

# On the role of R&D in e-government in Ecuador

Strategic Plan in ICT for Ecuador in the field of Information Society and e-Government

Juan José Moreno-Navarro  
Universidad Politécnica de Madrid &  
IMDEA Software Institute  
Madrid, Spain  
[juanjose.moreno@upm.es](mailto:juanjose.moreno@upm.es) / [imdea.org](http://imdea.org)

Carlos Miguel Casas Jiménez  
CONSULTRANS, SAU  
Madrid, Spain  
[ccasas@consultrans.es](mailto:ccasas@consultrans.es) / [ccasas@gmail.com](mailto:ccasas@gmail.com)

Juan Marcelo Ibijes Villacís  
Ministry of Telecommunications and Information Society  
Quito, Ecuador  
[Juan.ijebes@mintel.gob.ec](mailto:Juan.ijebes@mintel.gob.ec)

José Ignacio Alonso Montes  
Universidad Politécnica de Madrid  
Madrid, Spain  
[ignacio@gmr.ssr.upm.es](mailto:ignacio@gmr.ssr.upm.es)

Jaime Albuja Munive  
Ministry of Telecommunications and Information Society  
Quito, Ecuador  
[Jaime.albuja@mintel.gob.ec](mailto:Jaime.albuja@mintel.gob.ec)

Juan Carlos Urquiza Suarez  
National Institute of Pre-Investment (INP)  
Quito, Ecuador  
[juan.urquiza@preinversion.gob.ec](mailto:juan.urquiza@preinversion.gob.ec)

**Abstract—** Information and Communications Technologies (ICT) has become an essential tool for development worldwide. As several literature studies confirm, the development of the ICT industry and the massification of internet use conveys important social and economical benefits. Research, development and innovation (R&D&i) activities are crucial for countries in order to improve the social welfare, and the competitiveness and productivity of their economies.

This impact is especially more important in developing countries. In that sense the Ecuadorian Ministry of Telecommunications and Information Society (MINTEL), in cooperation with the National Institute of Pre-Investment (INP) decided to develop an Strategic Plan of Research, Development and Innovation for ICT in Ecuador for the period 2014-2018, with the help of a Spanish consultancy company and a couple of research institutions.

The paper describes briefly the methodology, development, and the concrete proposal of the Strategic Plan, including a complete analysis and diagnosis of the current situation, identification of the strong and weak points of ICT in Ecuador, the objectives and indicators of the Plan and its global structure. In particular, a dedicated programme for the development of the Information Society in Ecuador is described in some detail, where R&D&i in e-government plays a key role.

**Keywords—** Information and Communication Technologies; ICT; Strategic Plan; R&D&i; innovation, Research and Development in e-government

## I. INTRODUCTION AND CONTEXT

Nowadays, the current model of growth and welfare of modern societies is strongly based on innovation inside the so called Knowledge Society, which requires the adequate use of Information and Communication Technologies (ICT).

Research, development and innovation (R&D&i) activities are the engine of advance of countries definitively contributing to the social welfare, and the competitiveness and productivity of their economies, in a global and changing market.

The Ecuador government, aware of these needs and challenges, decided to developed a Strategic Plan on ICT, including a number of action lines in coherence with the goals of the Ecuadorian National Plan of Well Living 2013-2017 and having as primary goal setting up the basis for the future growth, the development of ICT in Ecuador, and the improvement of the research and technology transfer infrastructures, contributing, at the same time, to the advance of the information society of the country.

The ambition of this goal needs the cooperation of two key Ecuadorian institutions: the National Institute of Pre-Investment and the Ministry of Telecommunications and Information Society. The Plan has been developed by an external consultant company Consultrans with the help of two Spanish higher education and research institutions, the Technical University of Madrid – UPM and the Institute IMDEA Software.

This paper is devoted to show the main stages and findings of the project, giving a brief summary of its goals and structure. A special focus is done in the promotion of R&D&i in e-government in Ecuador. While there are many papers for surveying advances and strategies of e-government in concrete countries as well as more focused research papers (see [12] which identifies the main topics of these papers: perspectives on the impacts of e-government, research philosophy, use of theory, methodology and method, and practical recommendations, also [20], ), it is not easy to find in the literature reports on the organization of R&D&i in concrete

strategic R&D&i plans. This contribution tries to cover this gap by showing a practical case of development of such this Strategic Plan on R&D&i in Information Society and e-government.

