

¹³ MINEC defines dynamic enterprises as new or recent business projects with high growth potential, which can be distinguished in the following terms: (i) a new business model (such as home delivery of meals, or distribution of products over the Internet); and/or (ii) a product (good or service) which is innovative (given its design, process, or applied technology), such as vehicles driven by compressed air or solar energy; and/or (iii) a competitive advantage (which cannot be easily copied).

¹⁴ The usefulness of incubating firms abroad stems from exposing new firms to the best business practices, receiving technical assistance and consulting services to develop businesses, while being able to present projects to venture capital networks. These firms connect with international networks, as proven by successful experiences in Mexico and Chile.

investor networks; and (iv) feasibility studies for the design of new instruments to support the technology-based dynamic enterprise.

- 1.22 **Subcomponent II.2. Human capital formation for competitiveness (US\$7.48 million).** The aim of this subcomponent is to strengthen the supply of advanced-level human capital in science and engineering, to speed up innovation processes in productive sectors. To improve the quality of the supply of national professionals in those areas, scientific and technological staff from research centers, universities, and firms will be given support to attend high-quality postgraduate education abroad in the priority areas, with a view to upgrading their skills. On their return, they will be able to help raise the quality of the supply of national graduate and postgraduate programs, and strengthen business innovation capacities.
- 1.23 **Shared financial incentives to incorporate human resources in firms to resolve complex technological problems (US\$500,000).** The plan to attract technicians and professional staff in firms will target firms in the priority areas of the ICT plan and industrial policy,¹⁵ cofinancing the inclusion of technical and professional staff from abroad on a temporary basis to solve technological problems in support of national human resources. A total of 50 firms, chosen through an evaluation of proposals, will benefit from the talent attraction plan.
- 1.24 **Postgraduate fellowship program abroad (US\$6.93 million).** A national program of postgraduate fellowships will be created for professionals linked to research in the priority areas defined by the ICT policy and the industrial policy. The 75 fellowships to be awarded will give preference to doctoral programs targeting full-time researchers (with employment contracts) at research centers, universities, or firms. The beneficiary eligibility and selection criteria are established in the program Operations Manual.
- 1.25 **Design of national postgraduate programs (US\$500,000).** Demand and feasibility studies will be conducted for the design of specialized postgraduate programs in science and engineering areas aligned with the priorities of the ICT policy and the industrial policy.
- 1.26 **Subcomponent II.3. Demand-driven technology transfer to the productive sector (US\$15.6 million).** The aim of this subcomponent is to strengthen the transfer of technology and results of applied research to the business sector. Support will be provided for the capacities of technological and productive innovation complexes, as well as for forging partnerships with the productive sector and collaborating internationally through incentives to set up international sector-based technological development and innovation centers.
- 1.27 **Support for linkage units between technological development centers and the private sector (US\$6 million).** The program will finance the design, creation, and

¹⁵ Ministry of the Economy (2011): “Política Industrial. 2011-2024” [Industrial Policy 2011-2024] , produced jointly by STP, MINEC, the Ministry of Agriculture, the Salvadoran Industrialists Association and the Central Reserve Bank of El Salvador.

strengthening of units to promote linkages between the activities of technological development centers (in universities or private research centers) and enterprises. These units will help firms to develop projects to improve their productive and commercial activities, by promoting innovations that involve R&D, technology transfer, and technical assistance, while also making their structure available to assist in project management. Units that forge links between firms and international development centers will also be eligible for financing. The eligible thematic areas will be those considered priorities in the industrial policy. The linkage unit proposals will be selected through competitive processes with clear eligibility rules to be defined in the program Operations Manual.

- 1.28 **Design and establishment of technological and productive innovation complexes (US\$9.6 million).** Technological and productive innovation complexes (CITPs) will be established¹⁶ to foster agglomeration economies encouraging innovative firms from key sectors to concentrate in specific localities, where they can share high-quality infrastructure and enjoy shared economic benefits. The process for selecting and awarding the funds will benefit proposals with studies that clearly support the necessary capacities and display economic prefeasibility. Financing will be provided to implement the CITPs with the greatest potential (rate of return). Works financing may not exceed 25% of the project benefiting from this program. This is expected to finance two CITPs that develop, register, and transfer to the productive business sector at least 20 methods to produce new products.
- 1.29 **Administration (US\$680,000).** Financing will be provided for the contracting of three specialists and one administrative assistant for the program executing unit (PEU), the audits planned under the program, and the cost of the evaluation plan (conducted by the OSICT).

Table 1.1. Project Costs (US\$ thousands)
(Financial costs will be paid by the borrower)

Components	IDB	Total	%
I. Strengthening the institutional framework to support innovation	3,580	3,580	12%
II. Investment in innovation	25,740	25,740	86%
1. Support for business innovation	2,660	2,660	
2. Human capital formation of for competitiveness	7,480	7,480	
3. Demand-driven technology transfer to the productive sector	15,600	15,600	
Administration	680	680	2%
TOTAL	30,000	30,000	100%

¹⁶ CITPs will integrate firms, technological development centers, tertiary education centers, and linkage units with the productive sector, including prospecting and marketing services, for the first time in the same physical space. This integration will make it possible to create technological development centers shared with the private sector, foster technology transfer to the firms, and promote the development and launch of new products. The CITPs will aim to transfer mechanisms to the private sector to support the development of new products and promote technology transfer for the production of applications in specific industries. Agglomeration and scale economies are expected to be obtained over time.

C. Key results indicators

- 1.30 The preliminary cost-benefit analysis yields an internal rate of return (IRR) estimated at 21%, and a benefit-cost ratio of 1.76 for every dollar invested—indicators that recommend execution of the program. Table 1.2 shows the key indicators for the expected outcomes.

