

DOCUMENTO DE TRABAJO N° 353

**SCIENCE, TECHNOLOGY AND INNOVATION IN  
PERU 2000-2012: THE CASE OF SERVICES**

**Mario D. Tello**

DEPARTAMENTO  
DE **ECONOMÍA**



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<http://www.pucp.edu.pe/departamento/economia/images/documentos/DDD353.pdf>

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Science, Technology and Innovation in Peru, 2000-2012: The Case of  
Services

Lima, Departamento de Economía, 2013  
(Documento de Trabajo 353)

PALABRAS CLAVE: Innovation, Labor Productivity, Science,  
Technology and Innovation Policy

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Hecho el Depósito Legal en la Biblioteca Nacional del Perú N° 2013-06079.  
ISSN 2079-8466 (Impresa)  
ISSN 2079-8474 (En línea)

Impreso en Cartolán Editora y Comercializadora E.I.R.L.  
Pasaje Atlántida 113, Lima 1, Perú.  
Tiraje: 100 ejemplares

# **SCIENCE, TECHNOLOGY AND INNOVATION POLICY IN PERU, 2000-2012: THE CASE OF SERVICES**

Mario D. Tello

## **RESUMEN**

Este trabajo resume la política en Ciencia, Tecnología e Innovación (CTI) en el Perú, particularmente en el sector de servicios. Dicha política no ha sido prioritaria para los gobiernos de las últimas dos décadas. Adicionalmente, los indicadores CTI están entre los más bajos de América Latina (AL). El sistema nacional CTI (SINACYIT) es desarticulado y basado en programas que promueven actividades de innovación en los sectores primarios y manufacturados sin ninguna estrategia específica de innovación que la sustente. En el caso de servicios, la política fue orientada en proveer infraestructuras para las herramientas de tecnologías de información y comunicaciones (TIC) bajos los principios de acceso universal, asequibilidad, fomento de la competencia privada, y convergencia tecnológica y de servicios en concordancia con la evolución y desarrollo de las tecnologías de información y comunicación. Estos hechos conjuntamente con las magnitudes inadecuadas de los indicadores CTI sugieren la necesidad de replantear la estrategia de la política STI y de sus arreglos institucionales.

Código JEL: O14; O54

Palabras clave: Innovación, productividad laboral, ciencia, tecnología e innovación.

## **ABSTRACT**

This paper summarizes the science, technology and innovation (STI) policy in Peru focusing in the services sector. Consistent with some other survey studies, STI policy in Peru has not been a priority for the different government administrations of the last two decades. Further, STI indicators are among the lowest ones of Latin American Countries (LAC). The national STI system (SINACYIT) has been built in a disarticulated way and STI policy was concentrated on some particular programs and funds oriented basically to foster firms' innovation activities of primary and manufactured sectors without

a specific and previously designed innovation strategy. In the case of services, policy was oriented in providing information and communication technology (ICT) infrastructure under the principles of universal access, affordability, fostering private competition, technological convergence in concordance with the evolution and development of ICT. These facts together with the inadequate figures of STI indicators suggest the need to rethink STI policy strategy and its institutional arrangement.

JEL Code: O14; O54

Key word: Innovation, Labor Productivity, Science, Technology and Innovation Policy.

# SCIENCE, TECHNOLOGY AND INNOVATION POLICY IN PERU, 2000-2012: THE CASE OF SERVICES

Mario D. Tello<sup>1</sup>

## INTRODUCTION

As many countries, services are one of the most important activities in terms of output and employment generation. In the case of Peru, the average share of output of the services sector<sup>2</sup> out of GDP in Peru in the last decade has been about 40% (Banco Central de Reserva del Peru, 2012) and the estimated employment share out of total occupied economic active population about 32%, wherein 77% of this employment comes from the informal sector<sup>3</sup>.

Although only recently Latin American Countries (LAC) realize the importance of the services sector not only as source of output and employment as fundamentally as a source of innovation and productivity (e.g., Tacsir *et al*, 2011), most developed countries has found the role of services in the sustainability of economic growth through increases in productivity in this sector (e.g., Gallouj & Weinstein, 1997; Gallouj, 2002; Evangelista & Savona, 2003; Cainelli *et al*, 2006; Crespi *et al* 2006; Gallouj & Savona, 2009; Gallouj & Djellal, 2010; European Commission, 2010).

This paper analyzes Peruvian policy on science, technology and innovation, focusing in interventions on the services sector. For that purpose, this work is

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<sup>1</sup> This paper is based upon the IADB-CINVE-IDRC project on 'Innovation and Productivity'. I sincerely thanks to Francisco Sagasti, Juana Kuramoto and Fernando Villarán who kindly responded a designed survey for the present paper. My thanks also are extended to Viviana Cruzado who help me in the STI policy section and Carla Solis for its excellent research assistance.

<sup>2</sup> This sector include: electricity and water, financial and insurance services, government services, households and enterprises services, transport, telecommunications, private health and education services and hotels and restaurants.

<sup>3</sup> Author's estimation. According with the World Bank (2012) figures, the average share of the services sector out of GDP for period 2000-2010 has been 59% and employment share for the same period (without 2010) 77%. The differences in the figures is due that services data of the World Bank (2012) include wholesale and retail trade and employment is defined over the formal sector. Author's estimations for 2009 (Tello, 2011a) indicates that close to 80% of the labor force belongs to the informal sector.

divided in sections. Section 1 describes briefly the country STI indicators compared with others in the LA region. Section 2 describes the STI indicators at the level of firms for the year 2004 using data of CONCYTEC-INEI (2005). Section 3 describes STI policy and Section 4 that in services and report the 'opinion' of three Peruvian experts on the subject through a small survey reported in the annex. Last Section 5 summarizes the main conclusions drawn upon the previous sections. At the end a list of references is presented and a series of tables that provides more information on STI policy of Peru.

## **1. SCIENCE, TECHNOLOGY AND INNOVATION INDICATORS OF PERUVIAN ECONOMY**

*"This is the true and crucial dilemma that Peru faces, in the middle of the renowned economic success [of high rate of growth of per capita GDP]. Although it requires maintaining the macroeconomic and finance equilibrium and the same time it urges to advance in science, technology and innovation, in other words, in the total factor productivity of the economy. Without national prioritization of STI activities, it would not be possible to maintain the high rates of economic growth in the long run and risking the advances achieved in the social areas".* Comisión Consultiva para la Ciencia, Tecnología e Innovación (CTI), 2012. Enacted on RS. 038-2011-ED

Consistent with the previous statement, the figures of Table 1<sup>4</sup> point out that Peru has one of the lowest levels of 'innovation' as measured by the WEF (1998-2011)<sup>5</sup> within Latin American Countries. Thus whereas it invest about 0.1% out of the GDP in Research and Investment activities (R&D), United states invest close to 3% out of the GDP. The low performance of innovation activities can be attributed to the low levels of: i) quality of the scientific institutions, ii) the degree of cooperation among the STI entities; iii) technological capability, and iv) technological sophistication.

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<sup>4</sup> Most of the innovation indices have been transformed to a scale from zero to 100%  $(=(x-\text{Min}) * 100 / (\text{Max}-\text{Min}))$ , wherein x is the score of the index, Min is the minimum value of the index and Max the its maximum value.

<sup>5</sup> This index includes the following aspects: the capacity for innovation, the quality of scientific research institutions, company spending on R&D, university-industry collaboration in R&D, Government procurement of advanced technology products, availability of scientists and engineers, utility patents\*, and Intellectual property protection.

Figures of Tables 2, 3 and 4 present a set of STI indicators at the level of the firm. The data source used for these tables is the National Survey of Science, Technology and technological innovation (ENCYT-04) of 2004 implemented by CONCYTEC and INEI between October and November of 2005<sup>6</sup>. ENCYT-04 provides information on science, technology and technological innovation activities for 4898 firms from 44 sectors of the ISIC classification (Revision 3).

From this survey, a sample of 3888 firms from services and manufacturing sectors for comparison purpose are drawn upon. Services firms are further divided into two ISIC groups: knowledge intensity business services (Kibs) and traditional services. The ISIC branches that belong to this group are listed in the tables. Analogously, manufacturing firms are divided into two groups: high-tech and low-tech manufactures. The ISIC branches belonging to these two groups are also listed in the tables.

Real value added<sup>7</sup> (at prices of 1994) for the whole sample represented 31.90% of total value added of both services and manufacturing sectors of the year 2004. Firms' real value added in services represented 33.33% and 27.40% for manufactures<sup>8</sup>. On the other hand, employment data of these firms represented 18.23% of the total formal economic active population of these two sectors of the same year: 15.95% corresponded to firms in services branches and 24.17% for firms in manufactures<sup>9</sup>.

The main features of the set of STI indicators obtained from ENCYT-04 and described in Tables 3, 4 and 5 are the following:

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<sup>6</sup> Another survey of the same features of ENCYT 2004 has been recently implemented by the same institutions gathering data for 2009 and only manufacturing firms.

<sup>7</sup> Firms' value added comes from sales data. These are obtained using the average ratio of value added over value of production of the respective ISIC sector of the input output matrix of 1994 and 2007 provided preliminarily by the INEI.

<sup>8</sup> For the four ISIC groups the shares of the real value of the firms out of the respective real value of the universe were for Kibs 21.19%, Traditional services, 43.79%, High-Tech 22.44% and Low-Tech 27.37%. In the case of formal employment the figures are Kibs 12.53%, Traditional Services 18.87%, Low Tech manufactures 24.25%, High-Tech manufactures 23.56%.

<sup>9</sup> In the case of formal employment the figures are Kibs 12.53%, Traditional Services 18.87%, Low Tech manufactures 24.25%, High-Tech manufactures 23.56%.



i) From firms STI output (Table 3), the share of the number of firms that innovate (either technological and non-technological innovation or both) was greater for manufacturing firms than for services firms: 38.2% and 28.1% respectively. Shares for both manufacturing branches were slightly higher than firms from both services branches. On the other hand, the respective share for firms with more than 10% of the total capital foreign owned in both sectors was greater than the respective share of national owned firms. Regarding the distinction between technological innovation (TI) and non-technological one (NTI), services firms did have a greater share of NTI than TI. The opposite shares had firms from the manufacturing branches.

ii) From firms STI inputs (Table 4), firms' investment intensity ratio (measured as the share of expenditure on STI activities out the total sales) was slightly higher for services (i.e., 4.9%) than for manufacturing (4.4%). Kibs and the high-tech manufacturing had the highest ratios (9.4% and 5% respectively). Further, national firms STI investment ratios were higher than foreign firms in both manufacturing and services sectors. On the other hand, and consistent with the higher share of manufactured innovative firms, the share of firms that performed in continuous basis in manufacturing (i.e., 14.8%) was higher than in services (9.6%). More than 50% of the total STI expenditures in both sectors were spent in other STI activities related to training, consultancy services, engineering and industrial design, software and technology services.

iii) From policy relevant STI indicators (Table 5), figures show that in general firms did not collaborated with other entities for innovation purposes. In any case, the share of manufacturing firms that did collaborated (i.e., 6.1%) was higher than the respective share of services firms (3.7%). The same low shares applies for firms' international exposure having also manufacturing firms a higher share (i.e., 4.8%) than services firms (1.6%). Similar figures are obtained for the share of firms that did have patents. On the other hand, the share of foreign firms that had collaboration, patents application and international exposure was higher than domestic firms for both sectors. Finally, the share of firms that received public financial support for innovation

was higher for manufacturing (i.e., 7.9%) than for services 2.2%. Unexpectedly, the share of foreign firms that did receive this support was greater than the respective share of domestic firms in both sectors.

Summing up, the 2004 figures on firms STI activities are consistent with the low STI investment indicators at the national level and priority of STI economic policy of shown in the former section. What is striking is that despite that a third of the interviewed firms of the sample that did perform STI activities, their average amount spent on these activities per worker in both sectors were US 2353 dollars of 1994 per worker (less than 6.5 dollars per day/worker). The set of indicators at firm level is also consistent with the following hypotheses:

**H1:** Services firms do innovate and it seems they do it in a higher proportion in non-technological (i.e., innovation is organization, marketing and trade) than in technological innovation (i.e., en product or processes). Contrarily, the share of manufacturing firms that innovate in technological innovation is higher than the respective share of non-technological innovation.

**H2:** Most of firms in both sectors innovate in isolated way without collaboration with other entities and using their own resources.

**H3:** By 2004, public financial support was mainly concentrated on manufacturing firms and the share of services firms that received this support was rather low (2.16%). Further and surprisingly, this support was mainly oriented to foreign owned firms from both sectors.

**Table 1**  
**STI and ICT indicators, 1998-2011**

<b>Countries</b>	<b>Year</b>	<b>Innovation index<sup>1</sup></b>	<b>R&amp;D/GDP<sup>2</sup></b>	<b>Private R&amp;D<sup>2</sup></b>	<b>Quality of scientific institutions<sup>2</sup></b>	<b>Cooperation index<sup>2</sup></b>	<b>Index of technological sophistication<sup>2</sup></b>	<b>Index of technological capability<sup>1</sup></b>	<b>Technological absorption (firms)<sup>2</sup></b>	<b>Telephone lines (x100 inhabs.)</b>	<b>Mobiles (x100 inhabs.)</b>	<b>PC (x 100 inhabs.)</b>	<b>Internet users (x 100 inhabs.)</b>
Peru	1998	n.d	0.1	21.2	24.7	30.7	26.2	n.d	34.5	6.2	3	3	1.2
	2000	27.0	0.1	23.3	25	33.3	28.3	45.2	63.3	6.6	4.9	4	3.1
	2004	19.7	0.2	26.7	30	21.7	38.3	40.8	46.7	7.5	14.9	8.4	11.7
	2009	28.5	0.1	28.3	31.7	33.3	39.8	39.8	58.3	10	72.7	10.1	24.7
	2011	28.3	0.1	26.7	31.7	36.7	n.a.	n.a.	65.0	10.9	100.1	n.a.	34.3
Chile	1998	n.d	0.5	31.8	39.3	45	53.5	n.a	60.7	20.3	6.4	6.2	1.7
	2000	40.2	0.5	28.3	45	36.7	55	57.5	68.3	21.4	22.1	9.2	16.5
	2004	29.5	0.7	36.7	45	36.7	66.7	59.2	68.3	20.6	57.4	13.3	19.4
	2009	40.2	0.7	36.7	48.3	48.3	54.7	54.7	75	21	88.3	26	32.6
	2011	33.3	0.4	35.0	50.0	51.7	n.a.	n.a.	73.3	20.2	116.0	n.a.	45.0
Brazil	1998	n.d	0.7	23.3	34.3	41.3	35.3	n.a	57.7	11.8	4.4	3	1.5
	2000	27.7	0.9	31.7	40	48.3	40	55.5	73.3	17.8	13.3	4.9	2.9
	2004	20.7	0.8	45	55	46.7	55	54	68.3	21.5	35.7	13.1	19.1
	2009	42.0	1	46.7	53.3	51.7	51	51	73.3	21.4	78.5	29.2	35.5
	2011	46.7	1.1	46.7	51.7	53.3	n.a.	n.a.	70.0	21.6	104.1	n.a.	40.7
Mexico	1998	n.d	0.4	26.5	26	37.8	28	n.a	57.7	10.4	3.5	3.7	1.3
	2000	26.8	0.4	25	38.3	41.7	40	61.7	58.3	12.6	14.4	5.8	5.2
	2004	20.0	0.5	33.3	45	35	50	52.2	53.3	17.7	37.7	11	17
	2009	33.2	0.5	31.7	45	41.7	42.2	42.2	60	19.3	70.8	14.4	21.9
	2011	33.3	0.4	33.3	50.0	50.0	n.a.	n.a.	60.0	17.5	80.6	n.a.	31.1
Argentina	1998	n.d	0.4	25	41.8	31.7	34.3	n.a	56	19.7	7.4	5.3	0.8
	2000	43.5	0.4	26.7	38.3	40	35	55.5	58.3	21.4	17.6	6.9	7.1
	2004	30.8	0.4	30	38.3	23.3	48.3	47.8	50	22.8	35.2	8.3	16
	2009	32.5	0.5	31.7	46.7	41.7	42.3	42.3	58.3	24.2	116.6	9	28.1
	2011	31.7	0.5	33.3	53.3	48.3	n.a.	n.a.	58.3	24.7	141.8	n.a.	36.0
Bolivia	1998	n.d	0.3	15.8	21.8	23.2	14	n.a	47	5.7	3	0.8	0.6
	2000	25.0	0.3	16.7	11.7	40	11.7	42	33.3	6.1	7	1.7	1.4
	2004	21.5	0.3	20	25	20	21.7	30.2	31.7	6.9	20	2.3	4.4
	2009	20.5	n.d	20	25	25	22.3	22.3	38.3	7.1	49.9	2.4	10.5
	2011	33.3	0.3	33.3	33.3	35.0	n.a.	n.a.	43.3	8.5	72.3	n.a.	20.0
Costa Rica	1998	n.d	0.3	40.8	58.3	46.3	51	n.a	65.7	19.8	2.9	8	2.7
	2000	41.8	0.4	31.7	56.7	41.7	51.7	66.2	70	22.9	5.4	15.3	5.8
	2004	19.3	0.4	43.3	53.3	35	55	49.5	61.7	31.6	21.7	21.9	20.8
	2009	44.7	0.4	46.7	60	55	45.3	45.3	68.3	31.8	41.7	31.2	33.6