The rest of the paper is organized as follows: Section II describes the methodology we have used in the development of the Strategic Plan. Section III is focused on the diagnosis and analysis of the departing situation in order to show some key data and allow an identification of strong and weak points. Section IV is devoted to presenting the overall structure of the Strategic Plan. Section V includes the main contributions of the paper regarding the topic of the conference, namely the (important) role of e-governments and the R&D&i on it. Finally we conclude pointing out some key issues and sketching the future of the Plan.

## II. METHODOLOGY FOR DEVELOPING THE STRATEGIC PLAN

We have used a rigorous methodology based on three phases:

- Analysis of the departing situation
- Identification of plan objectives and indicators of the Strategic Plan
- Definition and planning of initiatives and programs for achieving the objectives

The first one includes a detailed analysis and diagnosis of the current situation by using several sources:

- Statistical data from the Ecuadorian statistic institute (INEC), Ministry of Telecommunications (MINTEL), Secretary for Higher Education and Science (SENACYT) and other internal sources.
- Data, reports and indicators for international and Latin-American institutions.
- Onsite meetings, interviews, workshops and consultations in the Ecuadorian ICT and R&D ecosystem.
- Global strategic plans of the Ecuador government like the National Plan of Well Living 2013-2017 [1] and the Ecuador Digital Strategy that includes a National Plan for universal access, a National Plan for broadband, and a National Plan for Digital Government. Next subsection describes the MINTEL objectives and some details about the e-government Plan.

### A. *The role of MINTEL and the Ecuador Program of Digital Government*

The Ministry of Telecommunications and Information Society as the institution in charge of the ICT sector in Ecuador creates policies of e-government as follows:

- To promote the standardization, development, optimization and modernization for adequate infrastructure related to ICT, for secure connectivity and interconnectivity in public institutions.
- To impulse and regulate the provision of ICT equipment for public institutions in order e-government services can be enhanced.
- To guarantee the availability, integrity, interoperability, reliability and security of informatics systems, based on data and information repositories of public and private institutions for the use of ICT tools and the development of e-government
- To reduce the digital divide based on citizens training, and by increasing the ICT use in public and private institutions.
- To increase the development of digital applications and contents with standards and norms that allows citizens to take advantage of public services through e-government applications.

In consequence MINTEL is committed to improve the legal, businesses, cultural and institutional environment for an efficient ICT industry development, the promotion for a productive transformation towards an economy based on ICT products and services that could generate added value, and also the creation of digital content and applications for the development of the Information Society as a medium for improving the quality of life of Ecuadorian society.

The Ministry of Telecommunications and Information Society (MINTEL), has designed, and is currently implementing the National Program of Digital Government [27], whose main objective is to improve and optimize online government services delivered to citizens in the vein of [23], [24], [25], [26].

Specific objectives of the National Plan of Digital Government are web platforms of e-government related to the development of the ICT industry, as well as e-services implementation, and also to contribute the technological innovation and entrepreneurship in firms and citizens in general, and the creation of the ICT Observatory.

## III. DIAGNOSIS AND ANALYSIS PHASE: MAIN FINDINGS

### A. *International reports*

On this step, not too much advanced research is done as we are using Ecuadorian data from international reports. However, the detailed analysis of data, the comparison among them and with the internal data, as well as the interpretation is original work. The on-site work we will report below is a double check of most of the findings.

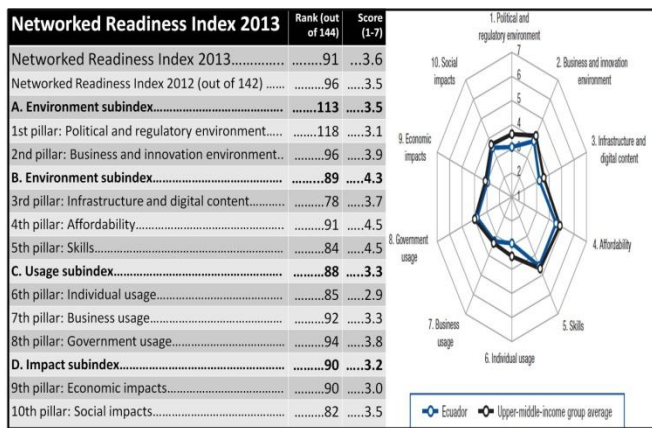


Fig. 1: Networked Readiness Index 2013 - Ecuador Fiche

Although several international sources have been used, we will report on this paper a selection of them, showing those that, from our opinion, are the main and most significant one and can give a clear snapshot of the Ecuadorian landscape.