Table 1.2. Key Results Matrix Indicators
(Details in the Results Matrix– Annex II)

Indicator	Base	Target
Number of firms supported in formulating innovation projects and innovation management.	0	100
Number of firms supported by the temporary attraction of (foreign) professional and technical staff in the firms (PATP).	0	50
Number of firms supported in financed alliance-building R&D projects.	0	10
Training of holders of doctorates in technology and engineering in priority areas of the productive sector and on topics that are strategic for the country, as defined in the national research agenda.	0	75
Percentage of firms with human capital obstacles to innovation (difference between beneficiary and control firms).	0	-0.20%
Percentage of firms that introduce product innovations (difference between beneficiary and control firms).	0	35%
Increase in private sector investment in innovation as a percentage of sales (difference between beneficiary and control firms).	0	1.5
Total factor productivity (TFP) growth	1.00	1.15
Improvement in institutional capacities to implement innovation and human capital programs.	0	40
Increase in tax payments resulting from higher profits of beneficiary firms thanks to their increased productivity.	1.00	1.15

II. FINANCING STRUCTURE AND RISKS

A. Financing instruments

- 2.1 The operation is a specific investment loan with a five-year execution period. The program's estimated cost is US\$30 million, to be financed out of the Bank's Ordinary Capital.

Table 2.1: Estimated Annual Disbursements (US\$ thousands)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
TOTAL	644	3,921	10,275	9,475	5,685	30,000
%	2%	13%	34%	32%	19%	100%

- 2.2 **The following will be special contractual conditions precedent to the first disbursement: (i) to have created an ad hoc program coordination committee**

(CDC), with a representative each from MINEC, the VCYT, and the STP, with functions described in detail in the program Operations Manual; (ii) to have the program's Operations Manual, establishing procedures, roles, responsibilities of the different participating units and agencies, as well as describing the mechanism for evaluating and awarding the nonreimbursable cofinancing envisaged in the program approved by the CDC; and (iii) to have created the PEU in the MINEC, with the selection of at least a coordinator general, a procurement specialist, a financial accounting specialist, and an administrative assistant. The following will be special contractual conditions precedent to the disbursement of funds for the OSICT: an agreement will have been signed between MINEC and CONACYT to execute this component and obtain the information required for program evaluations. As special contractual execution conditions, the terms and conditions governing public requests for proposals to finance projects, fellowships, or training under component II of the program, must have the Bank's no objection before the respective request for proposals.

B. Environmental and social risks

- 2.3 As the program is expected to finance institutional strengthening and human resource training activities, along with projects that involve transfers to the productive sector, no negative environmental and social impact is anticipated. The program is classified as a category "C" operation under the Bank's Environment and Safeguards Compliance Policy, and does not require any further environmental and social review.

C. Fiduciary risks

- 2.4 The analysis of MINEC's institutional capacity indicates medium development and medium associated risk. Fiduciary risks would stem from the possibility of the procurement plan and annual work plan (AWP) not being fulfilled, due to a potential work overload. The mitigation measures proposed include strengthening the Institutional Financial Unit (UFI) and Procurement Units (UACI) with specialized staff. Interagency coordination mechanisms will be defined in the program's Operations Manual, along with procedures, roles, and responsibilities. During the execution period and taking account of lessons learned, risk workshops will be held to fine-tune the program's risk analysis.

D. Other key issues

- 2.5 The proposed investments will promote innovation activities in productive sectors, through a public-private nonreimbursable cofinancing effort, with measurable economic returns. To guarantee the transparency and efficiency with which public funds are allocated to all the subcomponents of component 2, contracts will be awarded through competitive processes. At a minimum, the selection and award process will include the following stages: launch of a public request for proposals (at least two per year), receipt of proposals by the PEU, evaluation of proposals by external peers (preferably international), selection of beneficiaries based on the potential assessed in each proposal, and the execution and monitoring of projects by

the PEU. The details of the process and the necessary documentation will be described in detail in the program Operations Manual. Projects will be selected on the basis of quality and according to best international practices, while also drawing on lessons learned from the Bank's extensive experience in implementing such mechanisms. In projects involving nonreimbursable cofinancing, when the beneficiary firms are at least one year old, they will contribute at least 20% of the investment for each project. Firms less than one year old will contribute at least 10% of the project investment.

III. IMPLEMENTATION PLAN AND PROJECT MANAGEMENT

A. Summary of the institutional implementation arrangements

- 3.1 **Borrower and implementation arrangements.** The borrower will be the Republic of El Salvador, with MINEC serving as executing agency through a PEU to be set up within its organizational structure. In addition, the ad hoc CDC will be created to coordinate the program, encompassing the STP, MINEC, and the VCYT.
- 3.2 **Coordination Committee (CDC).** The CDC will be created as an ad hoc top-level strategic agency to guide the program. It will act as a forerunner of the top-level policy coordination mechanism to be formed using the loan proceeds (component I), namely the Interministerial Committee, and will consist of the STP, VCYT, and MINEC. The CDC will be chaired by each of the three institutions on an annually rotating basis, and will meet at least twice a year and on an exceptional basis at the request of any of its members. The CDC will give its no objection to the AWP prepared by the PEU; and will make decisions on the necessary adjustments to the AWP arising from the evaluations of outcomes obtained from the PEU. Divergences, adjustments, and lessons learned will be discussed with the Bank, with a view to agreeing upon corrective actions or improvements. The details of other CDC functions will be specified in the Operations Manual.
- 3.3 **Program executing unit.** The PEU will be accountable to the CDC for AWP execution. It will implement the strategies and plans established by the CDC, with functions to be specified in the program Operations Manual. The PEU will consist of a coordinator and staff fulfilling administrative and technical program support functions to be defined in the Operations Manual. The contracting of the PEU staff during the initial months will be financed with resources from technical cooperation operation ATN/KF-13325-ES.
- 3.4 Implementation rules will be set out in detail in the Operations Manual, which will be approved by the CDC under the terms agreed upon with the Bank; any change to the Operations Manual will require the Bank's written no objection. The Operations Manual will include details of the execution procedures agreed upon for the different components, financial procedures, eligibility requirements for program beneficiaries, and interagency coordination mechanisms between the executing agency and CONACYT. To execute funds by competitive processes, following the Bank's no objection for the selection, the beneficiary will sign an agreement with

the executing agency, clearly specifying the amount to be financed by the program and the amount to be financed by the beneficiary as counterpart.