**Table 1**  
**STI and ICT indicators, 1998-2011**

Countries	Year	Innovation index <sup>1</sup>	R&D/GDP <sup>2</sup>	Private R&D <sup>2</sup>	Quality of scientific institutions <sup>2</sup>	Cooperation index <sup>2</sup>	Index of technological sophistication <sup>2</sup>	Index of technological capability <sup>1</sup>	Technological absorption (firms) <sup>2</sup>	Telephone lines (x100 inhabs.)	Mobiles (x100 inhabs.)	PC (x 100 inhabs.)	Internet users (x 100 inhabs.)
	2011	40.0	0.4	43.3	60.0	55.0	n.a.	n.a.	66.7	31.8	65.1	n.a.	36.5
	1998	n.d	2.6	75.3	86.5	76.3	92.5	n.d	35.2	65.2	25.1	45	30.7
	2000	91.7	2.7	75	95	56.7	95	90.3	91.7	68.2	38.8	57.1	43.9
	2004	90.2	2.6	80	88.3	73.3	91.7	87.3	88.3	60.7	63.1	76.4	66.3
United States	2009	79.5	2.7	76.7	86.7	81.7	76.8	76.8	86.7	52.6	89	80.6	72.4
	2011	70.0	2.8	71.7	80.0	78.3	n.a.	n.a.	81.7	48.9	90.2	n.a.	74.2

**Source:** author's own elaboration based on WEF (1998 – 2011) and UNESCO (2009). 1 Data reported for 2000 correspond to 2001; 2 For Bolivia and Costa Rica, data for 1998 corresponds to 1999; 3 Data from UNESCO (2009). Data for 1998 in Brazil corresponds to 1996 and the most recent correspond to 2005. Most recent data for Bolivia corresponds to 2002. The latest data in Chile, México, Argentina, Costa Rica and United States corresponds to 2007; 4 Most recent data corresponds to 2007.

**Table 2: STI Output Indicators at Firm Level, Peru 2004**

ISIC DESCRIPTION	CIU	N	Technological Innovation				Non-Technological Innovation				Tech and Non-Tech Inn <sup>6</sup>	
			Product	Process	Inn <sup>1</sup>	In-house Tech-Inn <sup>2</sup>	New <sup>3</sup>	Org	Mark	Non-Tech Inn <sup>4</sup>		Any Inn <sup>5</sup>
<b>Services</b>		<b>2732</b>	<b>12.77</b>	<b>13.07</b>	<b>17.97</b>	<b>9.99</b>	<b>4.65</b>	<b>19.62</b>	<b>14.35</b>	<b>23.17</b>	<b>28.07</b>	<b>13.07</b>
<b>KIBS</b>												
Land transport	60	252	7.14	10.32	13.10	6.75	2.38	15.08	11.90	18.25	22.22	9.13
Water transport	61	11	9.09	0.00	9.09	9.09	0.00	18.18	9.09	18.18	18.18	9.09
Air transport	62	19	21.05	21.05	26.32	15.79	10.53	15.79	10.53	21.05	31.58	15.79
Auxiliary transport activities	63	101	19.80	12.87	25.74	14.85	7.92	27.72	15.84	33.66	41.58	17.82
Post and telecommunications	64	34	20.59	17.65	26.47	20.59	11.76	14.71	17.65	23.53	32.35	17.65
Financial intermediation	65	43	44.19	32.56	48.84	37.21	4.65	32.56	16.28	32.56	51.16	30.23
Insurance and pension funding	66	26	34.62	19.23	38.46	30.77	11.54	38.46	23.08	38.46	50.00	26.92
Auxiliary activities to fin. inter.	67	15	13.33	6.67	20.00	13.33	6.67	6.67	6.67	13.33	26.67	6.67
Computer and related activities	72	49	16.33	22.45	28.57	14.29	6.12	18.37	10.20	20.41	32.65	16.33
Research and development	73	17	52.94	41.18	58.82	23.53	29.41	41.18	23.53	41.18	64.71	35.29
Business activities (excluded 749)	74	171	17.54	18.71	22.22	14.62	7.60	20.47	12.28	21.05	28.07	15.20
<b>Subtotal</b>		<b>738</b>	<b>17.21</b>	<b>16.12</b>	<b>23.04</b>	<b>14.23</b>	<b>6.37</b>	<b>20.60</b>	<b>13.41</b>	<b>23.44</b>	<b>31.30</b>	<b>15.18</b>
<b>Traditional Services</b>												
Recycling	37	4	25.00	25.00	25.00	0.00	25.00	0.00	0.00	0.00	25.00	0.00
Electricity	40	38	23.68	18.42	28.95	13.16	2.63	31.58	13.16	31.58	39.47	21.05
Water	41	31	22.58	25.81	32.26	16.13	12.90	35.48	16.13	35.48	41.94	25.81
motor vehicles	50	305	6.23	7.54	9.84	5.57	1.64	13.77	10.16	15.74	19.34	6.23

**Table 2: STI Output Indicators at Firm Level, Peru 2004**

ISIC DESCRIPTION	Technological Innovation							Non-Technological Innovation				Tech and Non-Tech Inn <sup>6</sup>
	CIU	N	Product	Process	Inn <sup>1</sup>	In-house Tech-Inn <sup>2</sup>	New <sup>3</sup>	Org	Mark	Non-Tech Inn <sup>4</sup>	Any Inn <sup>5</sup>	
Wholesale trade	51	686	10.79	11.66	15.60	8.31	3.06	20.70	17.78	25.66	28.43	12.83
Retail trade	52	316	10.76	12.03	15.19	8.54	4.43	19.94	18.04	25.00	27.53	12.66
Hotels and restaurants	55	169	12.43	15.38	19.53	7.69	8.28	17.75	16.57	23.67	28.40	14.79
Real estate	70	71	8.45	7.04	11.27	7.04	1.41	11.27	4.23	14.08	19.72	5.63
Renting of machinery	71	27	3.70	3.70	7.41	3.70	0.00	14.81	7.41	14.81	14.81	7.41
Other business activities	749	158	7.59	10.13	12.66	5.70	3.80	15.19	8.23	16.46	20.89	8.23
Health and social work	85	44	31.82	34.09	43.18	22.73	11.36	36.36	25.00	38.64	47.73	34.09
Sewage and refuse disposal	90	10	10.00	0.00	10.00	0.00	0.00	30.00	20.00	40.00	50.00	0.00
Membership organizations	91	21	23.81	14.29	23.81	19.05	9.52	23.81	14.29	28.57	28.57	23.81
Recreational activities	92	39	25.64	17.95	35.90	23.08	5.13	28.21	10.26	30.77	41.03	25.64
Other services	93	75	10.67	10.67	16.00	8.00	5.33	17.33	9.33	20.00	25.33	10.67
<b>Subtotal</b>		<b>1994</b>	<b>11.13</b>	<b>11.94</b>	<b>16.10</b>	<b>8.43</b>	<b>4.01</b>	<b>19.26</b>	<b>14.69</b>	<b>23.07</b>	<b>26.88</b>	<b>12.29</b>
<b>National</b>		<b>2592</b>	11.54	12.08	16.55	8.91	4.44	19.06	14.08	22.61	26.85	12.31
<b>Foreign</b>		<b>140</b>	35.71	31.43	44.29	30.00	8.57	30.00	19.29	33.57	50.71	27.14
<b>Manufactures</b>		<b>1156</b>	<b>24.57</b>	<b>25.95</b>	<b>32.87</b>	<b>19.64</b>	<b>9.43</b>	<b>22.49</b>	<b>15.22</b>	<b>25.78</b>	<b>38.15</b>	<b>20.50</b>
			<b>Low Tech Manuf.</b>									
Food products, beverages	15	288	26.04	23.26	31.60	19.44	13.19	19.79	14.24	23.61	36.46	18.75
Tobacco products	16	1	100.00	100.00	100.00	100.00	0.00	0.00	0.00	0.00	100.00	0.00
Textiles	17	65	26.15	32.31	36.92	20.00	9.23	30.77	20.00	33.85	41.54	29.23
Wearing apparel	18	60	13.33	20.00	23.33	10.00	3.33	21.67	11.67	23.33	31.67	15.00

**Table 2: STI Output Indicators at Firm Level, Peru 2004**

ISIC DESCRIPTION	CIU	N	Technological Innovation					Non-Technological Innovation			Any Inn <sup>5</sup>	Tech and Non-Tech Inn <sup>6</sup>
			Product	Process	Inn <sup>1</sup>	In-house Tech-Inn <sup>2</sup>	New <sup>3</sup>	Org	Mark	Non-Tech Inn <sup>4</sup>		
Leather and footwear	19	22	13.64	22.73	27.27	9.09	4.55	13.64	13.64	18.18	31.82	13.64
Wood	20	53	16.98	16.98	20.75	15.09	3.77	18.87	11.32	18.87	24.53	15.09
Paper	21	16	37.50	50.00	50.00	37.50	6.25	25.00	12.50	25.00	50.00	25.00
Recorded media	22	101	18.81	21.78	26.73	16.83	5.94	19.80	17.82	26.73	30.69	22.77
Refined petroleum	23	1	100.00	0.00	100.00	100.00	0.00	100.00	0.00	100.00	100.00	100.00
Rubber	25	87	28.74	29.89	36.78	25.29	6.90	21.84	10.34	22.99	42.53	17.24
Non-metallic mineral products	26	57	24.56	28.07	35.09	14.04	12.28	14.04	12.28	17.54	40.35	12.28
Basic metals	27	36	33.33	33.33	44.44	19.44	13.89	19.44	13.89	25.00	50.00	19.44
Other transport equipment	35	118	19.49	20.34	27.12	16.10	6.78	16.10	12.71	21.19	31.36	16.95
Fabricated metal products	28	7	28.57	14.29	28.57	28.57	28.57	28.57	14.29	28.57	28.57	28.57
Furniture	36	42	11.90	19.05	21.43	7.14	2.38	21.43	4.76	21.43	28.57	14.29
<b>Subtotal</b>		<b>954</b>	<b>23.06</b>	<b>24.32</b>	<b>30.82</b>	<b>17.92</b>	<b>8.91</b>	<b>20.13</b>	<b>13.52</b>	<b>23.58</b>	<b>35.74</b>	<b>18.66</b>
<b>High Tech. Manuf.</b>												
Chemicals	24	103	32.04	39.81	47.57	27.18	12.62	34.95	28.16	37.86	55.34	30.10
Machinery and equipment	29	45	22.22	20.00	26.67	22.22	8.89	26.67	13.33	26.67	28.89	24.44
Electrical machinery	31	29	20.69	20.69	31.03	17.24	3.45	24.14	13.79	27.59	37.93	20.69
Communication equipment	32	1	100.00	0.00	100.00	100.00	0.00	100.00	0.00	100.00	100.00	100.00
Medical, precision instruments	33	3	66.67	66.67	66.67	66.67	33.33	100.00	66.67	100.00	100.00	66.67
Vehicles	34	19	52.63	42.11	57.89	42.11	21.05	36.84	21.05	42.11	68.42	31.58
Other transport	35	2	100.00	100.00	100.00	100.00	50.00	100.00	100.00	100.00	100.00	100.00

**Table 2: STI Output Indicators at Firm Level, Peru 2004**

ISIC DESCRIPTION	CIU	N	Technological Innovation				Non-Technological Innovation				Tech and Non-Tech Inn <sup>6</sup>	
			Product	Process	Inn <sup>1</sup>	In-house Tech-Inn <sup>2</sup>	New <sup>3</sup>	Org	Mark	Non-Tech Inn <sup>4</sup>		Any Inn <sup>5</sup>
<b>Subtotal</b>		<b>202</b>	<b>31.68</b>	<b>33.66</b>	<b>42.57</b>	<b>27.72</b>	<b>11.88</b>	<b>33.66</b>	<b>23.27</b>	<b>36.14</b>	<b>49.50</b>	<b>29.21</b>
<b>National</b>		<b>1196</b>	25.59	26.25	34.45	20.32	10.03	22.49	14.97	25.75	39.88	20.32
<b>Foreign</b>		<b>104</b>	49.04	49.04	59.62	40.38	15.38	43.27	33.65	52.88	68.27	44.23

**Source:** CONCYTEC-INEI (2005). Author's own work. <sup>1</sup> Product or process innovation. <sup>2</sup> This firms produced innovation of any kind (product, process, marketing and organization), with their own funds and without any collaboration from other entities <sup>3</sup> New to Market product innovation. <sup>4</sup> Organization or marketing innovation. <sup>5</sup> Technological or non-technological innovation. <sup>6</sup> Technological and non-technological innovation.