The World Economic Forum elaborates the Networked Readiness Index (NRI). The index measures the propensity for countries to exploit the opportunities offered by information and communications technology. It is published annually. The NRI seeks to better comprehend the impact of ICT on the competitiveness of nations. The NRI is a composite of four components and ten pillars

The World Economic Forum (together with the INSEAD business school) publishes the Global Information Technology Report [2], which makes use of the index. In the 2013 report Ecuador occupies position 91 (out of 144 countries surveyed) with a score of 3.6 (maximum seven), where Latin-American average is 3.68. A detailed look shows that the best evaluation is obtained in the third pillar (Infrastructure and Digital Content) where Ecuador ranks up to 78<sup>th</sup> with a score of 3.7. The government usage (eight pillar) ranks 94<sup>th</sup> and scores 3.8. Fig. 1 shows the Ecuador fiche in the NRI.

According to the analysis presented in the Network Readiness Index, a 10% increase in the digitization score has a positive impact of 0.75% increase on a country's GDP.

As it is presented in [3] this score measures a country's level of digitization in a scale between 0 and 100, and defines different levels of digitization according to its development: limited, emerging, transitional and advanced.

Ecuador has been categorized as an emerging nation regarding its digitization, which it is characterized to have a score between 20 and 35. Countries with these scores have focused to address problems related to the accessibility to digital services, not only by increasing ICT deployment infrastructure but also reaching adequate Internet affordability levels; however the quality of digital services and applications in these nations are limited. Ecuador's level of digitization in 2012 is 33/100.

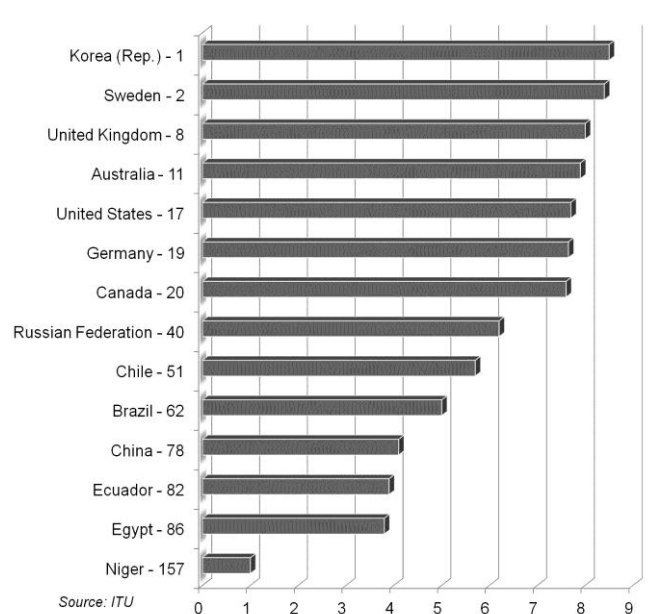


Fig. 2: ICT Development Index - Selected countries

In general, the analysis indicates that the ongoing digitization of a country has positive effects in economic development, social well-being and in government efficiency, nevertheless these impacts varies according to the level of digitization, the higher the score the more beneficial the impacts are. Therefore the importance of creating a national R&D&i plan in Ecuador.

The ICT Development Index (IDI) is published by the International Telecommunication Union based on internationally agreed ICT indicators [3]. This makes it a valuable tool for benchmarking the most important indicators for measuring the information society.

The IDI is a standard tool that governments, operators, development agencies, researchers and others can use to measure the digital divide and compare ICT performance within and across countries. The ICT Development Index is based on 11 ICT indicators, grouped in three clusters: The access sub-index (weight 40%) captures ICT readiness, and includes infrastructure and access indicators (fixed-telephony, mobile telephony, international Internet bandwidth, households with computers, and households with Internet).

The use sub-index (weight 40%) captures ICT intensity and usage with three indicators (Internet users, fixed (wired) - broadband, and mobile broadband). The skills sub-index (weight 20%) captures ICT capability or skills as indispensable input indicators (adult literacy, gross secondary enrolment and gross tertiary enrolment).