- 3.5 **Private Sector:** The private sector has actively participated in defining the activities under the national plans and policies. The government has maintained an ongoing dialogue with the leading business associations, and they have even played an active role in the formulation and presentation of the National Innovation, Science, and Technology Policy. During program execution, through shared cofinancing, the private sector will contribute at least 10% of the total project funding. This means that fulfillment of the program's objectives will be the result of a joint public-private effort.
- 3.6 **Financial and fiduciary management.** In terms of record-keeping and reporting, MINEC will manage and make available budgetary appropriations for the execution of all program components. The accounting records and corresponding support documentation will be produced by the UFI using the integrated financial management system (SAFI). To manage the resources disbursed by the Bank, MINEC will maintain a special account at the Central Reserve Bank, as well as an designated operational account in a commercial bank from which payments to suppliers and contractors will be made, using the SAFI cash management subsystem; both accounts will be used exclusively for the program. The PEU will handle disbursement requests made to the Bank, as well as the submission of the financial reports required to verify execution arrangements. As indicated in the Bank's policy on financial management (document OP-273-2), disbursements will be made based on the program's liquidity needs.
- 3.7 **Procurement of works, goods, and services.** The procedures applicable for each type of procurement will follow the Policies for the Procurement of Works and Goods Financed by the Inter-American Development Bank (document GN-2349-9) and the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (document GN-2350-9). Bank supervision of procurement of works, goods, and services and the contracting of consulting services using program funds will be undertaken according to the procurement plan and Appendix I of documents GN-2349-9 and GN-2350-9.
- B. Summary of arrangements for monitoring results**
- 3.8 **Annual work plan.** This plan will be prepared by the PEU and will receive the CDC's no objection. Once this requirement has been fulfilled, it will be delivered along with the semiannual report at the end of the year prior to that to which the plan refers, including activities programming and an updated procurement plan.
- 3.9 **Semiannual execution reports.** Within 60 days following the end of each calendar six-month period, the PEU will submit a report on the progress of program execution, including details of outputs achieved and under execution, according to the program's Results Matrix indicators, an analysis of problems encountered and corrective measures adopted, divergences in the execution of activities from what was planned, and the calculation of the program's performance indices.

- 3.10 A program monitoring and evaluation plan has been prepared. The PEU will receive training funded from the technical cooperation operation supporting project preparation (operation ATN/KF-13325-ES). MINEC will be responsible for monitoring, and will submit semiannual reports on the AWP activities completed, based on the evaluations performed using the OSICT. The monitoring and evaluation plan includes outcome monitoring indicators, specifying their measurement annually, biannually, or at the end of the program. To measure the impact and outcome indicators, regression-discontinuity analysis will be used, along with differences in differences, and before and after matching.
- 3.11 **Financial statements and external audit.** MINEC will submit annual financial statements audited by a firm of independent auditors acceptable to the Bank. The contracting will be done by a competitive process under the guidelines defined in the Bank's financial management policy and under terms of reference agreed upon previously with the Bank. The Bank will review this contracting on an ex ante basis. The program's midterm financial monitoring will use the financial reports produced by the institutional application (SAFI); and details of the necessary breakdown will be given in the corresponding notes and complementary financial information. These unaudited reports will initially be required on a quarterly basis, and their frequency may be subsequently adjusted. The quarterly reports should be submitted within 45 days following the end of each calendar quarter.

C. Significant design activities

- 3.12 This program's activities are proposed in light of the experiences and lessons learned from similar Bank-financed operations in other countries of the region.¹⁷ Recent interventions by the Bank in El Salvador were also analyzed, including projects implemented by the Multilateral Investment Fund (MIF)¹⁸ and the Program to Support Production Development for International Integration (loan 2383/OC-ES),¹⁹ to ensure adequate coordination with the activities of this program.
- 3.13 The Bank has broad experience in implementing cofinancing mechanisms that target innovation, including programs in Argentina, Uruguay, Chile, Panama, and Colombia. While summarizing the evidence for these seven programs (in the countries listed plus Mexico), Crespi (2011) concludes that the firms that receive public support increased their own investment in innovation, and there was only (weak) evidence of a partial displacement of private investment. In terms of the impact on the output of cofinancing activities, the results suggest a significant

¹⁷ Recent loans: 2437/OC-AR, 1728/OC-AR, 2004/OC-UR, 1663/OC-PE, 2693/OC-PE, 1987/OC-PN, and 2335/OC-CO.

¹⁸ The Proinnova project of the Salvadoran Foundation for Economic and Social Development (FUSADES) receives MIF support amounting to US\$1.8 million, through operation ATN/ME-10714-ES signed in 2008.

¹⁹ This program includes a component supporting the National Innovation System, to initiate support for dialogue activities between system stakeholders, deepen agreements between the public and private sectors, and help each system stakeholder identify the role it should play and its relation with other stakeholders.

impact by the incentives on the performance of the firms, with increases in labor productivity of 13% in the case of Panama and 15% in the case of Colombia. At the same time, an analysis of innovation support programs in six Latin American countries (Argentina, Brazil, Colombia, Chile, Panama, and Uruguay) also reported positive economic results, in terms of estimated internal rates of return and net present value.²⁰

- 3.14 The recommendation that MINEC serve as executing agency reflects the ministry's capacity and experience in processes involving competitive bidding processes, evaluation, and award of public funds to the business sector (FONDEPRO), with operations analogous to those proposed in this program. In component I, activities will be designed to collect, monitor, and evaluate equal opportunities indicators for the projects and beneficiaries supported; and these evaluations will indicate whether any action is needed to improve gender equity.

²⁰ López, A. (2009), "Las evaluaciones de programas públicos de apoyo al fomento y desarrollo de la tecnología y la innovación en el sector productivo en América Latina. Una revisión crítica" [Evaluations of public programs to support the promotion and development of technology and innovation in the productive sector in Latin America. A critical review], Technical Note, Regional Policy Dialogue; Innovation, Science, and Technology Network.