Table 3: STI Input Indicators at Firm Level, Peru 2004

ISIC DESCRIPTION	CIU	N	Inputs					
			Expenditure on STI <sup>7</sup>	R&D <sup>8</sup>	STI Capital Goods <sup>9</sup>	Other STI Activities <sup>10</sup>	Firms that performed R&D	Firms that performed R&D on a continuous basis
<b>Services</b>		<b>2732</b>	<b>4.87</b>	<b>2.56</b>	<b>19.93</b>	<b>77.53</b>	<b>5.29</b>	<b>9.55</b>
			<b>KIBS</b>					
Land transport	60	252	5.83	0.17	31.26	68.57	1.75	8.33
Water transport	61	11	1.00	0.00	0.00	100.00	0.00	0.00
Air transport	62	19	2.30	10.47	13.31	76.22	14.29	5.26
Auxiliary transport activities	63	101	4.51	0.00	12.89	87.11	0.00	10.89
Post and telecommunications	64	34	2.81	0.00	9.71	90.29	0.00	5.88
Financial intermediation	65	43	3.06	0.62	16.96	83.12	4.17	20.93
Insurance and pension fund.	66	26	1.79	0.00	0.00	100.00	0.00	23.08
Auxiliary activities to f-int.	67	15	9.22	10.65	0.00	89.35	50.00	6.67
Computer and related act.	72	49	11.18	5.57	13.79	80.63	11.11	16.33
Research and development	73	17	66.66	30.31	3.23	66.46	63.64	23.53
Business act. (excluded 749)	74	171	12.11	4.48	16.61	78.91	5.88	11.70
<b>Subtotal</b>		<b>738</b>	<b>9.40</b>	<b>3.34</b>	<b>16.92</b>	<b>79.80</b>	<b>7.08</b>	<b>11.25</b>
			<b>Traditional Services</b>					
Recycling	37	4	57.02	100.00	0.00	0.00	100.00	0.00
Electricity	40	38	4.32	10.07	9.09	80.83	26.67	10.53
Water	41	31	2.17	0.00	28.90	71.10	0.00	6.45
motor vehicles	50	305	1.76	0.81	24.53	74.66	1.59	4.59
Wholesale trade	51	686	1.66	2.92	18.26	78.82	5.45	10.79
Retail trade	52	316	2.05	0.42	20.08	79.50	1.14	6.96
Hotels and restaurants	55	169	4.15	1.68	37.70	60.62	6.12	10.65
Real estate	70	71	8.70	0.00	11.77	88.23	0.00	7.04
Renting of machinery	71	27	10.79	0.00	71.55	28.45	0.00	3.70
Other business activities	749	158	1.66	2.42	14.00	83.57	2.94	9.49
Health and social work	85	44	8.21	1.87	18.85	79.28	9.52	18.18
Sewage and refuse disposal	90	10	0.72	0.00	2.82	97.18	0.00	10.00
Membership organizations	91	21	3.03	14.29	18.31	67.40	14.29	14.29
Recreational activities	92	39	7.15	0.00	35.51	64.49	0.00	15.38
Other services	93	75	4.69	0.00	18.58	81.42	0.00	6.67
<b>Subtotal</b>		<b>1994</b>	<b>2.91</b>	<b>2.23</b>	<b>21.23</b>	<b>76.54</b>	<b>4.51</b>	<b>8.93</b>
<b>National</b>		<b>2592</b>	5.16	2.52	20.83	76.68	5.14	9.07
<b>Foreign</b>		<b>140</b>	2.06	3.03	11.21	85.76	6.76	18.57
<b>Manufactures</b>			<b>4.35</b>	<b>10.20</b>	<b>28.82</b>	<b>61.04</b>	<b>18.32</b>	<b>14</b>
			<b>Low Tech Manuf.</b>					
Food products, beverages	15	288	3.59	10.26	24.30	65.44	17.43	11.11
Tobacco products	16	1	6.64	0.00	75.00	25.00	0.00	0.00
Textiles	17	65	4.89	2.03	37.96	60.01	3.33	20.00
Wearing apparel	18	60	3.03	0.16	37.76	62.08	4.55	10.00
Leather and footwear	19	22	1.42	0.00	40.08	59.92	0.00	18.18
Wood	20	53	7.21	0.00	31.50	68.50	0.00	1.89
Paper	21	16	2.43	23.62	38.76	37.62	37.50	31.25
Recorded media	22	101	4.58	3.57	43.92	52.51	6.45	16.83
Refined petroleum	23	1	5.33	0.00	40.23	59.77	0.00	0.00
Rubber	25	87	3.38	11.92	39.59	48.50	17.95	12.64
Non-metallic mineral products	26	57	5.77	24.15	29.22	46.64	40.00	12.28
Basic metals	27	36	3.39	17.44	12.00	70.56	38.89	16.67
Other transport equipment	28	118	4.19	3.73	25.47	70.80	10.26	14.41
Fabricated metal products	35	7	1.05	0.00	0.00	100.00	0.00	0.00
Furniture	36	42	10.87	2.38	42.36	55.26	8.33	9.52
<b>Subtotal</b>		<b>954</b>	<b>4.25</b>	<b>8.57</b>	<b>31.03</b>	<b>60.41</b>	<b>15.41</b>	<b>12.89</b>
			<b>High Tech. Manuf.</b>					
Chemicals	24	103	5.71	20.04	24.23	55.72	36.21	29.13
Machinery and equipment	29	45	1.84	14.38	7.66	77.96	15.38	6.67
Electrical machinery	31	29	6.99	22.16	14.67	64.51	45.45	27.59

**Table 3: STI Input Indicators at Firm Level, Peru 2004**

ISIC DESCRIPTION	CIU	N	Inputs					
			Expenditure on STI <sup>7</sup>	R&D <sup>8</sup>	STI Capital Goods <sup>9</sup>	Other STI Activities <sup>10</sup>	Firms that performed R&D	Firms that performed R&D on a continuous basis
Communication equipment	32	1	8.82	0.00	93.01	6.99	0.00	100.00
Medical, precision inst.	33	3	0.76	0.00	0.00	100.00	0.00	0.00
Vehicles	34	19	4.17	5.84	40.76	53.40	15.38	26.32
Other transport	35	2	2.47	0.00	0.00	100.00	0.00	50.00
<b>Subtotal</b>		<b>202</b>	<b>4.97</b>	<b>16.53</b>	<b>22.75</b>	<b>60.95</b>	<b>29.70</b>	<b>23.76</b>
<b>National</b>		<b>1071</b>	4.69	8.86	30.05	61.09	16.50	13.73
<b>Foreign</b>		<b>85</b>	2.48	20.42	23.28	56.71	32.76	28.24

**Source:** CONCYTEC-INEI (2005) Author's own work. <sup>7</sup> Total expenditures on STI (as a % of total turnover). <sup>8</sup> Expenditure on R&D as a % of total expenditure on STI. <sup>9</sup> Expenditure on STI Capital as % of total expenditure on STI <sup>10</sup> Expenditure on the others STI activities as a % of total expenditure on STI. These other STI activities include: training, consultancy services, engineering and industrial design, software and technology services. \*Turnover from product innovations and from new to market product innovations were not available for Peruvian data.

Table 4: STI Policy Indicators at Firm Level, Peru 2004

ISIC DESCRIPTION	CIU	N	International markets (11)	Co-operated with foreign partners (12)	Co-operated (13)	Co-operated with Universities or Gov. (14)	Public Support (15)	Applied for patents (16)
<b>Services</b>		<b>2732</b>	<b>1.61</b>	<b>0.44</b>	<b>3.73</b>	<b>2.05</b>	<b>2.16</b>	<b>1.21</b>
<b>KIBS</b>								
Land transport	60	252	1.19	0.00	1.19	0.40	0.79	0.40
Water transport	61	11	0.00	0.00	0.00	0.00	0.00	0.00
Air transport	62	19	15.79	0.00	5.26	0.00	5.26	0.00
Auxiliary transport activities	63	101	3.96	1.98	6.93	4.95	0.00	0.00
Post and telecommunications	64	34	2.94	0.00	2.94	0.00	0.00	2.94
Financial intermediation	65	43	0.00	2.33	6.98	0.00	4.65	2.33
Insurance and pension fund.	66	26	3.85	3.85	7.69	3.85	0.00	0.00
Auxiliary activities to f-int.	67	15	0.00	6.67	13.33	13.33	13.33	0.00
Computer and related activities	72	49	0.00	0.00	2.04	2.04	8.16	4.08
Research and development	73	17	0.00	0.00	11.76	11.76	35.29	0.00
Business act. (excluded 749)	74	171	1.75	1.17	5.26	4.09	3.51	0.58
<b>Subtotal</b>		<b>738</b>	<b>2.03</b>	<b>0.95</b>	<b>4.20</b>	<b>2.57</b>	<b>3.12</b>	<b>0.81</b>
<b>Traditional Services</b>								
Recycling	37	4	0.00	0.00	25.00	0.00	25.00	25.00
Electricity	40	38	2.63	0.00	13.16	7.89	10.53	5.26
Water	41	31	0.00	0.00	9.68	3.23	3.23	0.00
motor vehicles	50	305	0.33	0.00	0.98	0.66	0.98	0.66
Wholesale trade	51	686	1.31	0.29	2.48	1.46	2.19	1.60
Retail trade	52	316	0.95	0.32	2.85	0.95	0.32	1.58
Hotels and restaurants	55	169	6.51	0.59	8.28	5.92	1.78	1.18
Real estate	70	71	0.00	0.00	2.82	1.41	2.82	1.41
Renting of machinery	71	27	0.00	0.00	3.70	0.00	0.00	0.00
Other business activities	749	158	0.63	0.63	4.43	1.90	0.63	0.63
Health and social work	85	44	2.27	0.00	4.55	2.27	6.82	0.00
Sewage and refuse disposal	90	10	0.00	0.00	10.00	0.00	0.00	10.00
Membership organizations	91	21	0.00	0.00	9.52	4.76	4.76	0.00
Recreational activities	92	39	2.56	0.00	7.69	5.13	0.00	0.00
Other services	93	75	1.33	0.00	1.33	0.00	1.33	1.33
<b>Subtotal</b>		<b>1994</b>	<b>1.45</b>	<b>0.25</b>	<b>3.56</b>	<b>1.86</b>	<b>1.81</b>	<b>1.35</b>
<b>National</b>		<b>2592</b>	<b>1.43</b>	<b>0.46</b>	<b>3.55</b>	<b>1.93</b>	<b>1.89</b>	<b>1.04</b>
<b>Foreign</b>		<b>140</b>	<b>5.00</b>	<b>0.00</b>	<b>7.14</b>	<b>4.29</b>	<b>7.14</b>	<b>4.29</b>

Table 4: STI Policy Indicators at Firm Level, Peru 2004

ISIC DESCRIPTION	CIU	N	International markets (11)	Co-operated with foreign partners (12)	Co-operated (13)	Co-operated with Universities or Gov. (14)	Public Support (15)	Applied for patents (16)
<b>Manufactures</b>		<b>1156</b>	<b>4.76</b>	<b>0.78</b>	<b>6.06</b>	<b>3.81</b>	<b>7.87</b>	<b>3.89</b>
<b>Low Tech Manuf.</b>								
Food products, beverages	15	288	4.51	1.39	7.99	5.90	7.29	4.51
Tobacco products	16	1	0.00	0.00	0.00	0.00	0.00	0.00
Textiles	17	65	12.31	1.54	7.69	4.62	1.54	1.54
Wearing apparel	18	60	6.67	0.00	8.33	6.67	1.67	6.67
Leather and footwear	19	22	0.00	0.00	4.55	0.00	0.00	9.09
Wood	20	53	3.77	0.00	1.89	0.00	0.00	0.00
Paper	21	16	0.00	0.00	0.00	0.00	18.75	0.00
Recorded media	22	101	0.00	0.99	3.96	1.98	4.95	1.98
Refined petroleum	23	1	0.00	0.00	0.00	0.00	0.00	0.00
Rubber	25	87	1.15	0.00	4.60	2.30	8.05	4.60
Non-metallic mineral products	26	57	5.26	0.00	10.53	5.26	17.54	3.51
Basic metals	27	36	13.89	2.78	16.67	5.56	19.44	2.78
Other transport equipment	28	118	4.24	0.00	3.39	2.54	3.39	1.69
Fabricated metal products	35	7	14.29	0.00	0.00	0.00	0.00	0.00
Furniture	36	42	4.76	0.00	2.38	2.38	2.38	0.00
<b>Subtotal</b>		<b>954</b>	<b>4.61</b>	<b>0.73</b>	<b>6.29</b>	<b>3.88</b>	<b>6.29</b>	<b>3.25</b>
<b>High Tech. Manuf.</b>								
Chemicals	24	103	6.80	0.97	6.80	4.85	20.39	7.77
Machinery and equipment	29	45	2.22	0.00	0.00	0.00	6.67	0.00
Electrical machinery	31	29	3.45	0.00	3.45	0.00	17.24	3.45
Communication equipment	32	1	0.00	0.00	0.00	0.00	0.00	0.00
Medical, precision instruments	33	3	0.00	0.00	0.00	0.00	0.00	66.67
Vehicles	34	19	5.26	5.26	10.53	10.53	10.53	15.79
Other transport	35	2	50.00	0.00	0.00	0.00	0.00	0.00
<b>Subtotal</b>		<b>202</b>	<b>5.45</b>	<b>0.99</b>	<b>4.95</b>	<b>3.47</b>	<b>15.35</b>	<b>6.93</b>
<b>National</b>		1071	4.30	0.65	5.79	3.73	6.54	3.83
<b>Foreign</b>		85	10.59	2.35	9.41	4.71	24.71	4.71

**Source:** CONCYTEC –INEI (2005). Author's own work. <sup>11</sup> Share of firms that were active on international markets. <sup>12</sup> Share of firms that co-operated with foreign partners on innovation. <sup>13</sup> Share of firms that co-operated on innovation activities. <sup>14</sup> Share of firms that co-operated with Universities/Higher education or government research institutes. <sup>15</sup> Share of firms that received public financial support for innovation. <sup>16</sup> Share of firms that applied for one or more patents.

## 2. STI POLICY IN PERU<sup>10</sup>

The analysis of STI policies has been described recently by CTI (2012), UNCTAD (2012), OECD (2011), UNCTAD-CEPAL (2011), Kuramoto (2008, 2007), Kuramoto & Diaz, (2010 and 2011); Tello (2010); and Sagasti (2011 and 2009).

Thus, the OECD report (2011) indicates that the 90's decade of Peruvian represented a period of dismantling of the incipient system of research and development of the 70's and 80's. In such decades the R&D system failed to consolidate itself due to: an over-trust in the capacity of government planning, a significant unbalance between the resources devoted to the management of STI and the ones implemented effectively in projects, an absence of a critical mass of researchers, neglecting of academic excellence in universities, migration of researchers and professionals, and the low attention to the requirements of the private sector as well as the unwillingness to include them in the formulation and management of the STI programs.

During the 90's decade, as a result of structural reforms and rationalization in the administration of public spending, additional reduction in research and development spending was experienced in universities budgets and in public institutes of research which exerted a bigger pressure on the sector (Kuramoto & Díaz, 2010). In the political-institutional plan, the *National Council for Science and Technology* (CONCYTEC), which was before a planning and coordinating body, was handed out to the Education Ministry (MINEDU), losing the resources, roles and hierarchy that its previous position in the *Presidency of the Council of Ministers* (PCM) entailed.

As a result of this sustained crisis on the sector, the science and technology indicators in the 90's decade ended up at a much lower level that the ones of other economies of the region. So, for example, in 1997 the research and

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<sup>10</sup> This section has greatly expanded by the contribution of Viviana Cruzado.

development spending represented less than 0.1% of the GDP, while in Latin America this percentage was at 0.5%. In addition, the number of scientific publications registered in Peru on the SCI (Science Citation Index) index was 175, while Colombia counted 545 and Chile 1170.