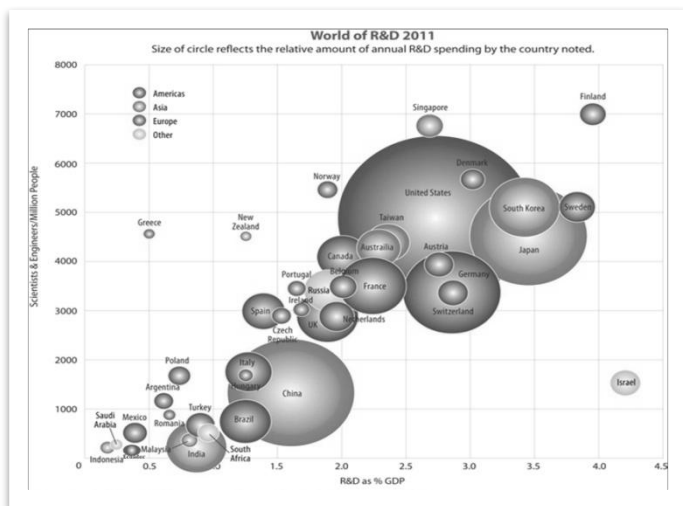


Fig. 3: R&D&i Ecuador main figures and world comparison

Ecuador ranks position 81, average score 4.0 with the best score in the skill sub-index (7.29/67<sup>th</sup>) and the worse in the use sub-index (2.22/84<sup>th</sup>). Ecuador ranks in 16<sup>th</sup> position in the Americas, a bit up average of the region. Fig.4 shows the index for most interesting countries.

Additional data for infrastructure and use of ICT have been obtained from United Nations ICT Task Force [4], the World Bank ([5]), the Latin-American repository for Science and Technology (RICYT) [6] and the Ecuadorian ICT and Internet report 2012 [7].

Regarding the involvement of Ecuador in Research and Development in general and in ICT in particular, we have obtained information from several sources [8]. The Ecuador official statistics report that the investment in R&D is a 0.48% of the GPD and 139.4 scientists per million people. This gives a position in the rear part of Latin-America as shown in [8].

According to SCImago Journal and Country Rank (SJR Indicator [10]) the number of research articles in the area of Computer Science in 2012 is 8, occupying the 107 position of the world. This information is displayed in **¡Error! No se encuentra el origen de la referencia.**

**B. On-site work**

Although the international data offers a significant view of the Ecuadorian situation, it is mandatory to contrast the information with the main actors in order to check them, analyze the reasons and identify the correct actions to be taken. In fact, this is one of the main contributions of the paper and we claim that reported on this actions is useful and interesting.

	Country	Documents
1	China	31.960
2	United States	24.948
3	Germany	7.734
4	United Kingdom	7.538
5	France	6.490
6	Japan	5.714
7	Spain	5.589
8	South Korea	5.536
9	Canada	5.064
10	Italy	4.978
17	Brazil	2.017
34	Mexico	708
44	Argentina	357
59	Colombia	165
68	Cuba	94
73	Venezuela	69
76	Uruguay	54
93	Peru	17
107	Ecuador	8

Fig. 4: Scimago Country Ranking - Computer Science

The first action taken was to organize some meetings and interviews, including relevant multinational and Ecuadorian companies, industry associations, universities (especially with the most relevant technical ones), technology centers and parks, and institutions of the Ecuadorian Central Government. This gave us a first overview of the identification, role, impression and concerns of the main actors of the Ecuador ecosystem on ICT R&D.

We also organized two workshops in Quito with significant delegations from the most relevant actors in the Ecuadorian ICT Sector. The first one was devoted to the diagnosis and the main components of the Strategic Plan and the second one to the check the research lines of the Plan. Surprisingly, for most of the attendees it was the first inter-sector meeting for discussing strategic issues allowing them both to pose ideas on the strategy and, at the same time exchange ideas of potential academic-industrial cooperation.

To complete the analysis phase a wide consultation to the ICT community about the situation of Ecuador and the needs for the development of R&D&i and Information Society was done. The consultation was done during the first series of workshops. A summary of the questionnaire is depicted in Table 1, where some examples of concrete questions are included.