Development Effectiveness Matrix			
Summary			
I. Strategic Alignment			
1. IDB Strategic Development Objectives	Aligned		
Lending Program	Lending to small and vulnerable countries.		
Regional Development Goals	The operation contributes to the following regional development goal: Percent of firms using Banks to finance investments.		
Bank Output Contribution (as defined in Results Framework of IDB-9)	The operation contributes to the following Bank's outputs: i) Individuals (all, men, women, youth) benefited from programs to promote higher labor market productivity, ii) Number of jobs added to formal sector, iii) Micro/small/medium productive enterprises financed, and iv) Public financial systems implemented or upgraded (budgeted, treasury, accounting, debt, and revenues).		
2. Country Strategy Development Objectives	Aligned		
Country Strategy Results Matrix	GN-2575-1	The operation is aligned with Country Strategy objective: Increase tax revenue intake.	
Country Program Results Matrix	GN-2661-4	The intervention is included in the 2012 Country Program Document.	
Relevance of this project to country development challenges (If not aligned to country strategy or country program)			
II. Development Outcomes - Evaluability	Highly Evaluable	Weight	Maximum Score
	9.4		10
3. Evidence-based Assessment & Solution	8.8	25%	10
4. Ex ante Economic Analysis	10.0	25%	10
5. Monitoring and Evaluation	8.6	25%	10
6. Risks & Mitigation Monitoring Matrix	10.0	25%	10
Overall risks rate = magnitude of risks*likelihood	Medium		
Environmental & social risk classification	C		
III. IDB's Role - Additionality			
The project relies on the use of country systems (VPC/PDP criteria)	Yes	Procurement: Information System.	
The project uses another country system different from the ones above for implementing the program			
The IDB's involvement promotes improvements of the intended beneficiaries and/or public sector entity in the following dimensions:			
Gender Equality	Yes	The project includes indicators to monitor the evolution of the different funding mechanisms from a gender perspective and if necessary corrective mechanisms will be incorporated.	
Labor	Yes	One objective of the program is to strengthen the supply of advanced human capital in science and engineering, which will facilitate access to high quality postgraduate education.	
Environment			
Additional (to project preparation) technical assistance was provided to the public sector entity prior to approval to increase the likelihood of success of the project	Yes	ES-T1089 (CT Intra), ES-T1080 (Operational Support)	
The ex-post impact evaluation of the project will produce evidence to close knowledge gaps in the sector that were identified in the project document and/or in the evaluation plan.	Yes	The ex-post evaluation will produce impacts based on quasi-experimental methods on the effectiveness of advanced human capital development programs. Additionally, the impact evaluation will produce indicators (B-A) on the improvement of institutional capacities.	

The project is aligned with IDB institutional priorities. The project contributes to: (i) the IDB lending priorities "Lending to small and vulnerable countries"; (ii) the Regional Development Goal "Percent of firms using Banks to finance investments"; and (iii) the Bank Output Contribution to Regional Development Goals 2012-2015 "i) Individuals (all, men, women, youth) benefited from programs to promote higher labor market productivity", "Number of jobs added to formal sector", "Micro/small/medium productive enterprises financed", "Public financial systems implemented or upgraded (budgeted, treasury, accounting, debt, and revenues)". The project is also aligned with the country strategy's objectives to increase tax revenue intake.

The project document and its annexes provide a clear and complete justification for the project. Problems and their causes are clearly identified and discussed. The project's potential beneficiaries are also clearly identified and described. Evidence of the effectiveness of similar interventions in similar contexts is also clearly discussed. The project's metric is well defined and the result matrix includes valid indicators with baseline and targets at all level. The project document includes a complete and realistic cost/benefit analysis. It also includes a monitoring and evaluation plan (MEP) that is complete and follows the DEM outline. The evaluation strategy is convincing and based on a quasi-experimental methodology, which is clearly discussed in the MEP.

The risks identified in the risk matrix are reasonable and they include mitigation measure and related metric to track their implementation.

RESULTS MATRIX

Program Objective	The project's general objective is to help increase competitiveness and productivity in El Salvador by strengthening public agencies responsible for innovation policies and supporting innovation activities in the productive sector. The specific objectives are to: (i) lay foundations for the institutional framework needed to coordinate innovation in the country; (ii) stimulate innovation activities in firms; and (iii) increase the quantity and quality of human resources needed to meet the demand for innovation activities in the private sector.		
Impact indicators (ex post)	Baseline	Target	Comments
<p>Increase in tax payments resulting from higher business profits stemming from greater productivity</p> $\tau \otimes (\pi^B - \pi^{NB})$	1.00	1.15	Impact indicator aligned with the Bank's country strategy with El Salvador. Calculated as the increase in the index of total factor productivity (TFP) in beneficiary firms compared to the control group, multiplied by the average tax ratio. Source: Third Survey of Innovation in El Salvador (2017). Baseline: First Survey of Innovation in El Salvador (2012).
<p>Growth of total factor productivity</p> $\left(\frac{Y_t^B}{(K_t^\alpha L_t^{1-\alpha})^B} \right) / \left(\frac{Y_t^{NB}}{(K_t^\alpha L_t^{1-\alpha})^{NB}} \right)$	1.00	1.15	Final outcome indicator aligned with the program's general objective. Calculated as the increase in the index of total factor productivity in beneficiary firms compared to the control group, multiplied by the average tax ratio. Source: Third Survey of Innovation in El Salvador (2017). Baseline: First Survey of Innovation in El Salvador (2012).
<p>Growth of labor productivity</p> $\left(\frac{Y_t^B}{L_t^B} \right) / \left(\frac{Y_t^{NB}}{L_t^{NB}} \right)$	1.00	1.20	Final outcome indicator aligned with the program's general objective. Calculated as the increase in the index of labor productivity in beneficiary firms compared to the control group, multiplied by the average tax ratio. Source: Third Survey of Innovation in El Salvador (2017). Baseline: First Survey of Innovation in El Salvador (2012).
<p>Improvement in institutional capacities for implementing innovation and human capital programs:</p> <p>Δ score on MIDI Institutional performance index (0-100).</p>	N/A	40	Final outcome indicator aligned with specific objective (i). Calculated as the difference in the average scores resulting from application of the MIDI methodology at the start and end of the program, on the two main executing agencies in El Salvador: (i) the FONDEPRO and (ii) the CONACYT (see monitoring and evaluation plan).
<p>Growth of private sector investment in innovation (as % of sales)</p> $\left(\frac{\bar{I}_t^B}{\bar{Y}_t^B} \right) - \left(\frac{\bar{I}_t^{NB}}{\bar{Y}_t^{NB}} \right)$	0.00%	1.50%	Final outcome indicator aligned with specific objective (ii). Calculated as the % of sales of beneficiary firms less those of the control firms. Source: Third Survey of Innovation in El Salvador (2017). Baseline: First Survey of Innovation in El Salvador (2012).
<p>Reduction in the % of firms facing human capital obstacles for innovation</p> $\left(\frac{\sum N(obs)^B}{N^B} \right) - \left(\frac{\sum N(obs)^{NB}}{N^{NB}} \right)$	0	-0.20%	Final outcome indicator aligned with specific objective (iii). Calculated as the % of beneficiary firms reporting human capital obstacles, less the % of firms with such problems in the control group. Source: Third Survey of Innovation in El Salvador (2017). Baseline: First Survey of Innovation in El Salvador (2012).