In the 2000 decade, different and still weak initiatives pointed out to a renewal of the attention of the public sector in STI policies were carried out. Consequently, in 2004 the Legal Framework of Science, Technology and Innovation was promulgated and approved by supreme decree N° 032-2007-ED. This device granted to CONCYTEC the role of “directing, promote, coordinate, articulate, supervise and evaluate all actions of the State in the science’s areas, technology and technologic innovation”, and would conduct the role of administrative authority of the *National System for Science, Technology and Innovation* (SINACYT), composed by all institutions and agents involved in the areas of research and development and its promotion<sup>11</sup>. It should be mentioned that although it was considered initially to ascribe CONCYTEC to the PCM, it finally remained at the MINEDU.

Within this framework, in 2005 the *National Strategic Plan for Science, Technology and Innovation for Competitiveness and Human Development (PNCIT) 2006-2021* was formulated. Its objectives, strategies and lines of action were outlined for the promotion of technological transfer, boosting basic and applied research, improving human capital and strengthening institutions and the STI system. On the other hand, STI funds with financial support of multilateral organisms were formulated and implemented during the 2000 decade. Among others<sup>12</sup>:

INCAGRO, (Innovation and Competitiveness for Peruvian Agro) launched in 2001 with an initial budget of US\$ 20 million, addressed to promote

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<sup>11</sup> Figure A1 show the SINACYT of Peru.

<sup>12</sup> Table A1 presents a detailed list of STI Peruvian programs and projects of the last decade.

innovation, technological transfer and public-private collaboration in the agricultural sector;

FINCyT (Fund for Innovation, Science and Technology) launched in 2006 with a US\$36 million budget. Among other objectives were to finance technological innovation projects in businesses as well as research projects in universities, research centers and associations between them, and to promote the formation of highly qualified human capital;

FIDECOM (Fund for R&D of Competitiveness) launched in 2006 with a US\$65 million budget in charge of financing technological innovation projects with a special emphasis in small businesses (MYPEs);

A network of CITEs (Technology Innovation Centers) created in 2000 by the Ministry of Production (PRODUCE) with the aim of giving extension and technological transfer services to private businesses in a specialized manner according to their economic subsector (wood, textiles, wine, etc.). These were designed in a way that could be public or private. The first group of CITEs was financed by the government (PRODUCE). Latter on CITEs were financed by private sources and the income originated by their services. Nowadays there are 14 CITEs: 3 public and 11 private;

Finally, in 2004 within the framework of the Canon Law was established that 20% of the resources transferred to regional governments were to be distributed to the public universities of the region, with the aim of promoting research.

These STI initiatives, however, were subject of a series deficiencies reported by different reports on STI Peruvian policies<sup>13</sup>. Thus, regarding CONCYTEC, the UNCTAD-CEPAL report (2011) argues that this STI institution faces the following challenges: (i) a diffuse vision on the function of the national

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<sup>13</sup> Table A2 lists some additional deficiencies.

innovation systems framework; (ii) an excessively reduced budget to carry out their functions (around US\$4.5 millions between 2005 y 2010); (iii) structural weakness of others crucial subsystems for the development of the STI activities, particularly educational and industrial ones. As a result of these difficulties, at the end of 2011 an Advisory Commission was formed intended to propose the fundamental outlines of a public policies' Strategic Plan for Science, Technology and Innovation (STI), and evaluate the institutional reforms needed to implement it.

This commission recommended the creation of a Ministry of Science, Technology and Innovation which was not accepted. In June of 2012, CONCYTEC was ascribed to the PCM.

On the other hand, STI funds by 2011 onwards are concentrated in FINCyT due to the closure of INCAGRO, and the designation of this program as technical secretariat in charge of the execution of resources of the FIDECOM. Additionally, in the 2013 Budget Law a second operation has been generated that counts with a fund of US\$100 millions for 4 years administrated by FINCyT.

Regarding the Public Research Institutes (IPI), Advansis report (2011) indicates these institutes have the following limitations: (i) low quality in research and development activities; (ii) lack of strategic vision; (iii) weak conditions for coordination and governance; (iv) scarce financial resources; (v) inadequate preparation in the management of intellectual property rights, and (vi) conflict of interests. Advansis's assessment highlights the lack of leadership by the central government in the attention of the IPI necessities. In addition, there is not a national or sectoral strategy in which the activities of these are centrally directed, coordinates and supervised, which in this case would correspond to CONCYTEC. On the other hand, CITEs (most of them financed by private fund) lack the resources and the mission to get more intensively involved in research and development. Furthermore, they usually



would not receive the projects' financing benefits from FINCyT or FIDECOM, thus damaging their own development and the objective which they officially have.

Regarding the resources generated by the Canon Law, public universities suffer a great deal of limitations in the use of such resources for research development. Besides the low human capabilities and lack of infrastructure, there is also the fact that the normative presents a series of restrictions in the formation or hiring of human capital for the development of the investigations such as: financing postgraduate studies, association with research centers, assistance to international events, or pre-feasibility studies, among others. In addition, there is no quality control system of the research financed by these resources, which endangers its effective impact on technological development and regional innovation.

### **3. STI POLICY IN THE SERVICES SECTOR<sup>14</sup>**

Given the Peruvian productive structure oriented towards the primary and secondary sectors and its STI policy oriented towards production of goods<sup>15</sup>, it is no surprise that services ISIC branches, in general, have not been prioritized in such a policy. STI Policy in services has been concentrated on basic research at universities, public institutions, and research centers and on promoting Information and Communications Technologies (ICT). Even then, in most cases, the businesses within the service sector are not explicitly the target audience of these policies, although they are included in such policies.

Given the ICT cross-sectional nature and their direct relevance to the service sector (and its ISIC branches such as information technology, technological

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<sup>14</sup> The analysis of this section is concentrated in services sectors with a relative propensity to produce 'innovation'. Services related to the export sector such as transport and tourism are not analyzed. Tello (2012b) briefly survey the literature on tourism for exports.

<sup>15</sup> For example, fisheries at the IMARPE (Maritime Institute of Peru), agriculture at the INIA (National Institute of Agrarian Innovation), mining and energy at the INGEMMET (Geological, Mining and Metallurgical Institute) and manufactures branches at the CITEs.

services, telecommunications, finance, education, culture, among others), the focuses of Peruvian ICT policy since 1990, similar to several Latin American Countries (LAC) (Guerra & Jordán, 2010), has been to provide and promote the infrastructure and the public services related to the Telecommunications sector under a strategy of universal access, affordability, fostering private competition, technological convergence in concordance with the evolution and development of information and communication technologies. Despite of this policy the digital gap between Peru and other LAC still persist (Tello, 2012a).

Investment in telecommunications infrastructure spread and modernized in the 90s. During this decade this market was deregulated and privatized<sup>16</sup>. Nevertheless, it mainly served the capital of Peru Lima and the most important district centers, leaving the inner regions of the country unattended, especially rural areas. Thus, nowadays there are 142 capital cities of provinces that still do not have access to fiber optic, and the mobile and fixed-line broadband penetration rate per department is below 5.2% in every department of the country except Lima and Callao. Along those lines, the e-government indicators of the Peruvian Government are below the regional and worldwide leaders (63rd place among 184 countries according to the United Nations), particularly in the case of the farthest local governments<sup>17</sup>.

Universal access policy of the public services in Telecommunications was declared in 1998 through the Guidelines of the Universal Access Policy (Legal devices 017-98-CD/OSIPTEL, 07/10/1998) and the creation of FITEL (Investment Fund for Telecommunications, D.S 013-93-TCC, 06/05/1993) for the provision of these services in rural areas and for social interest groups. Services for those areas and groups are being offered by the promotion of

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<sup>16</sup> The major policy instruments in this area were: the privatization of the telecommunications (D.L. 702, 08/11/1991); the promotion of investment (Law of telecommunications, No 26096, 29/12/1992), competition (Law 26285, 12/01/1994) and openness of the telecommunications market (D.S. 020-98-MTC, 05/08/1998 and D.S 003-2007-MTC, Guides to Consolidate and Develop Competition of the Telecommunications services in 02/02/2007); the creation of OSIPTEL (The supervisor institution of Private Investment in Telecommunications ((DL. 702, 08/11/91) which objectives are to regulate and supervise the market of public services of telecommunications.

<sup>17</sup> D.S 067-2003-PCM, of 28/06/2003 established the Electronic Government in Peru.

competition of mobile telephony and broadband licenses. It should be noted that the expansion of broadband infrastructure remains the key limitation to promote greater penetration of telecommunications services. To deal with this obstacle on June 28, 2012, the Law for the Promotion of Broadband and the Construction of the National Fiber Optic Backbone Network (Law No 29904) was passed to facilitate the Government participation in the promotion of broadband access through a subsidy for the private implementation of a fiber optic backbone network at inter-provincial level. This would enable to overcome market failure, which limits the private sector (given the complex geography) and finds support in the high levels of positive social and economic external factors generated.

Another ICT policy instrument was the establishment of the Information Society with the objective to elaborate and implement the so called Digital Agenda 2.0 through a Multi-sectoral Commission to develop the information society (CODESI) (R.M 181-2003-PCM, 07/06/2003 and D.S. N° 048-2008-PCM del 16/07/2008-which redefine CODESI). This agenda contains guidelines, objectives, and strategies regarding the development of telecommunications infrastructure, human capacity, production service sectors, e-government, among others (see Table A3). The "Digital Agenda 2.0" is currently in process of implementation. This implies a cross-sectional impact on the access and use of the infrastructure, the promotion of research and innovation, the modernization of public services, among others.

Other public initiatives aimed at promoting ICT is the CITE Software intended to provide software services and technological solutions to micro, small and medium enterprises (MSME), and the "Crea Software Perú" Program aimed at promoting the trade integration of the information technology sector in external markets. Likewise, specific measures for the promotion of the call centers sector were implemented (General Sales Tax exemption and the creation of Tacna's free zone). There are also private initiatives, such as the

Program to Support Competitiveness of the Software Industry (PACIS) and the Quality Decentralization Project for Software Competitiveness, among others.

Regarding the generation of ICT knowledge, there is a reduced and disjointed group of initiatives related to the generation of knowledge in the ICT sector. Among these initiatives is the Information and Communications Technologies Center (CTIC) of the National Engineering University (UNI), supported by the Korea International Cooperation Agency (KOICA) which conducts research on software design, miniaturized satellites, and artificial intelligence. Likewise, there is the CONCYTEC Chair in Information and Communications Technologies, aimed at developing software at San Agustín National University in Arequipa in cooperation with several public and private institutions involving experts from the Institut de Recherche pour le Développement (IRD) of France. The objective of this chair is to turn the region of Arequipa into one of the software industry development centers.

On the other hand, there is a National Institute for Telecommunications Research and Training (INICTEL) which objectives are to conduct research, training, and carry out studies and projects in the telecommunications field. It currently is assigned to the UNI. Public research institutes generally make intensive use of ICT-related knowledge to conduct research, among which are Peru's Geophysics Institute (IGP), Peru's National Service of Agricultural Sanitation (SENASA), the National Geographic Institute (IGN), and the National Meteorological and Hydrological Service (SENAMHI), among others.

In general, there are not public resources specifically intended for research in the ICT sector. It is important to mention that the financing sources for innovation have a restriction on the percentage of resources intended to pay researchers, representing a high barrier to research in the ICT sector since the use of labor is the major cost.

Three major shortcomings of ICT policy can be drawn from the previous description. First, an absence of a governing entity that organize the institutional framework of the ICT-related institutions, define and harmonize the policy guidelines to be followed, and coordinate and comply with its policies. In this regard, the low institutional capacity of CONCYTEC, as the governing body of SINACYT, has been a bottleneck in the structuring of this basic frame to the design and implementation of ICT promotion policies in every sector including the service sector. Although the “Digital Agenda” may be an alternative that allows us to move forward independently and in parallel to ICT promotion, nevertheless, in the absence of a basic institutional arrangement, the differentiation of roles and goals comprised in it, together with those of CONCYTEC and the National Council for Competitiveness (CNC), are not clearly defined.

Second, ICT promotion policy in the service sector does not have a clear definition of the associated sectors that could be the target of these policies. ICT policies are commonly related to the primary or secondary sector, and only indirectly to the tertiary sector in the ICT and research sector. In this context, the CITE Software is an interesting alternative for the delivery of services and technological solutions that could be evaluated for replication purposes in other service subsectors. The recent Law for the Promotion of Broadband and the Construction of the National Fiber Optic Backbone Network (on June 28/2012), if well implemented, may be a way to generate a better level of access to facilitate the delivery of higher value-added services within a wider spatial and population spectrum. On the other hand, a greater public sector participation in supporting and promoting these private initiatives could be another way to expand the focus of ICT policy to the services sector (examples of this participation has been the Program to Support Competitiveness of the Software Industry, PACIS, and the Quality Decentralization Project for Software Competitiveness).

Third, ICT policy has been oriented to provide the services rather than for productive purposes in any of the sectors that may be used. ICT tools in most of the cases are used as communication and information means. In that sense, the supply oriented ICT policy may be complemented with a promotion of the demand for ICT tools for productive purposes to enhance innovation activities to lead to higher and sustained growth of productivity.

### 3.1 Experts Opinion on STI Policy

Regarding the experts opinion (Table A4), all of them coincided on pointing out that STI policy support in services has been partial and discretionary from 1990 to nowadays. On the other hand, innovation strategy in Peru can be represented by a set of disarticulated institutions undertaking STI projects in an isolated fashion. The major actors and institutions related to STI policy are those listed in Figure 1, wherein FINCYT and FIDECOM were quoted as the most important programs/funds to support STI activities. Whereas Villarán argues that innovation, in general, is not a priority for political actors, Sagasti and Kuramoto point out that there are some particular actions from private and public entities that focus in the services sector, particularly, transport and ICT. For the experts, the relevant services sectors in Peru are those related to small and micro enterprises, SME, (e.g., trade, restaurants, hotels, personal services, and transports) and financial services. Competition and tender are the most often promotion instruments used in the services sector (and all the sectors in general) and there are only a few programs promoting independent innovation.

Experts also coincided regarding the absence of a demand policy for innovation services and that the external conditions such as infrastructure in ICT, networks and some advance in regulation have been the most used in Peruvian economy. Finally in terms of future policy in services, there are no clear answers although one of them emphasized the generation of human capital.

The question is for this expert is what we mean by services and innovation in services.

#### **4. CONCLUSIONS**

In the last decade the area of science, technology and technological innovation in Peruvian economy has been of low priority for policy makers. The institutional disarticulated national STI system (SINACYIT) was concentrated on some particular programs and funds oriented basically to foster firms' innovation activities of primary and manufactured sectors without a specific and previously designed innovation strategy. STI in services were oriented mainly in providing information and communications technology infrastructure under the principles of universal access, affordability, fostering private competition, technological convergence in concordance with the evolution and development of ICT.

As a result of this limited STI policy, the STI of indicators (such innovation index, degree of cooperation among the STI entities; technological capability, and technological sophistication) of Peru show the lowest levels compared with other Latin American Countries and the United States.