Topic	Subtopic	Example of question
Diagnosis	Global vision	Is the Ecuadorian industry innovative enough? (1..10 value)
	Human resources and talent	ICT Ecuadorian graduates valuation (1..10) on : <i>Education, Technological and transversal competences, R&amp;D and entrepreneurship capacity</i>
	Infrastructures and regulations	Adequacy of tax incentives for ICT deployment and R&D (1..10)
	e-government & inf. society	In which collective is the information society and e-government better developed: <i>administration, citizens, companies, education</i>
	Industrial policies	Adequacy of IPR regulation in the ICT sector in Ecuador (1..10)
	Community Organization	Valuation of mechanisms and structures of coordination between academy and business (1..10)
R&D&I lines	Priorities	Need and capacity for developing R&D in sectors (1..10): Digital TV and contents, e-education, e-health, e-government, e-commerce, e-security, domotics, e-leisure
	Funding mechanisms	Valuation of funding mechanisms (1..10): project calls, tax incentives, loans
	Governance	Best method for periodical evaluation of the Ecuador R&D system: internal, external-international, mixed
Strategic actions	Action characteristics	Recognition of an "Ecuador software trademark" (1..10)

Table 1: Questionnaire for the public consultation

In fact, the results of the consultations were obtained in real time thanks to a computer application we developed to process the results, allowing for discussing almost immediately the global opinion with the community, enriching substantially the diagnosis.

An important result from the consultation is a number of qualitative indicators of the global situation on Information Society, and R&D&i in Ecuador. They are shown by using web charts in **¡Error! No se encuentra el origen de la referencia..**

All the international data and indicators, plus the valuable information obtained in-site, allows us to identify the strong and weak points of ICT in Ecuador. We produce a SWOT analysis (Fig. 6).

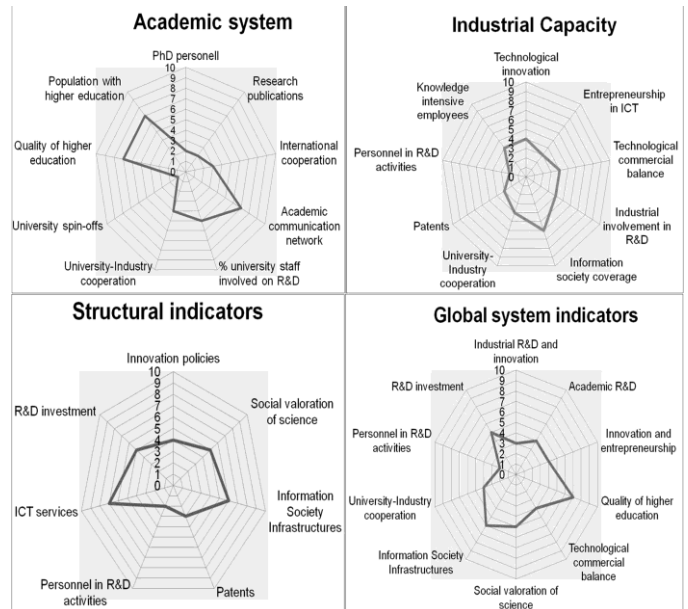


Fig. 5: Summary of Diagnosis in R&D&i in ICT in Ecuador



Fig. 6: SWOT

Regarding the specific topic of e-government, the approach is also similar. On the side of international reports, we can mention the United Nations Global e-Government Survey framework [11] that encompasses the economic and social development context of a country. They use a benchmarking tool that provides a comparative assessment for monitoring progress of a country's e-Government development from 2003 to 2012. As such it provides an interactive snapshot picture of a

country's e-Government Development in the world. Main figures of the global ranking can be found in Fig. 7. Ecuador ranges in the middle of the South America countries (102 in the total list) with a score of 0.4869, a bit lower than in 2010.

The report also includes an index on e-participation. The e-Participation Index assesses the quality and usefulness of information and services provided by a country for the purpose of engaging its citizens in public policy making through the use of e-government programs. As such it is indicative of both the capacity and the willingness of the state in encouraging the citizen in promoting deliberative, participatory decision-making in public policy and of the reach of its own socially inclusive governance program. Some significant country results can be found in Fig. 8.