Outcome indicators									
	Unit of measure	Baseline 2012	Year 1	Year 2	Year 3	Year 4	Year 5	Final target (2017)	Comments
Specific objective I: Strengthening the institutional framework to support innovation									
Percentage of FONDEPRO and CONACYT investment budget committed by the end of the first quarter of the year	%	10%	10%	15%	20%	25%	30%	35%	Percentage of the investment budget committed by the end of the first quarter of the year. Source: OSICT.
Specific objective II: Increase in business innovation									
Firms that introduce product innovations (percentage-point difference between beneficiary and control firms)	%	0.00	0.00	10%	20%	30%	30%	30%	Calculated as the % difference between the fraction of beneficiary firms and the fraction of control firms. Source: Third Survey of Innovation in El Salvador.
Firms that introduce process innovations (percentage-point difference between beneficiary and control firms)	%	0.00	0.00	5%	10%	15%	15%	15%	Calculated as the % difference between the fraction of beneficiary firms and the fraction of control firms. Source: Third Survey of Innovation in El Salvador.
Firms that outsource technological services and cooperate with research and technology transfer centers (percentage-point difference between beneficiary and control firms)	%	0.00	5%	7%	8%	9%	10%	12%	Calculated as the % difference between the fraction of beneficiary firms and the fraction of control firms. Source: Third Survey of Innovation in El Salvador.
Specific objective III: Increase in human capital									
Increase in the availability of engineers and technology experts with advanced human capital, as a proportion of the stock of engineers and technology experts	%	14%	10%	10%	10%	10%	15%	20%	Calculated as the % of engineering and technology PhDs in the total stock of PhDs. Source: MINED Statistics Unit and 2017 Population Census. Baseline: 2007 Population Census.
Increase in the % of women among engineers and technology experts holding doctorates	%	30%	30%	30%	30%	30%	32%	35%	Calculated as the % women engineering and technology PhDs in the total stock of women PhDs. The “sandwich” fellowship system is expected to benefit women more. Source: MINED Statistics Unit and 2017 Population Census. Baseline: 2007 Population Census.

Publications in indexed journals in technology and engineering areas	Number	0.00	0.00	0.00	0.00	0.00	0.05	2.00	Measured at the end of the program, capturing the difference in cumulative publications during the studies by beneficiaries compared to the control group of nonbenefited applicants. In these disciplines, publishing before graduating is very common, as a condition for earning the degree. Source: WEB of Science and SCIENTI system of El Salvador.
Patent registrations in El Salvador by supported researchers	Number	0.00	0.00	0.00	0.00	0.10	0.40	0.50	Difference in the number of patent applications compared to the control group of nonsupported applicants. Source: Third Survey of Innovation in El Salvador and SCIENTI system of El Salvador.
Academic degrees (% of researchers supported who reach the level of associate Professor)	%	0.00	0.00	0.00	10%	15%	30%	50%	Difference with respect to the control group. Source: MINED Statistics Unit and SCIENTI system of El Salvador.
Academic degrees for women (% women researchers supported who reach the level of associate Professor)	%	0.00	0.00	0.00	5%	10%	20%	30%	In the sample of supported individuals who are women, the percentage who reach the level of associate professor is calculated. The same percentage is calculated for women who applied but were not supported. The difference between the two percentages is the impact indicator. Source: MINED Statistics Unit and SCIENTI system of El Salvador.

Output indicators										
	Budget	Unit of measure	Baseline	Year					End of project target	
				1	2	3	4	5		
Component I. Strengthening the institutional framework to support innovation										
I.1 Analysis reports on the capacities of institutions comprising the national innovation system (SNI)	195,000	Number of reports prepared	0	1	1	0	0	1	3	Documents analyzing installed capacities in MINEC and the SNI institutions. Design, definition of roles, regulatory framework, and implementation of the institutional model for the national ICT system. Source: OSICT.

I.2 MINEC information system for decision-making functioning	33,000	Number of systems	0	0	0	1	0	0	1	Provide MINEC with a systemized tool for information capture, measurement, and evaluation of services provided to firms. Source: OSICT.
I.3 Financial instruments to support innovation designed	75,000	Number of reports	0	0	1	0	0	0	1	Identification of best financing practices for the Development Bank of El Salvador (BANDESAL) Source: OSICT.
I.4 Business innovation surveys conducted	190,000	Number of surveys conducted	1	0	0	1	0	1	2	Repeat the innovation survey every two years and extend it to the services sector. Source: OSICT.
I.5 Technological prospecting methodology designed and training provided	216,000	Number of technical assistance courses	0	1	0	0	0	0	1	Install capacities in MINEC to undertake technological prospecting studies (including methodology and implementation of the first 6). Source: OSICT.
I.6 Intellectual property office technology platform functioning	182,000	Number of systems	0	0	0	0	0	1	1	Includes platform, training of trainers, and dissemination. Source: OSICT.
I.7 Technical standards on innovation and technological development adopted	150,000	Number of standards	0	0	0	1	1	1	3	Direct contracting of the technical standardization organization. Source: OSICT.
I.8 Training provided to institutional managers of public policies for innovation, science, and technology (ICT)	500,000	Number of managers	0	0	25	25	25	25	100	Training for institutions of the National Science, Technology, and Innovation System (SNCTI). Training of public managers. Includes public sector, universities, and specialized centers. Source: OSICT.
I.9 CONACYT strengthening plan implemented	295,000	Number of strengthening plans	0	0	1	0	0	0	1	Analysis of capacities, plan of investments in equipment and staff training, monitoring mechanisms. Procurements of bibliographic licenses, and design and implementation of a SCIENTI platform. Source: OSICT.
I.10 Salvadoran Innovation, Science, and Technology Observatory installed and functioning	1,000,000	Number of observatories in operation	0	0	1	0	0	0	1	Design, functional organization based on best practices. Design of ICT performance indicators. Platform for collection, analysis, monitoring, and evaluation of indicators. Propose elements for the design of ICT instruments and public policies. Equipment and materials. Source: OSICT.