On the other hand, STI indicators based upon firms' survey data (CONCYTEC-INEI, 2004) of 2004 3888 enterprises of services and manufacturing support three basic hypotheses. First, services firms do innovate and it seems they do it in a higher proportion in non-technological (i.e., innovation is organization, marketing and trade) than in technological innovation (i.e., en product or processes). Contrarily, the share of manufacturing firms that innovate in technological innovation is higher than the respective share of non-technological innovation. Second, most of firms in both sectors innovate in isolated way without collaboration with other entities and using their own resources. Third, by 2004, public financial support was mainly concentrated on manufacturing firms and the share of services firms that received this support

was rather low (2.16%). Further and surprisingly, this support was mainly oriented to foreign owned firms from both sectors.

The overall analysis of the STI activities in Peru suggest that urgent need to devote political attention and respectable amount of resources to foster firms innovation as a mean to sustain increasing rates of growth of total factor productivity.

Finally, the policy recommendations of the advisory commission of CTI (CTI, 2012) summarize the way that most experts consider STI policy. These are: i) the need for human capital formation; ii) promoting R&D efforts; iii) STI policy should promote and facilitate social inclusion; iv) promoting innovation by enterprises; v) improving the physical and institutional infrastructure pro development of STI activities; and vi) disseminating knowledge. Moreover, in the list of prioritized 'sectors', services are not considered. Such a list includes: development of biotechnology in national crops oriented to exports, foods and seafood; development of STI (particularly nanotechnology) in materials from mining, metallurgical, and petrochemicals, development of ICT, improving traditional and cleaning technologies for SME, improving specific health diseases related to rural and poor social groups; and designing STI activities to prevent natural disasters.



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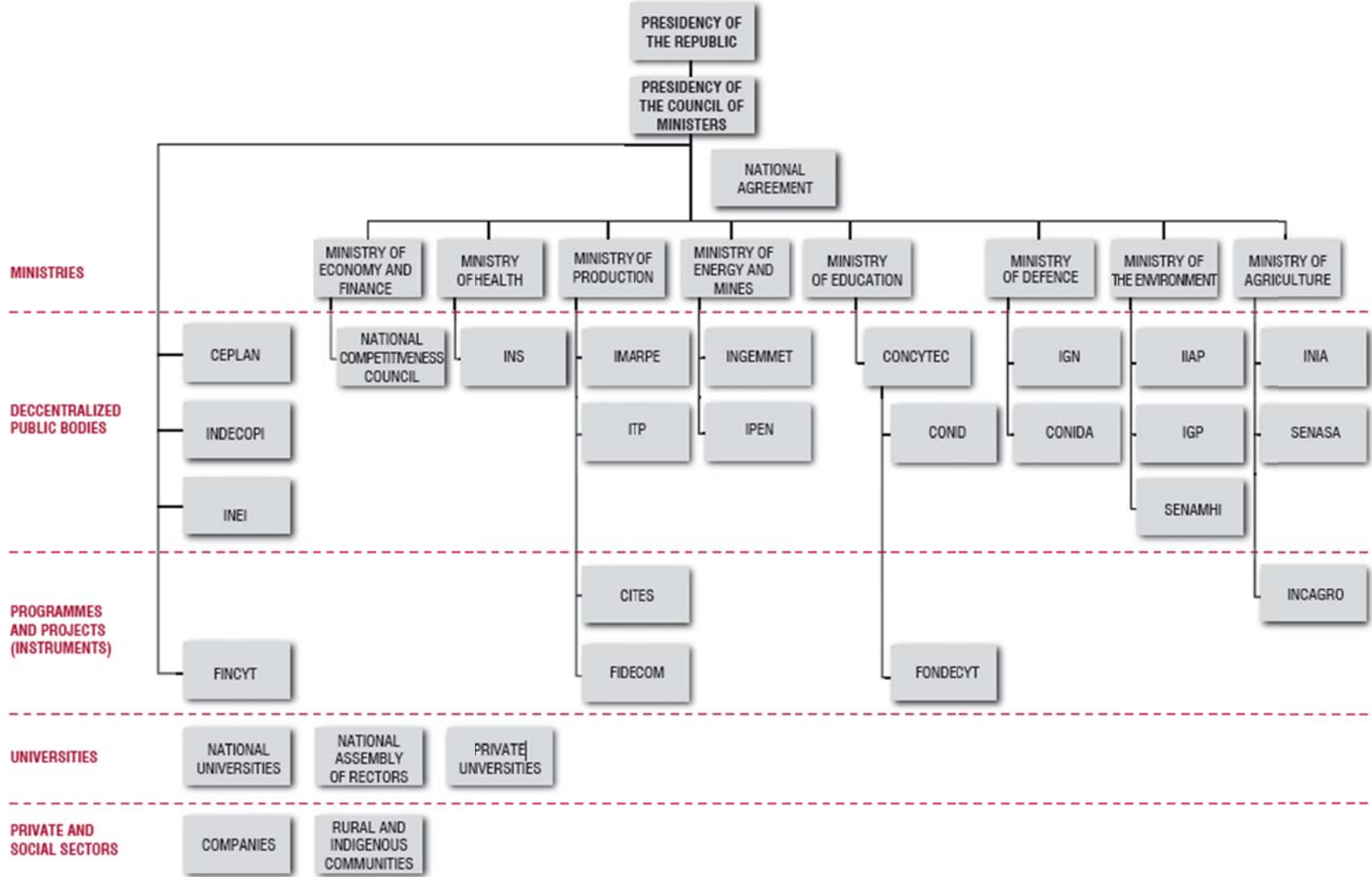
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**FIGURE A1**  
**National System of Science, Technology and Technological Innovation (SINACYT)**



Source: UNCTAD-ECLA (2011)

**Table A1  
PLANS, PROGRAMS, PROJECTS, INSTITUTIONS AND POLICY IN SCIENCE, TECHNOLOGY  
AND INNOVATION IN PERU**

<b>Plan/Programs/Projects /Institutions/Policy</b>	<b>Description</b>
National System of Science Technology and Technological Innovation (SINACYT)	SINACYT is the set institutions and firms of Peru devoted to Research, Development (R&D) and Technological Innovation (TI) and to promote them.
<b>Ministries and Their Decentralized Public Bodies Belonging to SINACYT</b>	
<b>Presidency of the Council of Ministers</b>	
National Strategic Planning Centre (CEPLAN)	CEPLAN is the national planning system, consolidated and articulated to contribute effectively to sustainable development through the construction of development plans with shared vision and concerted manner, using modern methods and technological infrastructure.
National Institute for the Defense of Competition and Protection of Intellectual Property (INDECOPI)	INDECOPI is the entity in charge of management of intellectual property, defense of competition, standardization, accreditation and metrology. This decentralized technical body has granted 10503 patents between 2000-2008 (UNCTAD 2011). Its budget in 2010 was S/. 74.3 million.
National Institute of Statistics and Informatics (INEI)	This organism, which is part of The Presidency of the Council of Ministers, produces and disseminates official statistical information, in an integrated, coordinated and rationalized form, based on common technical standards, in order to contribute to the design, monitoring and evaluation of government policies and decision-making by socioeconomic agents and the academic community. Its Budget was USD 31.93 million in 2009 )
<b>Programs, Projects and Policies</b>	
Science and Technology Program(FINCyT)	On 2006, the Government of Peru and the Inter American Development Bank (IADB) signed the loan Agreement No. 1663/OC-PE, giving rise to the Science and Technology Program. On July 31, 2007 received the first disbursement of IDB for the start of the program. The resources are from the IADB (US 25 million) and the public treasury (USD 11 million). On January 2012, the IADB approved to grant a second loan for \$ 35 million, budget to be implemented over the next 7 years. The projects implemented by competitive funds are innovation projects in associated companies (PITEA), projects of basic research, applied research and pre competitive research (PIBAP), innovation projects in individual companies (PITEI). Benefitted sectors are agro-industry, telecommunications, fishing, textiles. Other projects are scholarships. Those who can apply for this funding are companies, civil non-profit associations composed of producers, universities or institutes of research and development (R&D).
<b>Ministry of Economics and Finance(MEF)</b>	

**Table A1  
PLANS, PROGRAMS, PROJECTS, INSTITUTIONS AND POLICY IN SCIENCE, TECHNOLOGY  
AND INNOVATION IN PERU**

<b>Plan/Programs/Projects /Institutions/Policy</b>	<b>Description</b>
National Competitiveness Council	This is a coordinating committee responsible, in conjunction with public sector entities and in partnership with the private sector, for driving policies and strategies designed to increase the country's competitiveness and that of its companies, in order to improve the quality of life of Peruvian citizens.
<b>Ministry of Health</b>	
National Institute of Health (INS)	Executive agency of the Ministry of Health, dedicated to research into priority health problems and technological development. Its mandate is to improve the population's living standards by proposing policies and legislation, promoting, developing and disseminating scientific and technological research and providing services in the area of public health, control of transmissible and non-transmissible diseases, diet and nutrition, biological products, control of food quality, pharmaceutical and related products, occupational health, protection of the environment and intercultural health. Its Budget was USD 19.6 million in 2003 and USD 29.8 million (93% from institutional funding) in 2009.
<b>Ministry of Production</b>	
Maritime Institute of Peru (IMARPE)	Advisory and research institute about the study and knowledge of the Peruvian Sea and its resources Its Budget was USD 8.67 million in 2003- USD12.19 million in 2009 (90% from institutional funding)
Institute of Fish Technology (ITP)	Applied research and technical advisory institute for better utilization of fisheries resources, orientation for higher added value activities and encouraging the improvement of sanitary conditions. Its Budget was USD 3.69 million in 2003 and USD 5.06 million (33.3% from institutional funding) in 2009.
<b>Programs, Projects and Policies</b>	
Technological Innovation Centers (CITE's)	On 2000, the Ministry of Production started the development of innovation centers (CITE's) to transfer technology and promote innovation in enterprises. CITE'S are the technology partners to companies for increasing innovation capacity and achieve greater competitiveness and productivity. Currently, there are 17 CITE's. In manufacture , there are 12 CITE's in the following regions: Piura: CITE-Agroindustrial; Lima: CITE-Madera, CITE-Ccal; Ica: CITE-Vid; Arequipa: CITE- Confecciones El Taller, CITE-Agroindustrial CEPROPRUI, CITE-Industria textil camélidos IPAC, CITE-Agroalimentario; Tacna: CITE-Agroindustrial; Loreto: CITE-Forestal; San Martín: CITE-Cacao; Ucayali: CITE-Madera Unidad Técnica de Pucallpa. In mining, there is the CITE-Minería y Medio Ambiente, in Cajamarca. In the Service Sector, there are four CITE's. In Lima, CITE- Logística GS1, CITE-Software, CITE Confección Diseño y Moda CHIO LECCA and in Loreto, CITE-Frutas tropicales y plantas medicinales.

**Table A1  
PLANS, PROGRAMS, PROJECTS, INSTITUTIONS AND POLICY IN SCIENCE, TECHNOLOGY  
AND INNOVATION IN PERU**

<b>Plan/Programs/Projects /Institutions/Policy</b>	<b>Description</b>
Research and Development Fund Competitiveness (FIDECOM)	On 2006, the Ministry of Economics and Finance created the Research and Development Fund Competitiveness-FIDECOM- In 2007, by Law No. 29152, the Ministry of Production was entrusted for this fund. This fund is in charge of promoting research and development of productive innovation projects of practical use in business. By 2012, this fund is comprised with 200 million soles. Among FIDECOM projects, we find productive innovation projects of affiliated companies (PIPEA), product innovation projects of individual companies (PIPEI), smaller projects for microenterprises (PIPEM), and technology transfer partnership projects for microenterprises (PATTEM). Those who can apply for this funding are businesses and civil associations of productive character legally constituted in the country and formal micro-enterprises, workers and managers, in partnership with academic institutions.
<b>Ministry of Energy and Mines</b>	
Geological, Mining and Metallurgical Institute (INGEMMET)	Research institute and authority in matters of geosciences information and those related to basic geology, subsurface resources, geological hazards, and environment. Its Budget was USD 5.28 million in 200 and USD 12.45 million (98% from institutional funding) in 2009.
Peruvian Nuclear Energy Institute (IPEN)	Research and promotion institute; national standards authority for nuclear matters Its Budget was USD 7.81 million in 2003 to USD 8.78 million in 2009 (85% from institutional funding)
<b>Ministry of Education</b>	
National Council for Science Technology and Technological Innovation (CONCYTEC)	Governing Body of SINACYT, It is ruled by three main objectives: policies and planning, coordination of the SINACYT, science and technology, STI foresight, information and communication systems. In addition, it is responsible for the management of FONDECYT and has promoted the creation of regional STI councils (20 to date) with which it maintains close management and coordination links. Its Budget was 0.22% of the Education sector budget and 0.02% of the total national budget (2010, MEF).
Regional Councils of Science, Technology and Innovation	Decentralization mechanism of CONCYTEC whose function is to promote generation of knowledge (through scientific and technological research) among the various economic and social agents in the regions, to stimulate the country's competitiveness and improve living standards. Some of their duties are Putting forward STI policies in the regional framework, formulating regional STI agendas and promoting sources of financing for scientific research.
National advisory council for research and development in STI (CONID)	National Advisory Council for Research and development in Science, Technology and Technological Innovation (90% from inst. funding)

**Table A1  
PLANS, PROGRAMS, PROJECTS, INSTITUTIONS AND POLICY IN SCIENCE, TECHNOLOGY  
AND INNOVATION IN PERU**

<b>Plan/Programs/Projects /Institutions/Policy</b>	<b>Description</b>
National Plan in Technology 2006-2021	Peru made the first long term National Plan (PNCTI) in this area, which seeks for sustainable development in this field.
<b>Programs, Projects and Policies</b>	
National Fund for Science Technology and Technological Innovation (FONDECYT)	The Fund is the organ of CONCYTEC responsible for mobilizing, managing, administering and channeling domestic and foreign resources destined for SINACYT activities in Peru. In 2010, its Budget was USD 2.1 million. Projects funded by FONDECYT are mainly three competitive funding projects: The research projects in science and technology (PROCYT), projects for technological innovation for competitiveness (PROCOM) and projects for extension and technology transfer (PROTEC). The selected projects emphasize the management of plant and animal biodiversity, prevention of human diseases, software development, development of new materials and innovation in production and industrial processes. Those who can apply for this funding are universities, companies, centers and institutes of public or private research, peasants and indigenous communities. Among other projects, there are projects in science and technology aimed at biocommerce, Binational research (with Spain and Italy), Grants for the Organization and participation in scientific and technological events, Publications of science, technology and technological innovation, Postgraduate scholarships in Peruvian universities, International scholarships and Programmes of support for the mobility of doctors, Peruvian Scientifics and post graduates.
<b>Ministry of Defense</b>	
National Geographical Institute(IGN)	Research and technical advisory institute; standardization body for geographical and mapping activities. Its Budget was USD 0.87 million in 2003 and USD 1.51 million in 2009 (90% from institutional funding).
National Aerospace Research and Development Commission(CONIDA)	Research institute and governing body for aerospace activities in Peru. It facilitates and develops research and work concerning the country's advance into space for peaceful purposes. It proposes national legislation applicable to space and concludes cooperation agreements with similar institutions, including private, national or foreign, subject to the relevant legislation. Its Budget was USD 1.10 million in 2009 (90% from inst. funding).
<b>Ministry of Environment</b>	