Country	E-Government 2012	Rank 2012	Rank 2011	Rank Change
Korea (Rep.)	0.9283	1	1	=
Netherlands	0.9125	2	5	+3 ↑
UK	0.8960	3	4	+1 ↑
USA	0.8687	5	2	-3 ↓
Germany	0.8079	17	15	-2 ↓
Japan	0.8019	18	17	-1 ↓
Spain	0.770	23	9	-14 ↓
Chile	0.6769	39	34	-5 ↓
Colombia	0.6769	43	31	-12 ↓
Brazil	0.6167	59	61	+2 ↑
Peru	0.5230	82	63	-19 ↓
Ecuador	0.4869	102	95	-7 ↓

Fig. 7: E-government index - selected countries

Country	E-Participation 2012	E-Participation 2010
Korea (Rep.)	1.0000	0.6000
Netherlands	1.0000	1.0000
UK	0.9211	0.7714
USA	0.9211	0.7571
Germany	0.7632	0.6143
Japan	0.7638	0.7571
Spain	0.5000	0.8286
Colombia	0.6769	0.4429
Chile	0.7368	0.3429
Brazil	0.5000	0.2857
Peru	0.3947	0.1714
Ecuador	0.2368	0.1571

Fig. 8: E-Participation index: Selected countries

On the side of the on-site work, we have used a report with internal data and statistics developed by the Ministry of Telecommunications and Information Society as the basis for the National Program of Digital Government. Furthermore e-government played a significant role on the whole process. For instance, a number of questions were included in the global consultation. As an example, Fig. 9 shows the results on the question included in the previous table:

**In which collective are the information society and e-government better developed?**

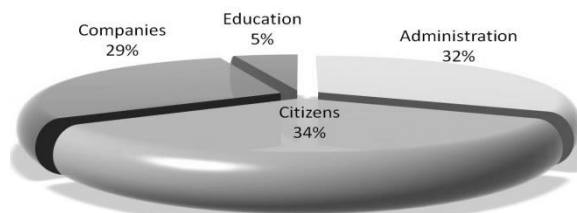


Fig. 9: Results of the consultation: example

For the purpose of this paper, it is possible to extract a particular and brief SWOT just for the case of e-government in Ecuador:

Strengths	Weakness
<ul style="list-style-type: none"> <li>Well-educated and highly creative IT professionals that allows for innovative ideas and solutions to e-government challenges.</li> <li>A good number of initiatives in digital cities along the country, with a clear focus on e-government.</li> <li>Very good experiences in e-government initiatives (Internal Revenue Service, agricultural information service, Social Indicators of Ecuador integrated system) both technically and innovative.</li> <li>Wide cover of mobile telephony and improving indicators for other access methods.</li> </ul>	<ul style="list-style-type: none"> <li>Reduced record of experiences of collaboration between universities and companies in the field of e-government.</li> <li>E-government responsibilities too much distributed along administrations. Capacity of improvement of the coordination between them.</li> <li>Need of reinforcement of intellectual property.</li> <li>Limitation to access to e-government: low cover of broadband, high costs for equipments.....</li> <li>Doubts in capacity of Ecuadorian companies to develop ambitious e-government projects: small and not too much innovative industry.</li> <li>Low extent of software quality certifications, a must for trust in e-government.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>Extension of new devices and social networks as new ways to Access and benefit e-government and e-participation.</li> <li>Opportunities of outsourcing in Ecuador for external companies that can develop general e-government solutions in Ecuador.</li> <li>Opportunities from the analogical blackout in 2017 in the digital contents production and distribution.</li> <li>Transparency as a clear goal of the government, therefore the promotion of e-government systems</li> </ul>	<ul style="list-style-type: none"> <li>No <i>Ecuador quality software production</i> brand outside the country for e-government solutions.</li> <li>All countries "run for e-government", so more effort needed for improving the position.</li> <li>External perception of e-government advances and the R&amp;D&amp;i and business climate not corresponding with reality.</li> <li>Incentives for R&amp;D&amp;i not well developed for (e-government) projects.</li> </ul>

#### IV. OVERVIEW OF THE PLAN STRUCTURE

The global goal of the Strategic Plan is to obtain an adequate use of ICT to contribute to an economic growth model based on increasing competitiveness and productivity, promotion of social equity, increment of accessibility, and welfare and life quality of citizens. This general goal is divided into seven specific objectives:

- i) more implied in ICT,
- ii) more technology balanced,
- iii) with a better structured R&D&i system,
- iv) with adequate information about its evolution,
- v) improving technological capacity of companies,
- vi) with better ICT services to the citizens, and
- vii) more international.

Additionally a number of impact indicators are defined to monitor the success of the Strategic Plan, see Table 2.

In order to achieve these goals, the structure of the Plan is designed by using axes, lines and programs. In order to gain in visibility, a name and motto are proposed for each component. The concrete programs are defined by fixing their objectives, description, beneficiaries, expected impact, budget, number of projects, etc.