Component II. Investment in innovation										
Subcomponent II.1: Support for business innovation										
II.1.1 Technological outreach workers trained in innovation management (innovation management program)	280,000	Number of outreach workers trained	0	10	10	20	30	30	100	Train technological outreach workers to generate innovation projects and/or technological development that stimulates continuity of the outreach work in the firm for continual project generation. Source: OSICT.
II.1.2 Firms assisted in innovation management (innovation management program)	720,000	Number of firms assisted	0	0	10	30	30	30	100	Assist firms in installing innovation management routines for six months. Source: OSICT.
II.1.3 Enterprise incubation and business acceleration system designed	150,000	Number of reports	0	0	1	0	0	0	1	Studies to generate entrepreneurship tools. Source: OSICT.
II.1.4 Angel investor networks supported	270,000	Number of investor networks	0	0	0	0	0	1	1	Support for the network executing unit. Source: OSICT.
II.1.5 Incubator networks supported	400,000	Number of performance contracts with incubators	0	0	1	1	1	1	4	Basic support for the operation of incubators through performance contracts (four incubators). Source: OSICT.
II.1.6.a Firms incubated abroad through the pilot global entrepreneurs program	200,000	Number of firms incubated	0	0	0	5	5	0	10	Pilot incubation program abroad. Source: OSICT.
II.1.6.b Firms incubated abroad through the pilot global women entrepreneurs program		Number of firms incubated	0	0	0	1	2	0	3	Pilot incubation program abroad. Source: OSICT.
II.1.7 Innovative localities requests for proposals held	150,000	Number of requests for proposals	0	1	1	1	1		5	Competitive process to boost cooperation and support among stakeholders (central government, local government, NGOs, private enterprise) with a view to achieving productive projects emanating from the localities. Source: OSICT.
Subcomponent II.2: Human capital formation for competitiveness										
II.2.1 Firms benefited by the program to attract (foreign) technicians and professionals on a temporary basis (PATP (firms supported))	500,000	Number of firms benefited	0	0	5	5	5	5	50	The PATP is a program to attract (foreign) technicians and professionals on a temporary basis, to solve problems in firms that cannot be resolved using national human resources and/or to generate specialized technical projects outsourced to (FUNDES, PROINNOVA, etc.). Source: OSICT.

II.2.2 Persons certified and confirmed in their innovation management skills	400,000	Number of innovation managers certified	0	20	20	20	20	20	100	Contribute to the standardization of project creation, development, implementation, and evaluation processes. Source: OSICT.
II.2.3.a PhDs trained in science and engineering abroad	6,900,000	Number of individuals supported for PhDs in science and engineering	0	0	10	15	20	30	75	Train 75 PhDs in science and engineering in the priority areas of the productive sector, and in strategic issues for the country as defined in the national research agenda (food security, health, environment, and energy). Source: OSICT.
II.2.3.b Women PhDs trained in science and engineering abroad		Number of women supported for PhDs in science and engineering	0	0	3	5	7	10	25	Number of women in trained by the PhD program in engineering. Source: OSICT.
II.2.4 Feasibility study undertaken for a national doctorate program	50,000	Number of feasibility plan reports	0	0	1	0	0	1	1	Design and implementation of the feasibility study for a program to strengthen national doctorate programs. Source: OSICT.
Subcomponent II.3: Demand-driven technology transfer to the private sector										
III.3.1 Strategic sector innovation programs (tourism, textiles and garment making, advanced services, machine tools and plastics, chemicals and pharmaceuticals) (projects)	1,800,000	Number of innovation projects formulated	0	0	10	10	15	15	50	Cofinancing for the generation of sector innovation agendas (produced by the sector units) and the technological linkage unit. Source: OSICT.
III.3.2 Mapping performed of the public technological support network	30,000	Number of studies conducted	0	1	0	0	0	0	1	Consultant for the design of the national technological services supply network. Source: OSICT.
III.3.3 Alliance-building sector-based innovation R&D projects (number of projects, five firms per project) approved to be co-financed	1,000,000	Number of studies financed	0	2	2	2	2	2	10	The aim is to stimulate the generation of business innovation projects based on the generation and use of sector-specific public goods, developed by the academic sector, and commissioned by public-private-academic roundtables in priority sectors. Source: OSICT.

III.3.4 International center of excellence in innovation and transfer in food and beverages in operation	1,400,000	Number of performance contract with international center of excellence	0	0	0	0	1	0	1	Promote the installation of a world-class sector-specific technological innovation and development center, with international linkage, enabling domestic firms to access international quality technological services. International request for proposals. Source: OSICT.
III.3.5 Implementation of technological and productive innovation complexes in priority areas	9,600,000	Number of complexes	0	0	1	1	0	0	2	Requests for proposals will be used to select two innovation complexes among those existing in El Salvador for strengthening. To this end, an initial exercise to evaluate institutional capacities will be carried out, a peer review, and development of a strategic investment plan (making it possible to identify requirements in terms of human resources, infrastructure, and technology transfer, etc.). Implementation of the plan will give rise to a number of targets and obligations for each complex, which will be specified in performance contracts signed between MINEC and each of the entities, establishing targets and disbursements. Source: OSICT.
III.3.7. Innovation projects for productivity targeting the priority areas selected for financing	1,855,000	Number of projects financed	7	0	10	15	15	15	55	Funding will be provided for activities such as: (i) targeted research projects; (ii) projects targeted on priority areas. These are multidisciplinary and collaborative projects between universities and research centers. Allocations will be made by competitive processes and awarded through the El Salvador International Fair (FIES) with a link to the firm. Source: OSICT.

FIDUCIARY AGREEMENTS AND REQUIREMENTS

Country: El Salvador
Project number: ES-L1058
Name: Innovation Program for Competitiveness
Executing agency: Ministry of the Economy (MINEC)
Prepared by: Santiago Castillo and Mario Castaneda (FMP/CES)

I. SUMMARY

1. As executing agency, the Ministry of the Economy (MINEC) is responsible for implementing the program through a program executing unit (PEU), which will be set up for that purpose within the Ministry. For program financial management and procurements, the PEU will be supported by the institutional financial management and procurement units. For financial management, the rules generally applicable to the public sector will be used, complemented by those of the Bank's Financial Management Policy (document OP-273-2). The Bank's policies and procedures will be used for procurement processes (documents GN-2349-9 and GN-2350-9).