**Table A1  
PLANS, PROGRAMS, PROJECTS, INSTITUTIONS AND POLICY IN SCIENCE, TECHNOLOGY  
AND INNOVATION IN PERU**

<b>Plan/Programs/Projects /Institutions/Policy</b>	<b>Description</b>
Peruvian Amazon Research Institute (IIAP)	Research, advisory and technical and scientific support institute. It makes technical recommendations which facilitate the development of its people and sustainable use and conservation of biodiversity in Peruvian Amazonia. To fulfill its Amazon regional mandate, it focuses on problems and locations strategically selected for their potential impact and conclude agreements, contracts and strategic partnerships to extend and project its action throughout the national Amazonian region in coordination with global processes. Its Budget was USD 3.24 million in 2003 and USD 4.63 million in 2009 (77% from institutional funding).
Geophysical Institute of Peru(IGP)	Research and training institute; provision of scientific and technological services in matters about disaster prevention and mitigation of natural and anthropogenic origin. Its Budget was USD 2.48 million in 2003 and USD 2.45 million in 2009.
National Meteorological and Hydrological Service(SENAMHI)	Provides public services, advice, scientific studies and research in the spheres of meteorology, hydrology, agro-meteorology and environmental matters. It participates in global atmospheric monitoring and provides specialized services to contribute to sustainable development, security and wellbeing of Peru. Its Budget was USD 6.28 million in 2003 and USD 9.35 million in 2009.
<b>Ministry of Agriculture</b>	
National Institute of Agrarian Innovation (INIA)	Institute of applied research and dissemination of technology in the agricultural field, especially native crops, and innovation. Its Budget was USD 12.1 million in 2003 and USD 23.35 million in 2009 (83.7 % from institutional funding).
National Agrarian Health Service(SENASA)	This institution has the function of protecting and increasing the value of Peru's phytosanitary and zoosanitary heritage in a competitive and changing global environment in order to contribute to the country's food safety and quality, and the competitiveness of agro-exports. SENASA's chief strategic objectives are: (a) protection and improvement of the phytosanitary heritage; (b) protection and improvement of the zoo sanitary heritage, (c) ensuring the quality of inputs used in agricultural and livestock farming; (d) guaranteeing organic production and contributing to a safe agro-food industry; and (e) ensuring consumer satisfaction and institutional sustainability.
<b>Programs, Projects and Policies</b>	

**Table A1**  
**PLANS, PROGRAMS, PROJECTS, INSTITUTIONS AND POLICY IN SCIENCE, TECHNOLOGY AND INNOVATION IN PERU**

<b>Plan/Programs/Projects /Institutions/Policy</b>	<b>Description</b>
<p style="text-align: center;">Innovation and Competitiveness for Peruvian Agro (INCAGRO)</p>	<p>This Government created fund started it's operations in 2001, which aim was to promote innovation, technology transfer and collaboration between public and private entities in the agricultural sector. This program was designed for a period of 12 years. Its initial budget was USD 20 million, rising to USD 43 million in its second stage. INCAGRO has proven to have a positive impact on income. Despite its success, this program ended in December 2010.</p>

**Source:** Author's work.

**Table No A2**  
**Diagnosis and Deficiencies in Science, Technology and Innovation**  
**Framework and Policy**

**STI Sector**

The STI in the Peru has no level, relevance, specific weight, or political backing that it has in other countries of similar economic development. It is a far cry from developed and emerging countries. Investment in CTI, specifically in research and development (R&D), barely reaches 0.1% of GDP, one of the lowest in the world.

The national system of innovation is "extremely weak and little integrated". This constituent institutions, such as universities, public research centers and private companies, carried out (with very few exceptions) very little ID and less innovation. The relationship between companies and universities is "virtually non-existent". There is a noticeable lack of leadership that sharpens the feeling of "adrift".

**Policy and Institutions**

The institutions in charge of designing the policies for science, technology and innovation suffer from serious deficiencies. Current legislation on the subject is lush and inoperative and is based on a legalistic and centralized conception, as shown in the "Framework Law for Science, Technology and Innovation" No. 28303 and the "Law of National Council for Science, Technology and Innovation Technology "(CONCYTEC) No. 28613.

Despite having functions that span multiple sectors of public administration, CONCYTEC is currently under the Ministry of Education. It's law of creation mixes regulatory, planning, coordination, funding, implementation and evaluation functions. Both features are contrary to international best practice in public management, because it locates an institution with a multi-sectoral scope under a specific ministry, and not separating policy formulation and program implementation, including fund management and financing mechanisms.

The "National Plan for Science and Technology" (NPTC) 2009-2013 sets a target of investment in research and development 1.5% of GDP 2013, without providing any explanation of how to achieve it. It also defines 234 "priority lines of action" and the section on "formulation and implementation of programs" have only two paragraphs and just say to be established "management committees" which shall "formulate, manage resources, implement, monitor and program evaluation at the office "with the support of CONCYTEC.

Public institutes engaged in activities related to science, technology and innovation have limitations in terms of financial resources, restrictions on budget execution, staffing and acquisitions, as well as confusion in defining their missions, governance problems, difficult to engage with business and conflicts of interest. Despite these impediments, the performance of some of these institutes has been commendable and praiseworthy, but could have been much better in the absence of these barriers.

The volume of research and development in the Peru is small according to international standards and this is very applicable to the IPI also.

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**Table No A2**  
**Diagnosis and Deficiencies in Science, Technology and Innovation**  
**Framework and Policy**

**Firms**

Production structure is specialized in primary and low value-added services, with minimal technological requirements. There is a lack of interrelation between counterparts of the innovation system, preventing the diffusion and transmission of knowledge. The government does not prioritize the technology or provide important sources of financing. Companies do not understand the meaning of innovation and human resources that generate innovation are scarce.

Small formal enterprises in traditional sectors suffer from unfair competition from informal ones (which represent almost 72% of total companies), because of the latter's artificially low cost structures. Weaknesses in enforcement of IPR and diffusion of an intellectual property culture as well as corruption hazards remain important disincentives for innovation in the business sector. Time and costs to open or close a business, difficulty of obtaining seed capital, may affect the rate of creation of innovative start-ups in manufacturing and services alike. The venture and seed capital industry is shallow in Peru, and the so-called angel capital is just emerging. There are also difficulties for new and growing firms to access capital. Also, as the tax regime is unclear it leaves the authorities room for discretionary interpretation of whether such investments are expenditures that can be written off against profits. There are also obstacles for transferring public funds to the private sector due to the The National System of Public Investment (SNIP), the criteria is not adapted to intangible investment, such as R&D expenditure. Labor market regulations can be obstacles to the recruitment and mobility of skilled human resources and inter-institutional co-operation on innovative activities. Shortage of technical skills for technology absorption and innovation management. Lack of collaborative practices and culture within the business sector and weak links with research institutions/universities. Too little social capital. Peru lacks a culture of industrial collaboration. Shortage of private intermediary institutions to act as "technology brokers" for knowledge transfer and provision of technology upgrading or technological infrastructure services. Lack of awareness of the value of innovation.

**Public Research Institutes (PRI'S)**

In comparison with the primary countries of reference (Finland, New Zealand and Chile), the Peruvian PRI's focus on industries and scientific fields like natural resources, agriculture and environmental security and national health. However, in comparison with other countries, the Peruvian system of the IPI is specifically weak in industrial and services research, which is not addressed properly.

**Table No A2**  
**Diagnosis and Deficiencies in Science, Technology and Innovation**  
**Framework and Policy**

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PRIs' autonomy is constrained in several ways and their margins of maneuver are in fact limited. First, their limited resources go first to fixed expenditures and there remain few resources for new research programs or projects that would require hiring new staff or expenditure on new S&T infrastructure. Second, prevailing labor laws and regulations make it difficult to develop human resource management practices based on the search for, and incentives given to, qualified and motivated staff. In many instances the most qualified staff can only be recruited under temporary contracts less rewarding than those of staff enjoying a more permanent status. The law bans researchers from receiving salaries from more than one source at any one time, so that collaborative research with other institutes and/or private industries is very difficult. Promotions are generally based on administrative performance rather than on research productivity. Highly skilled personnel have more incentives to leave the system than to remain. Under such circumstances it is difficult, to say the least, to develop a dynamic research strategy.

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PRIs' research agenda have often been mostly driven by the research institutes themselves with weak interactions with CONCYTEC, sectoral ministries and the productive sector. Their agendas are often static and based on narrow institutional interests rather than collective needs or demand from potential users in the productive sector.

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Inflation of managerial and administrative tasks has come at the expense of R&D and technological activities, owing to the combined effects of absence of incentives for qualified researchers, lack of autonomy in personnel management and bureaucratic inertia in the absence of performance-based evaluations. It has been estimated that in the past few years no more than 18% of PRIs' budgets has been used for R&D (Sagasti, 2009).

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The public research institutes, as publicly funded bodies, do not claim ownership of their inventions and rewards for inventors are therefore insufficient. In the current situation, researchers have no incentive to develop new technologies, and there is no mechanism to share the benefits of joint research among agencies.

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Some PRIs perform both regulatory functions and commercial activities on regulated products (e.g. INIA and ITP). This may create conflicts of interest and competition distortions.

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Peruvian investigators work in precarious conditions, generally obsolete equipment, insufficient information, scarce national and international relations and very limited access to financial sources to carry out its work. (Advisory Committee, 2012)

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**Source:** OECD (2010), CTI (2012). Author's work.

**Table A3**  
**Objectives and Strategies of the Peruvian Digital Agenda 2.0**

<b>Objective</b>	<b>Strategy</b>
Objective 1. Ensure that urban and rural populations have inclusive and participatory access to the Information and Knowledge Society.	1. Have a fiber optic backbone network.
	2. Develop connectivity in unattended areas.
	3. Connect all public institutions that provide services to the population.
	4. Promote connectivity of businesses from all sectors, especially inMSE (Micro and Small Enterprises).
	5. Promote connectivity and interaction between universities and research centers.
	6. Reinforce the regulatory framework that promotes and regulates telecommunications.
	7. Propose and implement governmental services that use innovative communication solutions supported by the Internet Protocol version 6 (IPv6).
Objective 2. Integrate, expand and ensure the development of skills to give population access to and participation in the Information and Knowledge Society.	1. Promote IT literacy programs.
	2. Provide training in the Information and Knowledge Society.
	3. Develop education applications and contents at different levels and methods, emphasizing basic regular education.
	4. Improve the quality of education management through the use of ICT.
Objective 3. Guarantee better opportunities to use and own ICT that ensure social inclusion, access to social services enabling full exercise of citizen rights and human development in full compliance with the millennium goals.	1. Reinforce public health in all its components (individuals, family members, and community) through the intensive use of ICT.
	2. Reinforce access to information and justice services through the intensive use of ICT.
	3. Promote digital inclusion of vulnerable social groups.
	4. Contribute to the creation of decent employment through the use of ICT.
	5. Promote ownership and use of ICT within rural areas.
	6. Reinforce risk management in the event of disasters.
	7. Reinforce development regarding Citizen Security.
	8. Promote efficient environmental management through the use of ICT.
Objective 4. Promote scientific research, technological development and innovation based on	1. Promote scientific production in ICT.
	2. Reinforce human resources for ICT research, development, and innovation.
	3. Generate mechanisms to create and reinforce ICT Science Parks.

**Table A3**  
**Objectives and Strategies of the Peruvian Digital Agenda 2.0**

<b>Objective</b>	<b>Strategy</b>
national development priorities.	4. Promote ICT centers of excellence, their infrastructure and laboratory equipment.
Objective 5. Increase productivity and competitiveness through innovation in the production of goods and services, with the development and application of ICT.	1. Adopt ICT to increase competitiveness within the various agents who carry out economic activities, especially in MSE.
	2. Develop E-Commerce.
	3. Adopt efficient management of electronic and electrical waste.
Objective 6. Develop a competitive and innovative national ICT industry with global presence.	1. Consolidate the growth and reinforcement of small and medium enterprises that produce software and other ICT goods and services.
	2. Promote the participation of the national ICT industry in the Government procurement process.
	3. Promote the supply and export of ICT contents, services and goods.
	4. Promote investment and capital markets within the national ICT industry.
	5. Promote an institutional framework for ICT promotion.
	6. Promote competitiveness in the national ICT industry through the certification of quality standards.
Objective 7. Promote a Public Administration of quality focusing on the population	1. Promote interoperability between Government institutions for the cooperation, development, integration and rendering of more and better services for the society.
	2. Provide the population with information, procedures and public services accessible through any available means.
	3. Develop and implement mechanisms to ensure the timely access to information and citizen security as a means to contribute to the governability and transparency of the public administration.
	4. Implement mechanisms to improve information security.
	5. Improve civil servants' skills as well as those of the society to have access to e-government services and use them effectively.
	6. Adapt the necessary regulations to implement e-government.

**Table A3**  
**Objectives and Strategies of the Peruvian Digital Agenda 2.0**

<b>Objective</b>	<b>Strategy</b>
Objective 8. Include the proposals of the "Agenda Digital Peruana 2.0" in local, regional, sectorial, and national policies to develop the Information and Knowledge Society.	1. Reinforce the institutional framework to implement and follow the "Agenda Digital Peruana 2.0."
	2. Promote the inclusion of the proposals of the "Agenda Digital Peruana 2.0" in the National Development Policies, as well as the inclusion of Sectorial and Institutional Strategic Plans in different government levels.
	3. Monitor the compliance with the regulatory framework that promotes the development of the Information and Knowledge Society.
	4. Develop monitoring and follow-up mechanisms for the proposals of the "Agenda Digital Peruana 2.0."
	5. Participate and contribute as a country in regional and global spheres that promote the Information and Knowledge Society.

**Source:** Author's work.



## Table A4

### STI Survey of Experts

#### 1. Expert 1

##### A. CONTEXTO NACIONAL DE POLÍTICAS

1. En términos generales, ¿cómo caracterizaría al apoyo público a la innovación en el **sector servicios** en su país? (Situación actual y tendencias emergentes, estrategias y nivel del sistema de innovación)

- A. Ningun Apoyo desde 1990 hasta la actualidad
- B. Parcial Apoyo y discrecional desde 1990 hasta la actualidad
- C. Desde 1990 a la fecha el apoyo se centra en los sectores primarios, manufacturas y empresas pequeñas
- D. Elabore otra opcion que Ud. considere más representativa

##### [Sobre Estrategias y nivel del sistema de innovación]

2. ¿Existe una estrategia nacional de innovación en su país? De ser así, ¿qué importancia estratégica tienen los servicios y la promoción de la innovación en ese sector?

- A. No existe Una Estrategia Nacional de Innovación desde el 1990 a la fecha
- B. Desde 1990, la estrategia se basa en la creación del Sistema Nacional de Innovación para el fomento de la Competitividad
- C. Desde 1990 a la fecha, la estrategia se basa en un conjunto de instituciones públicas y privadas cada una actuando de forma separada (con poca interrelaciones) realizando programas/proyectos CTI de acuerdo a los presupuestos disponibles de dichos entes.
- D. Elabore otra opcion que Ud. considere más representativa

3. Mediante un diagrama ilustre los principales actores en la política de innovación y las relaciones entre ellos a nivel nacional/regional.