There are two axes: The *Advance Axis* for applied research is devoted to generate and improve ICT services for the whole productive Ecuadorian system as well as the quality of life of citizens. It is structured in two Lines: The first one, called *Ecuador Conecta* (Connects) is oriented towards the Development of the Information Society, and it is described in detail in the next section. The second one, *Ecuador Reta* (Challenges), is oriented towards the advanced use of ICT for productive sectors. It will fund activities towards a nontrivial, innovative and technological disruptive use of ICT for the improvement of competitiveness of major priority industrial sectors. The selected sectors include those with better impact in Ecuador economy, namely Agri-food, Petrochemical, Banking and Business, Pharmaceutical, Construction, Engineering and Transportation, Tourism, Natural Environment, Energy, Industrial Automation and Public services. The technical components where the advances could be more significant are: Quality control, Logistics, Digital Marketing, Process Automation, Traceability, Production/stocks management, and Design/Production decisions.

The *Structural Axis* for better R&D&I structures in Ecuador includes three lines:

*Ecuador Estructura* (Structures) tries to minimize the problems related the lack of a real R&D&i culture and the incipient state of the relationship between knowledge generators and companies with no clear established mechanisms to promote such cooperation. The activities proposed include mainly the creation of new research and

technology centers, developing intermediary structures, promoting the creation of thematic clusters, reinforcing a complete information system / observatory of ICT information in Ecuador and the funding of new studies and plans for the sector.

*Ecuador Idea* (Devises) focused on basic research. The Ecuadorian system of R& D& i will be unable to achieve impact objectives on the challenges aforementioned if a frontier high-quality basic research in ICT is not developed. Topics adequate for the Ecuador Capacity and needs include Information Management, Intelligent Systems, Software Engineering, Advanced interfaces, Signal processing, and Architecture and network communication technology.

Finally Ecuador Crea (Creates) has as main aim to cooperate in the promotion of innovation and entrepreneurship by means of a number of accompanying measures to support the results of the Advance axe initiatives. It includes support for all the elements of the entrepreneurship ecosystem (investment funds, incubator, entrepreneurship contests, tax incentives), Internationalization (measures to improve exports and attract external investment), and improvements in the innovative structure (internal strategic R&D&i plan in companies, quality certification).

Indicator	Current value (2013)	Goal (2018)
Gross domestic expenditure on R&D as a percentage of GDP (%). Percentage devoted to ICT (%).	0,48% / NA <sup>1</sup>	0,66% / 25%
Personnel / Researchers dedicated to R & D in the ICT sector (per million people).	NA/NA	40/100
Annual number of publications/ Ranking position SCIMAGO in Computer Science	8 /107	54 / 70
Patent applications – Domestic/ Non residents	4/690	40/700
Exports of services / products / ICT tech (% of service exports, BoP)	NA/ 0,1 / 3%	0,21 / 0,4 / 5%
ICT Development Index: valuation and position	3,68: 82 of 155	5,00: 62 of 155
Position Networked Readiness Index: (NRI) / Infrastructures Pillar	3,58 :91 of 144 / 3,7: 71 of144	3,90 :70 of144/ 4.1: 55 of144
ICT investment to GDP	NA	5% (average LA)

Table 2: Indicators for the Strategic Plan

#### V. INFORMATION SOCIETY AND THE ROLE OF E-GOVERNMENT IN THE CONTEXT OF THE STRATEGIC PLAN

The Ecuador Conecta line tries to further develop the Information Society in Ecuador with a solid foundation on which to build a true knowledge-based economy. Therefore, the development of the Information Society, far from being a goal in itself, aims to improve and increase the quality of life of citizens. This can be achieved by promoting boosting methods,

<sup>1</sup> NA: Not applicable / Unknown

tools, processes, applications and innovative products that, going beyond the current state of technology, improve significantly the access, benefits and capabilities of services offered to citizens in a number of challenges. These challenges include:

- An administration closer to citizens: looking for new proposals in the area of e-government, trust and security.
- Improvement of the social welfare: with initiatives to improve sectors like e-education, e-health and other social areas.
- Impact in how we live, how we buy: with activities to further development of e-business, domotics, electronic devices, etc.
- New and better access to culture, information and leisure: departing from the analogical blackout towards a full digital TV, new proposal on digital contents and e-leisure and digital amenities are welcome.

Notice that all these challenges are essential to e-government to some extent (e.g. advances in digital contents clearly improve e-participation and the possibility to access to e-administration contents and services.)