II. FIDUCIARY CONTEXT OF THE EXECUTING AGENCY

1. Country financial management and procurement systems, along with their internal and external control mechanisms, are well defined in Salvadoran legislation. Under the law, no amount may be committed or paid without the corresponding budgetary appropriation approved by the Legislative Assembly. The Organic Law on State Financial Management (the AFI Law) governs public sector financial management; and an integrated financial management system (SAFI) has been adopted, which includes budget, public credit, cash management, and government accounting subsystems.
2. The AFI Law has created an Institutional Financial Unit (UFI) in each government entity, with responsibility for its financial management. This unit reports directly to the head of the institution in question. The law gives the Ministry of Finance regulatory powers, while decentralizing responsibility for financial transactions in the administrative process to executing units.
3. The UFI's fiduciary responsibilities are complemented with the respective Internal Audit Units and the Institutional Procurement Unit (UACI) in each government agency. The Law on Public Administration Procurement (LACAP) contains regulations in this field. In terms of external control, the Law of the Comptroller General of the Republic specifies that this institution is responsible for supervising the Public Treasury.

III. FIDUCIARY RISK EVALUATION AND MITIGATION MEASURES

1. The fiduciary team has estimated the total program risk, in terms of financial management and procurement, as medium. The conclusion basically reflects the institutional units' limited operational capacity and knowledge of the Bank's policies. The risks identified are summarized in the table below:

Table 1: Risks identified and proposed mitigation actions

Risks/weaknesses	Preventive/corrective action	Compliance date
Insufficient staff. This could result in errors and inefficiencies in processes for selection and procurement of goods and services or in accounting.	It is recommended to strengthen the fiduciary areas (UFI-UACI) with additional trained staff.	When the project startup workshop is held
Limited knowledge of the Bank's policies. Project execution requires procurement and finance staff with training in the Bank's operating policies and procedures.	Include ongoing training activities in the AWP's for staff involved in the administration of goods and services and financial management.	When the project has developed
Filing shortcomings. There is no procurement unit with a single filing system, to duly identify all procurement processes, and file all documentation for each of the stages of the procurement process in a single case file and place.	1. Create and maintain a single filing system in the procurement unit, where all procurement processes are duly identified and all documentation for each of the stages of the procurement process are kept in a single case file. 2. Prepare a site with appropriate furniture to conserve all files, and provide the necessary security.	When the project has developed

IV. CONSIDERATIONS FOR THE SPECIAL CONDITIONS OF THE CONTRACT

1. The following agreements and requirements should be included in the Special Conditions of the loan contract:
 - a. Submission for Bank approval of a program Operations Manual, defining procedures that are not established in existing laws and/or regulations, as well as interagency coordination mechanisms, roles, and responsibilities of entities participating in the program.

V. AGREEMENTS AND REQUIREMENTS FOR PROCUREMENT EXECUTION

1. **Procurement execution.** The fiduciary agreements and requirements in procurement processes specify provisions applicable to the execution of all procurement processes envisaged under the project.
 - a. **Procurement of works, goods, and nonconsulting services:**¹ Contracts subject to international competitive bidding (ICB) will be executed using the standard bidding documents (SBDs) issued by the Bank. Procurement processes requiring

¹ The Bank's procurement policies treat nonconsulting services similarly to goods.

- national competitive bidding (NCB) will be executed using national bidding documents that are satisfactory to the Bank.
- b. **Procurement of information technology (IT) systems:** The Bank's standard documents will be used.
 - c. **Turnkey procurement (supply and installation):** Not applicable.
 - d. **Procurement with community participation:** Not applicable.
 - e. **Selection and contracting of consultants:** Consulting service contracts will be included in the initial procurement plan and executed using the standard request for proposals (SRP) issued by the Bank.² The shortlist may consist entirely (100%) of national firms³ in the case of contracts for amounts below the threshold set by the Bank for El Salvador.
 - f. **Selection of individual consultants:** Individual consultants will be selected on the basis of their qualifications for the work in question, comparing the qualifications of at least three candidates.
 - g. **Training:** Applicable.
 - h. **Recurring expenses:** These consist of operating and maintenance expenses needed project operation throughout its useful life. **Not applicable.**
 - i. **Business practices:** All procurement practices must be undertaken in accordance with international business practices; and no procedures or practices will be imposed that violate the fundamental principles of competition, efficiency, and economy.
 - j. **Advance procurement/retroactive financing:** This project does not include planned advance procurements and/or associated contracts.
 - k. **National preference:** Not applicable.
 - l. **Other:** In the case of works procurements, before launching any bidding process, the executing agency must have possession of the corresponding land and/or rights of way, as well as the environmental permits needed to execute the project.

² *Policies for the Selection and Contracting of Consulting Services* ([GN-2350-9](#)) paragraph 3.9: Single source selection must be duly justified.

³ Participation by foreign firms is allowed.

2. Major procurement processes – Initial procurement plan

INITIAL PROCUREMENT PLAN

Description of procurement		Estimated amount (US\$)	Type of bidding process	Estimated date
WORKS	N/A			
GOODS	Equipment	70,000.00	NCB	Second half 2014
	Equipping of the Salvadoran Innovation, Science, and Technology Observatory (OSICT)	250,000.00	ICB	Second half 2014
SERVICES	Workshops to improve interagency coordination	75,000.00	NCB	First half 2013
	Innovation surveys	190,000.00	NCB	First half 2014
	Platform for collection, monitoring, and evaluation of indicators	450,000.00	ICB	Second half 2014
	Information system for decision-making	300,000.00	ICB	Second half 2014
FIRMS	Design of innovation, science, and technology performance indicators	300,000.00	QCBS	First half 2014
	Design and execution of the plan to implement the innovation coordination mechanism	120,000.00	QCBS	First half 2013
	ICT Observatory implementation plan	150,000.00	QCBS	First half 2014
	Design of the incubation system	140,000.00	QCBS	First half 2013
	Program audit	60,000.00	QCBS	Second half 2013
	Adjustment of instrument design	90,000.00	QCBS	Second half 2014
INDIVIDUAL	PEU consultants	300,000.00	NICQ	First half 2013