*Esto es muy complejo, me remito al informe de la Comisión Consultiva sobre ciencia, tecnología e innovación, que adjunto<sup>18</sup>.*

4. ¿Cuáles actores de política han enfatizado al sector servicios y sus innovaciones?

En el campo de los servicios los principales actores han sido:

<sup>18</sup> Section 2 above is based upon such a report and many others quoted in that section.

**Sector público:** los ministerios relacionados con la provisión de servicios: Transportes (telecomunicaciones), Salud (servicios de salud), Educación (sistema educativo), Economía y Finanzas (servicios financieros). Además se tiene al Consejo de Competitividad, al Fondo de Investigación y Desarrollo para la Competitividad (FIDECOM), al Programa de Ciencia y Tecnología en la PCM (FINCyT), y a los Centros de Innovación Tecnológica (CITES). Por otra parte, se tiene a la Municipalidad de Lima Metropolitana, que está tratando de innovar en la provisión de servicios de transporte en la capital,

Sector privado: las principales empresas que trabajan en cada uno de estos campos (eg. Telefónica y su programa Wayra en telecomunicaciones); y una multitud de empresas medianas y pequeñas que han recibido apoyo de FIDECOM y de FINCyT. Algunos inversionistas (e.g. Grupo Interbank en educación, SuizaLab en análisis) han empezado a incursionar en la provisión de servicios con programas innovativos. La reciente creación del Centro de Innovación de IPAE es una señal que el sector privado está prestando atención al tema. Por último, algunas empresas consultoras vienen prestando apoyo para mejorar la provisión de servicios en una amplia gama de actividades económicas. Todo esto fuera de las innovaciones en gastronomía, que me inhibo de mencionar porque son muy conocidas.

**Sector académico/sociedad civil:** las universidades, particularmente la PUCP con su centro de innovación, la red IDI de universidades (PUCP, Agraria, San Marcos, etc.), y algunas universidades en el interior del país y en Lima (e.g. Universidad de Piura, ESAN, Universidad del Pacífico, Cayetano), han empezado a prestar servicios de apoyo a la innovación en la gestión de empresas y entidades públicas. Además, organizaciones como Ciudadanos al Día, que presta apoyo reconociendo las buenas prácticas e innovaciones en gestión y políticas públicas, y como Futuras Generaciones, que está dando apoyo a los Comités Locales de Atención de Salud (CLAS), fuera de entidades como TAREA y muchos otros think tanks y centros de investigación (GRADE, FORO Nacional Internacional, DESCO, el Consorcio CIES), participan activamente en apoyar la innovación en servicios.

**5.** ¿Qué actores son los más relevantes y activos en relación al diseño e instrumentación de políticas de innovación para el sector servicios? (Los actores relevantes pueden incluir distintas organizaciones como: ministerios, agencias, intermediarios, organizaciones de desarrollo, organizaciones regionales, institutos de investigación, administradoras de programas, etc.)

*Se requiere primero una concepción clara de que ámbitos del sector servicios, que es muy amplio, se quiere promover la innovación: ¿salud, comercio, gastronomía, transportes, gestión pública, educación, otros? Si no se hace esto primero, se termina con una lista excesiva de actores que confunde el diseño de políticas y dificulta su implementación.*

*De lo dicho anteriormente se desprende que hay una diversidad de actores, que se agrupan por sector, grupos de actividades económicas y sociales vinculadas, etc.*

*No quiero entrar en el ámbito regional, ya que habría que reproducir los esquemas en el ámbito nacional en menor escala, con un conjunto similar de actores (¡si es que existen!)*

### **[Principales actividades de servicios en el país]**

6. De acuerdo a su experiencia, ¿cuáles son las actividades del sector servicios más relevantes en su país?

- a) En términos de tamaño de la rama
- b) En términos de actividades de I+D en la rama
- c) En términos de otras actividades innovadoras de la rama (excluyendo I+D)

*Estas preguntas son difíciles de contestar, ya que deberían basarse en datos estadísticos que en su mayor parte son inexistentes. Por lo tanto, me abstengo.*

## **B. POLÍTICAS PROMOTORAS DE LA INNOVACIÓN EN EL SECTOR SERVICIOS**

### **[Políticas y medidas de incentivo a la OFERTA de servicios innovadores]**

7. En su experiencia, podría identificar y describir las políticas y medidas que apuntan específicamente a la innovación en el sector servicios a través del estímulo a la oferta de innovación en los servicios.

- A. Concursos, licitaciones a empresas con financiamiento no reembosable
- B. Concursos, licitaciones a centros de investigación y universidades con fiinanciamiento no reembosable
- C. Transferencias a institutos técnicos
- D. Describa otras opciones que Ud. considere más representativa

*Esta lista es muy limitada y necesita elaboración. Va a ser muy difícil llegar a una conclusión sensata y pertinente para el diseño de políticas considerando esas opciones. Los instrumentos de política varían de sector a sector, y comprenden una gran variedad de mecanismo y opciones. Para el caso de ciencia, tecnología e innovación, por favor ver el informe de la Comisión Consultiva.*

8. En su experiencia podría identificar y describir las políticas y medidas de innovación independientes del sector de actividad. Incluya aquí las políticas que ofrecen apoyo general a la innovación (tecnológica, organizacional, etc.), que estén disponibles también para empresas que estén desarrollando innovación en servicios.

*Por el momento sólo tenemos FINCyT y FIDECOM, además de algunos servicios elementales de control de calidad (e.g. SENASA) y el apoyo limitado que presta INDECOPI en el ámbito de la propiedad intelectual.*

**[Políticas y medidas de incentivo a la DEMANDA de servicios innovadores]**

9. En su experiencia, podría describir las políticas y medidas que apuntan a la promoción de la innovación en servicios a través de la creación de demanda por servicios novedosos.

- A. Contratación pública de servicios innovadores
- B. Desarrollo activo de habilidades y prácticas de contratación
- C. Regulación que estimule la demanda de servicios innovadores
- D. Estandarización
- E. Incentivos Fiscales a Empresas por actividades de innovación
- F. Políticas sistémicas (ej. iniciativas en mercados líderes)
- G. Apoyo a la innovación impulsada por el usuario

Otras que Ud. considere más representativas

*Ninguna de estas medidas de política se está aplicando en la práctica de manera extensiva y deliberada actualmente, así que no es posible decir cuáles de ellas funcionan y tienen resultados.*

**[Políticas y medidas para el desarrollo de un MARCO DE CONDICIONES E INFRAESTRUCTURA para la innovación en servicios]**

10. En su experiencia podría describir las políticas y medidas que apuntan a crear un marco de condiciones favorable a la innovación en servicios.

- TICs y redes
- Capacitación y educación
- Reforma regulatoria

Otras que Ud. considera más importantes

*Formación de recursos humanos altamente calificados. No tenemos gente para gestionar innovación tecnológica, hacer investigación científica y desarrollo tecnológico, prestar servicios tecnológicos y de innovación al sector servicios, etc.*

### C. LISTA DE CONTROL DE MEDIDAS DE POLÍTICA

**11.** En su experiencia, mencione las políticas y medidas más importantes que apuntan a promover la innovación en servicios a través de la orientación hacia nuevos tipos de actores en la innovación, nuevos tipos de actividades de innovación y soluciones de negocio innovadoras.

- Promoción de nuevos modelos de negocio
  - Fomento de innovación impulsada por los usuarios y/o empleados
  - Establecimientos de compromisos con nuevos actores en la innovación (ej. ONGs)
  - Fomento de innovación en servicios que favorezca la responsabilidad ecológica y/o social
  - Creación de valor en las redes
  - Utilización óptima de la tecnología, a través de la combinación de servicios y tecnología
  - Soluciones a empresas y servicios empresariales innovadores
- Otras que Ud. considera más importantes

*Lo siento mucho, pero no entiendo qué respuesta se quiere obtener con esta pregunta. Deben haber personas con mayor conocimiento y experiencia que yo para responder, pero esta lista es demasiado heterogénea y general para poder responderla con propiedad.*

**12.** En su experiencia, mencione aquí las políticas y medidas más importantes que apuntan a la promoción de aptitudes y capacidades asociadas a la innovación en servicios.

- Apoyo a investigación, educación, capacitación y aprendizaje permanente
- Apoyo a aptitudes y capacidades multidisciplinarias
- Apoyo a redes de valor basadas en el conocimiento
- Apoyo a la co-creación de conocimiento

Otras que Ud. considera más importantes

*No entiendo que se quiere decir con las últimas tres preguntas, sobre todo una vez respondida la primera que engloba las otras tres.*

**13.** En su experiencia, indique las políticas y medidas más importantes que apuntan al desarrollo de mercados e infraestructura como estímulo a la innovación en servicios.

- Regulación favorable a la innovación
- La contratación pública como incentivo a la innovación en servicios
- Innovaciones sistémicas
- Estandarización "inteligente"
- Soluciones financieras "inteligentes" como estímulo al crecimiento basado en la innovación en servicios

Otras que Ud. considera más importantes

*Creo que ya respondí a esta pregunta más arriba.*

#### **D. DESARROLLOS FUTUROS Y NECESIDADES DE POLÍTICA PARA LA INNOVACIÓN EN SERVICIOS**

**14.** ¿Están siendo desarrolladas en su país nuevas medidas de política orientadas a los Servicios y su innovación?

*Se están empezando a desarrollar políticas de ciencia, tecnología e innovación en general, pero no veo nada dirigido específicamente al "sector servicios"*

**15.** ¿Cree que existen espacios que deberían ser abordados por nuevas medidas de Política orientadas a la innovación en servicios? (Por ejemplo apoyo a: internacionalización de servicios y productividad de los servicios)

*Esta pregunta es demasiado general para poder responderla*

**16.** Otros comentarios y observaciones que Ud. considere relevantes vinculados a las políticas emergentes de innovación en el sector servicios:

*Me parece que el cuestionario podría haber sido diseñado mejor, de manera más precisa y concisa.*

*Hace falta una definición de que se entiende por "sector servicios" e "innovación en el sector servicios" para orientar a quienes respondemos la encuesta. Todos tenemos apreciaciones diferentes y sesgadas de lo que son los "servicios", y me temo que las respuestas van a ser difíciles de comparar.*

## 2. Expert 2

### A. CONTEXTO NACIONAL DE POLÍTICAS

1. En términos generales, ¿cómo caracterizaría al apoyo público a la innovación en el **sector servicios** en su país? (Situación actual y tendencias emergentes, estrategias y nivel del sistema de innovación)

- A. Ningún Apoyo desde 1990 hasta la actualidad
- B. Parcial Apoyo y discrecional desde 1990 hasta la actualidad
- C. Desde 1990 a la fecha el apoyo se centra en los sectores primarios, manufacturas y empresas pequeñas
- D. Elabore otra opción que Ud. considere más representativa

### [Sobre Estrategias y nivel del sistema de innovación]

2. ¿Existe una estrategia nacional de innovación en su país? De ser así, ¿qué importancia estratégica tienen los servicios y la promoción de la innovación en ese sector?

- A. No existe Una Estrategia Nacional de Innovación desde el 1990 a la fecha
- B. Desde 1990, la estrategia se basa en la creación del Sistema Nacional de Innovación para el fomento de la Competitividad
- C. Desde 1990 a la fecha, la estrategia se basa en un conjunto de instituciones públicas y privadas cada una actuando de forma separada (con poca interrelaciones) realizando programas/proyectos CTI de acuerdo a los presupuestos disponibles de dichos entes
- D. Elabore otra opción que Ud. considere más representativa

3. Mediante un diagrama ilustre los principales actores en la política de innovación y las relaciones entre ellos a nivel nacional/regional.

- CONCYTEC - CORCYTECs
- FINCYT
- CNC
- PRODUCE – CITEs
- MINCETUR – CITEs
- Institutos Públicos de Investigación
- Universidades
- Sector privado – Empresas, Gremios y ONGs

4. ¿Cuáles actores de política han enfatizado al sector servicios y sus innovaciones?

El FINCYT tiene como una de sus áreas prioritarias a las TICs.

Sector privado – Programa Wayra está acelerando empresas en el sector TICs

5. ¿Qué actores son los más relevantes y activos en relación al diseño e instrumentación de políticas de innovación para el sector servicios? (Los actores relevantes pueden incluir distintas organizaciones como: ministerios, agencias, intermediarios, organizaciones de desarrollo, organizaciones regionales, institutos de investigación, administradoras de programas, etc.)

MINCETUR es un actor importante. Desde hacer algún tiempo ha estado haciendo estudios sobre la manera de promover las exportaciones de servicios.

Se supone que ONGEI debería promover más activamente el tema de gobierno electrónico y eso sería un estímulo de demanda para las empresas de software.

### **[Principales actividades de servicios en el país]**

MINCETUR ha identificado los siguientes subsectores de servicios: Servicios de informática y servicios conexos; Servicios de contabilidad y teneduría de libros; Servicios de logística; Servicios de ingeniería, especialmente consultaría en ingeniería; Servicios de salud, especialmente servicios prestados por laboratorios.

6. De acuerdo a su experiencia, ¿cuáles son las actividades del sector servicios más relevantes en su país?

a) En términos de tamaño de la rama

Servicios financieros y bancarios

b) En términos de actividades de I+D en la rama

No tengo conocimiento

c) En términos de otras actividades innovadoras de la rama (excluyendo I+D)

Servicios financieros y bancarios

## **B. POLÍTICAS PROMOTORAS DE LA INNOVACIÓN EN EL SECTOR SERVICIOS**

### **[Políticas y medidas de incentivo a la OFERTA de servicios innovadores]**

7. En su experiencia, podría identificar y describir las políticas y medidas que apuntan específicamente a la innovación en el sector servicios a través del estímulo a la oferta de innovación en los servicios.

- A. Concursos, licitaciones a empresas con financiamiento no reembolsable
- B. Concursos, licitaciones a centros de investigación y universidades con financiamiento no reembolsable
- C. Transferencias a institutos técnicos
- D. Describa otras opciones que Ud. considere más representativa



8. En su experiencia podría identificar y describir las políticas y medidas de innovación independientes del sector de actividad. Incluya aquí las políticas que ofrecen apoyo general a la innovación (tecnológica, organizacional, etc.), que estén disponibles también para empresas que estén desarrollando innovación en servicios.

El programa FINCYT brinda financiamiento a proyectos de investigación e innovación tecnológica. Una de sus áreas prioritarias es al sector de TICs, pero cualquier propuesta con la calidad suficiente, independiente del sector, puede acceder a financiamiento.

**[Políticas y medidas de incentivo a la DEMANDA de servicios innovadores]**

9. En su experiencia, podría describir las políticas y medidas que apuntan a la promoción de la innovación en servicios a través de la creación de demanda por servicios novedosos.

- A. Contratación pública de servicios innovadores
- B. Desarrollo activo de habilidades y prácticas de contratación
- C. Regulación que estimule la demanda de servicios innovadores
- D. Estandarización
- E. Incentivos Fiscales a Empresas por actividades de innovación Estandarización tentativa
- F. Políticas sistémicas (ej. iniciativas en mercados líderes)
- G. Apoyo a la innovación impulsada por el usuario

Otras que Ud. considere más representativas

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**[Políticas y medidas para el desarrollo de un MARCO DE CONDICIONES E INFRAESTRUCTURA para la innovación en servicios]**

10. En su experiencia podría describir las políticas y medidas que apuntan a crear un marco de condiciones favorable a la innovación en servicios.