In order to cover these aspects, a set of programs were included (see Fig. 10)

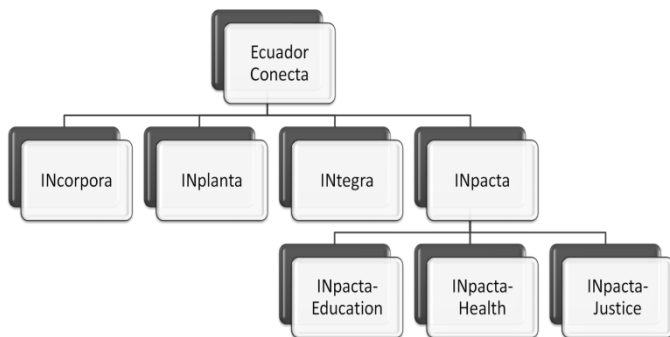


Fig. 10: Structure in programs of the Ecuador Conecta line

The INcorpora program is focused on the implementation of pre-competitive projects of R&D&i in the field of Information Society, where e-government is one of the main areas on the challenge of bringing the administration closer to citizens.

The INplanta program has similar objectives but the advanced technological projects are focused in government or society's priorities. The projects are selected in a R&D&i competition for each category or priority. In first stage a set of projects are approved to be developed. Then the best solution for each priority is supported and funded by the program in the framework of a new project that integrates the outputs and the prototypes generated in the previous projects.

The INtegra program is dedicated to promote businesses on the Web and Digital Business through partial subsidies to encourage the presence of Ecuadorian SMEs in Internet and e-commerce.

Finally, the INpacta program consists of direct actions on e-government areas related to citizens' welfare. In this sense, it includes three subprograms on e-education, e-health and justice fields.

## VI. RELATED WORK AND CONCLUSION

In modern society citizens have new capabilities and new requirements that require a profound transformation of the role and activities of the government. These require an open, responsible and innovative vision of providing citizens' services, and, at the same time, a clear decision for improving significantly access from ubiquity, high availability, inclusiveness and immediacy.

E-government is the concept coined for giving answers to these demands ([15]), especially if we understand it in a wider context ([19]).

In the literature one can find papers reporting on the adoption of strategies and example results with respect to the implementation of e-government in particular countries [16], see also for instance the cases of USA - [18], Canada - [22], or developing countries in general - [21]). A very complete and selected collection of success cases can be found in [13] while [21] concentrates on strategies for adoption. Other papers are more focused on the research challenges related to e-government (see [12], [14]).

Less information can be found on how to define strategic plans for developing R&D&i in e-government in order to achieve a better and more developed information society.

One of the great challenges of the work we report on this paper was to obtain and adequate collection of data an information to perform a useful diagnosis of the situation. Notice that a good diagnosis is a key for the rest of the process. Additionally to the collection of international report and data (essential but incomplete for the diagnosis) an intensive and wide work on-site was developed for analyzing, and completing the diagnosis as well as setting the basis for defining the strategic actions for achieving the desired goals. From our point of view, this is an interesting piece of applied research work.

Inside the e-government environment we understand several different issues related to confidence and convenience, that is, the wiliness of the relationship of the citizen with demand services through ICT, overcoming cultural, age, and location barriers. Among others we can consider including such aspects as: e-security, e-identity (Ecuador included some years ago the digital identity card), e-participation ([17]), e-inclusion, and, in general, e-access to citizen services in a wide concept that includes leisure, amenities, business, shopping, education, health, etc.

Therefore, all the R&D&i initiatives and structure proposed along the Ecuador Conecta line are in some degree defined to develop methods, methodologies, techniques, tools, processes, applications and products crucial in e-government development.

Ecuador has made considerable efforts in the establishment of a powerful information society with e-government as a pillar of the global strategy, and the comparative situation is in a



reasonable good position with its environment, which gives the country an excellent position to promote new ideas and experiences.

Ecuador has a quite exciting challenge in order to let in the XXI century to become one of the most advanced countries in its environment in its conception of the Information Society and ICT in general and e-government in particular, from a R&D&I perspective. The Plan allows offering its universities and research centers the possibility to improve capacity and international impact, their business opportunities to enhance their competitiveness and productivity, and its citizens a new generation of services that will improve their quality of life and a closer relation to the administration. In this sense, within of the Information Society Pillar of the Strategic Plan, the e-government is one of the main research areas.

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