3. Procurement supervision

- a. The Bank will review procurement processes on an ex post basis once a year. The frequency of ex post reviews and the thresholds defined for the ex ante review of contracts are consistent with the results of the capacity assessment. These thresholds and the frequency of ex post reviews may be adjusted as part of the updates and revisions of the procurement plan, based on the executing agency's performance and progress made in adopting the corrective measures described. The applicable procedures for each type of procurement are consistent with the Policies for the Procurement of Works and Goods Financed by the Inter-American Development Bank (document GN-2349-9) and the Policies for the Selection and Contracting of Consultants Financed by the Inter-American Development Bank (document GN-2350-9). Bank supervision of the procurement of goods and works and the contracting of consulting services using program funds will be undertaken pursuant to the procurement plan, Appendix I of documents GN-2349-9 and GN-2350-9, and as stipulated in the following table:

Procurement Procedures

Investment category	Threshold (US\$)	Procurement procedure	Type of review
Works	≥ 5,000,000	ICB	All ex ante
	≥ 350,000 but < 5,000,000	NCB	Ex ante for the first 3 contracts and ex post thereafter
	< 350,000	Shopping	Ex ante for the first 3 contracts and ex post thereafter
	No limit	Direct contracting (DC)	All ex ante
Goods and nonconsulting services	≥ 250,000	ICB	All ex ante
	≥ 50,000 but < 250,000	NCB	Ex ante for the first 3 contracts and ex post thereafter
	< 50,000	Shopping	Ex ante for the first 3 contracts and ex post thereafter
	No limit	DC	All ex ante
Individual consulting services	No limit	NICQ	Ex ante for the first 3 contracts and ex post thereafter
	No limit	Single source selection (SSS)	All ex ante
Consulting services provided by consulting firms	> 200,000	Shortlist with wide ranging geographic participation	All ex ante
	< 200,000	Shortlist may comprise national consultants.	All ex ante
	No limit	SSS	All ex ante

- 4. Records and files.** A single filing system needs to be set up and maintained in the procurement units, where all procurement processes are duly identified, and all documentation for each of the stages of the procurement process are kept in a single case file. A site also needs to be arranged to safeguard all files under the necessary security conditions. The head of the UACI will be responsible for maintaining and safeguarding project files and records. Project files and reports will be prepared in the formats described in the aforementioned program Operations Manual.

VI. FINANCIAL MANAGEMENT

- 1. Programming and budget.** The country system established for budget formation and execution is used. MINEC will make arrangements each year for budgetary allocation clearly identifying the program, with sufficient budgetary appropriations to cover execution commitments each year.
- 2. Accounting and financial reports.** The country system is partially used. The project's accounting records, together with the corresponding documentary support, will be the responsibility of the UFI, through the SAFI accounting subsystem.
- 3. Disbursements and cash flow.** The country's cash management subsystem is used to manage disbursements. MINEC will maintain a special account at the Central Reserve Bank, as well as an operational account designated in a commercial bank⁴ from which payments will be made to suppliers and contractors, using the SAFI cash management subsystem. Both accounts will be used exclusively for the program. As specified in the

⁴ This system will be maintained unless the government implements a single account system for payments.

Bank's new Financial Management Policy (document OP-273-2), disbursements will be made according to liquidity needs, for which a financial plan will be prepared as the basis for advances of funds or some other disbursement modality deemed appropriate.

4. **Internal control.** The technical rules on internal control issued by the Office of the Comptroller General of the Republic will apply.⁵ An important prior control involves review by the UFI budget area of the annual programming of procurement and contracting processes using funds allocated in the respective budget. In a second stage, the budget area makes the budgetary commitment through an entry in SAFI. Before settling contracted obligations, there is a new control on the accounting record to verify that the outlay has become due. The accounting record of the payment of the obligation is made immediately after the delivery of the check or a credit made in the beneficiary account.
5. **Internal audit.** MINEC has an internal audit unit with limited resources. To the extent possible, the internal audit is expected to include the review of program execution in its annual planning.
6. **External control and reports.** External control of the program will be contracted to a firm of independent auditors acceptable to the Bank, selected by a competitive process among tier I firms, pursuant to the guidelines set out in the Bank's Financial Management Policy and in the document on external audits of projects financed by the Bank (AF-200). The terms of reference will be wide-ranging and will be agreed upon previously with the Bank. The Bank will review this contracting process on an ex ante basis. According to the new Financial Management Policy (document OP-273-2), audited financial statements will be filed annually with the Bank within 120 days following the end of the executing agency's fiscal year, and the last audited financial statement will be submitted within 120 days following the last project disbursement.
7. **Supervision.** Financial monitoring of the program will use the (unaudited) financial reports produced by the institutional application (SAFI); and the necessary breakdown will be detailed in the corresponding notes and supplementary financial information. These reports will initially be required quarterly, although the frequency could be adjusted later. These quarterly reports should be filed no later than 45 days after the end of each calendar quarter. The explanatory notes of financial information will be designed to be consistent with the Bank's financial policy and tools. These reports will show progress in executing the activities specified in the multiyear project execution plan (PEP).
8. During the first six months of execution, onsite reviews will be made of the financial information submitted, comparing this with the planning. Fiduciary risks will be reassessed, and it will be decided whether additional onsite supervision is necessary, rather than desk reviews

⁵ Legislation in El Salvador makes civil servants responsible for the performance of their duties, such that cases of noncompliance can give rise to legal action against the civil servant. Title III "civil service accountability," Articles 52-61 of the Law on the Office of Controller General of the Republic.

9. **Execution arrangements.** The PEU will make sure that the annual operational planning documents and periodic status reports are prepared and kept up-to-date, as well as estimations of funds to prepare disbursement plans and the updating of program management and monitoring instruments (PEP and procurement plan).
10. **Program Operations Manual.** The considerations contained in these fiduciary agreements and requirements will be set out in detail in a program Operations Manual, which will require the approval of the undersigned fiduciary specialists.

DOCUMENT OF THE INTER-AMERICAN DEVELOPMENT BANK

PROPOSED RESOLUTION DE-___/12

El Salvador. Loan ___/OC-ES to the Republic of El Salvador
Innovation Program for Competitiveness

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the Republic of El Salvador, as Borrower, for the purpose of granting it a financing to cooperate in the execution of an innovation program for competitiveness. Such financing will be for the amount of up to US\$30,000,000 from the Ordinary Capital resources of the Bank, and will be subject to the Financial Terms and Conditions and the Special Contractual Conditions of the Project Summary of the Loan Proposal.

(Adopted on ____ 2012)

LEG/SGO/CID/IDBDOCS#37132337
ES-L1058