- TICs y redes
- Capacitación y educación
- Reforma regulatoria

Otras que Ud. considera más importantes

### C. LISTA DE CONTROL DE MEDIDAS DE POLÍTICA

**11.** En su experiencia, mencione las políticas y medidas más importantes que apuntan a promover la innovación en servicios a través de la orientación hacia nuevos tipos de actores en la innovación, nuevos tipos de actividades de innovación y soluciones de negocio innovadoras.

- Promoción de nuevos modelos de negocio
- Fomento de innovación impulsada por los usuarios y/o empleados
- Establecimientos de compromisos con nuevos actores en la innovación (ej. ONGs)
- Fomento de innovación en servicios que favorezca la responsabilidad ecológica y/o social
- Creación de valor en las redes
- Utilización óptima de la tecnología, a través de la combinación de servicios y tecnología
- Soluciones a empresas y servicios empresariales innovadores

Otras que Ud. considera más importantes

**12.** En su experiencia, mencione aquí las políticas y medidas más importantes que apuntan a la promoción de aptitudes y capacidades asociadas a la innovación en servicios.

- Apoyo a investigación, educación, capacitación y aprendizaje permanente
- Apoyo a aptitudes y capacidades multidisciplinarias
- Apoyo a redes de valor basadas en el conocimiento
- Apoyo a la co-creación de conocimiento

Otras que Ud. considera más importantes

\_No conozco\_\_\_\_\_

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**13.** En su experiencia, indique las políticas y medidas más importantes que apuntan al desarrollo de mercados e infraestructura como estímulo a la innovación en servicios.

Regulación favorable a la innovación

La contratación pública como incentivo a la innovación en servicios

Innovaciones sistémicas

Estandarización "inteligente"

Soluciones financieras "inteligentes" como estímulo al crecimiento basado en la innovación en servicios

Otras que Ud. considera más importantes  
No conozco de medidas concretas al respecto

#### **D. DESARROLLOS FUTUROS Y NECESIDADES DE POLÍTICA PARA LA INNOVACIÓN EN SERVICIOS**

**14.** ¿Están siendo desarrolladas en su país nuevas medidas de política orientadas a los Servicios y su innovación?

Hay lineamientos pero no estoy al tanto de avances

**15.** ¿Cree que existen espacios que deberían ser abordados por nuevas medidas de Política orientadas a la innovación en servicios? (Por ejemplo apoyo a: internacionalización de servicios y productividad de los servicios)

**Se están realizando consultorías pero no sé de otros avances concretos**

**16.** Otros comentarios y observaciones que Ud. considere relevantes vinculados a las políticas emergentes de innovación en el sector servicios:

No creo que haya una política clara y coherente. Hay avances parciales, especialmente en el área de TICs, pero no sé de otros avances

### 3. Expert 3

#### A. CONTEXTO NACIONAL DE POLÍTICAS

1. En términos generales, ¿cómo caracterizaría al apoyo público a la innovación en el **sector servicios** en su país? (Situación actual y tendencias emergentes, estrategias y nivel del sistema de innovación)

- Ningún Apoyo desde 1990 hasta la actualidad
- Parcial Apoyo y discrecional desde 1990 hasta la actualidad
- Desde 1990 a la fecha el apoyo se centra en los sectores primarios, manufacturas y empresas pequeñas
- Elabore otra opción que Ud. considere más representativa

#### [Sobre Estrategias y nivel del sistema de innovación]

2. ¿Existe una estrategia nacional de innovación en su país? De ser así, ¿qué importancia estratégica tienen los servicios y la promoción de la innovación en ese sector?

- A. No existe Una Estrategia Nacional de Innovación desde el 1990 a la fecha
- B. Desde 1990, la estrategia se basa en la creación del Sistema Nacional de innovación para el fomento de la Competitividad
- C. Desde 1990 a la fecha, la estrategia se basa en un conjunto de instituciones públicas y privadas cada una actuando de forma separada (con poca interrelaciones) realizando programas/proyectos CTI de acuerdo a los presupuestos disponibles de dichos entes
- D. Elabore otra opción que Ud. considere más representativa

3. Mediante un diagrama ilustre los principales actores en la política de innovación y las relaciones entre ellos a nivel nacional/regional.

CONCYTEC, CITEs, FINCYT, FIDECOM, UPCH, PUCP, UNMSM, UNI, UNA, una pocas Empresas privadas, IGP, IIAP, INDECOPI, CCL, IPAE, MML, entre las principales, con escasas relaciones entre sí.

4. ¿Cuáles actores de política han enfatizado al sector servicios y sus innovaciones?

En general los actores políticos no consideran la innovación como una prioridad en sus propuestas y actividades públicas; con las justas aceptan la competitividad como concepto, y dentro de ella, a veces aparece la innovación.

5. ¿Qué actores son los más relevantes y activos en relación al diseño e instrumentación de políticas de innovación para el sector servicios? (Los actores relevantes pueden incluir distintas organizaciones como: ministerios, agencias, intermediarios, organizaciones de desarrollo, organizaciones regionales, institutos de investigación, administradoras de programas, etc.)

En el sector servicios no hay actores relevantes en el diseño de instrumentos para la innovación; no hay muchos para la innovación en general, así que menos va a haber específicamente para el sector servicios.

#### **[Principales actividades de servicios en el país]**

6. De acuerdo a su experiencia, ¿cuáles son las actividades del sector servicios más relevantes en su país?

a) En términos de tamaño de la rama: la gran mayoría de empresas en servicios son MYPEs (Micro y Pequeña empresa, 1 a 50 trabajadores), representan el 99% del total; es cierto que con baja productividad y competitividad. Las ramas más importantes son: Comercio (minorista y mayorista), restaurantes y hoteles, transporte, reparaciones (autos, TVs, gasfitería, etc.), educación (nidos, escuelas, institutos), salud (consultorios, clínicas), servicios personales (peluquerías, saunas, spas), entre las principales

b) En términos de actividades de I+D en la rama: No conozco

c) En términos de otras actividades innovadoras de la rama (excluyendo I+D): Idem

#### **B. POLÍTICAS PROMOTORAS DE LA INNOVACIÓN EN EL SECTOR SERVICIOS**

##### **[Políticas y medidas de incentivo a la OFERTA de servicios innovadores]**

7. En su experiencia, podría identificar y describir las políticas y medidas que apuntan específicamente a la innovación en el sector servicios a través del estímulo a la oferta de innovación en los servicios.

A. Concursos, licitaciones a empresas con financiamiento no reemboslable: FINCYT y FIDECOM

B. Concursos, licitaciones a centros de investigación y universidades con financiamiento no reemboslable: FINCYT y FIDECOM

C. Transferencias a institutos técnicos

D. Describa otras opciones que Ud. considere más representativa

8. En su experiencia podría identificar y describir las políticas y medidas de innovación independientes del sector de actividad. Incluya aquí las políticas que ofrecen apoyo general a la innovación (tecnológica, organizacional, etc.), que estén disponibles también para empresas que estén desarrollando innovación en servicios.

**[Políticas y medidas de incentivo a la DEMANDA de servicios innovadores]**

En esto el Perú recién está empezando, muy atrás de los otros países de la región; el indicador más importante es la Inversión en I+D que llega a menos del 0.15% del PBI.

9. En su experiencia, podría describir las políticas y medidas que apuntan a la promoción de la innovación en servicios a través de la creación de demanda por servicios novedosos.

- A. Contratación pública de servicios innovadores
- B. Desarrollo activo de habilidades y prácticas de contratación
- C. Regulación que estimule la demanda de servicios innovadores
- D. Estandarización
- E. Incentivos Fiscales a Empresas por actividades de innovación Estandarización sentativa

Recién se está empezando con esto, aunque todavía no hay resultados

- F. Políticas sistémicas (ej. iniciativas en mercados líderes)
- G. Apoyo a la innovación impulsada por el usuario

Otras que Ud. considere más representativas

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**[Políticas y medidas para el desarrollo de un MARCO DE CONDICIONES E INFRAESTRUCTURA para la innovación en servicios]**

10. En su experiencia podría describir las políticas y medidas que apuntan a crear un marco de condiciones favorable a la innovación en servicios.

- TICs y redes
- Capacitación y educación
- Reforma regulatoria

Otras que Ud. considera más importantes

### C. LISTA DE CONTROL DE MEDIDAS DE POLÍTICA

**11.** En su experiencia, mencione las políticas y medidas más importantes que apuntan a promover la innovación en servicios a través de la orientación hacia nuevos tipos de actores en la innovación, nuevos tipos de actividades de innovación y soluciones de negocio innovadoras.

- Promoción de nuevos modelos de negocio
- Fomento de innovación impulsada por los usuarios y/o empleados
- Establecimientos de compromisos con nuevos actores en la innovación (ej. ONGs)
- Fomento de innovación en servicios que favorezca la responsabilidad ecológica y/o social
- Creación de valor en las redes
- Utilización óptima de la tecnología, a través de la combinación de servicios y tecnología
- Soluciones a empresas y servicios empresariales innovadores

Otras que Ud. considera más importantes

\_\_\_Algo de esto se está haciendo, pero por iniciativa privada como el CIDE de la PUCP o el Centro de Innovación de IPAE, o el Comité de la CyT de la Municipalidad Metropolitana de Lima (MML), para poner unos pocos ejemplos; hay muy poco de estas políticas desde el Estado, siendo una de las pocas los CITEs \_\_\_\_\_

**12.** En su experiencia, mencione aquí las políticas y medidas más importantes que apuntan a la promoción de aptitudes y capacidades asociadas a la innovación en servicios.

- Apoyo a investigación, educación, capacitación y aprendizaje permanente
- Apoyo a aptitudes y capacidades multidisciplinarias
- Apoyo a redes de valor basadas en el conocimiento
- Apoyo a la co-creación de conocimiento

Otras que Ud. considera más importantes

\_\_\_Una de las pocas experiencias que van en esta dirección ha sido el Programa Articulando MYPERU financiado por el FOMIN-BID (ver pag web: [www.articulacionempresarial.pe](http://www.articulacionempresarial.pe))\_\_\_\_\_

**13.** En su experiencia, indique las políticas y medidas más importantes que apuntan al desarrollo de mercados e infraestructura como estímulo a la innovación en servicios.

- Regulación favorable a la innovación
- La contratación pública como incentivo a la innovación en servicios
- Innovaciones sistémicas
- Estandarización "inteligente"
- Soluciones financieras "inteligentes" como estímulo al crecimiento basado en la innovación en servicios

Otras que Ud. considera más importantes

\_\_\_Casi no hay nada de esto. \_\_\_\_\_

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#### **D. DESARROLLOS FUTUROS Y NECESIDADES DE POLÍTICA PARA LA INNOVACIÓN EN SERVICIOS**

**14.** ¿Están siendo desarrolladas en su país nuevas medidas de política orientadas a los Servicios y su innovación?

No específicamente para servicios; se están haciendo algunas medidas en general.

**15.** ¿Cree que existen espacios que deberían ser abordados por nuevas medidas de Política orientadas a la innovación en servicios? (Por ejemplo apoyo a: internacionalización de servicios y productividad de los servicios).

Hay varios; recomiendo revisar el Informe de la Comisión Consultiva para la CTI (creada por RS 038-2011-ED que se encuentra en la pag. web del CONCYTEC).

**16.** Otros comentarios y observaciones que Ud. considere relevantes vinculados a las políticas emergentes de innovación en el sector servicios:



**ÚLTIMAS PUBLICACIONES DE LOS PROFESORES  
DEL DEPARTAMENTO DE ECONOMÍA**

*Libros*

Cecilia Garavito e Ismael Muñoz (Eds.)

2012 *Empleo y protección social*. Lima, Fondo Editorial, Pontificia Universidad Católica del Perú.

Félix Jiménez

2012 *Elementos de teoría y política macroeconómica para una economía abierta* (Tomos I y II). Lima, Fondo Editorial, Pontificia Universidad Católica del Perú.

Félix Jiménez

2012 *Crecimiento económico: enfoques y modelos*. Lima, Fondo Editorial, Pontificia Universidad Católica del Perú.

Janina León Castillo y Javier M. Iguiñiz Echeverría (Eds.)

2011 *Desigualdad distributiva en el Perú: Dimensiones*. Lima, Fondo Editorial, Pontificia Universidad Católica del Perú.

Alan Fairlie

2010 *Biocomercio en el Perú: Experiencias y propuestas*. Lima, Escuela de Posgrado, Maestría en Biocomercio y Desarrollo Sostenible, PUCP; IDEA, PUCP; y, LATN.

José Rodríguez y Albert Berry (Eds.)

2010 *Desafíos laborales en América Latina después de dos décadas de reformas estructurales. Bolivia, Paraguay, Perú (1997-2008)*. Lima, Fondo Editorial, Pontificia Universidad Católica del Perú e Instituto de Estudios Peruanos.

José Rodríguez y Mario Tello (Eds.)

2010 *Opciones de política económica en el Perú 2011-2015*. Lima, Fondo Editorial, Pontificia Universidad Católica del Perú.

Felix Jiménez

2010 *La economía peruana del último medio siglo*. Lima, Fondo Editorial, Pontificia Universidad Católica del Perú.

Felix Jiménez (Ed.)

2010 *Teoría económica y Desarrollo Social: Exclusión, Desigualdad y Democracia. Homenaje a Adolfo Figueroa*. Lima, Fondo Editorial, Pontificia Universidad Católica del Perú.

José Rodríguez y Silvana Vargas

2009 *Trabajo infantil en el Perú. Magnitud y perfiles vulnerables. Informe Nacional 2007-2008*. Programa Internacional para la Erradicación del Trabajo Infantil (IPEC). Organización Internacional del Trabajo.

*Serie: Documentos de Trabajo*

- No. 352 "Optimal Taxation and Life Cycle Labor Supply Profile". Michael Kuklik y Nikita Céspedes. Marzo, 2013.
- No. 351 "Contexto internacional y desempeño macroeconómico en América Latina y el Perú: 1980-2012". Waldo Mendoza Bellido. Marzo, 2013.
- No. 350 "Política fiscal y demanda agregada: Keynes y Barro-Ricardo". Waldo Mendoza Bellido. Marzo, 2013.
- No. 349 "Microeconomía: Aplicaciones de la teoría del productor". Alejandro Lugon. Diciembre, 2012.
- No. 348 "Endogenous Altruism in the Long Run". Alejandro Lugon. Diciembre, 2012.
- No. 347 "Introducción al cálculo de Malliavin para las finanzas con aplicación a la elección dinámica de portafolio". Guillermo Moloche. Diciembre, 2012.
- No. 346 "Reglas de política monetaria y choques externos en una economía semi-dolarizada". Oscar Dancourt. Noviembre, 2012.
- No. 345 "Calidad del aire y gasto de bolsillo en salud en Lima Metropolitana: Una aproximación a los modelos de producción de salud". Samuel D. Jaramillo De Souza. Noviembre, 2012.
- No. 344 "IS-LM Stability Revisited: Samuelson was Right, Modigliani was Wrong". Waldo Mendoza. Noviembre, 2012.
- No. 343 "Integración para la inclusión con desarrollo humano en el Perú". Efraín Gonzales de Olarte. Noviembre, 2012.