

Colombia's Digital Agenda: Successes and the Challenges Ahead

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In recent years, the information and communication technologies (ICT) sector has come to play a vital role and has gained in significance in the area of public policy in Colombia. The Colombian government considers the ICT sector to be a priority, acknowledging its importance and its potential impact on the national economy. It has taken critical steps toward increasing the country's interconnectedness and fully developing a national digital ecosystem, which it recognizes as having great potential for generating wealth and socioeconomic development.

International studies suggest that a direct correlation exists between Internet penetration levels, ICT adoption, the generation of employment, and the reduction of poverty.¹

A growing ICT industry creates new jobs in multiple industries and sectors. These jobs—unlike jobs in the primary and secondary sectors of the economy, such as agriculture and manufacturing—are focused on new activities of the third sector of the economy: services. ICT jobs are more competitive internationally and often have better salaries than jobs in the primary sectors. Furthermore, there is evidence that each job created by the ICT industry is a catalyst for the generation of employment in other sectors. In the Latin American context, the multiplier effect of employment in the ICT sector is estimated to be 2.42—that is, each job in the ICT industry generates more than 2 new jobs in other areas of the economy.²

At the same time, the development of the ICT industry increases the competitiveness of countries by allowing them to take advantage of opportunities in a market that is increasingly interconnected and that also facilitates the generation of local and global business opportunities.

A strong, more developed ICT industry makes a country more globally competitive, as demonstrated by the correlation between the Networked Readiness Index, which measures a country's preparedness to leverage ICTs, and the Global Competitiveness Index, which measures a country's overall capacity to boost competitiveness.³ It is clear that ICTs have great development potential, and also that those countries that are best prepared to take advantage of ICTs are those that obtain the most benefit from them.

In recent years, Colombia has made important progress: it has improved its ranking in the Networked Readiness Index more quickly than the global average, and it has established itself as the leader in Latin America in terms of e-government tools.

BARRIERS TO WIDESPREAD INTERNET USE IN COLOMBIA

Colombia has been addressing multiple barriers to achieve widespread Internet use. Obstacles arise in all parts of the digital ecosystem: infrastructure, services, applications, and users.

Since President Juan Manuel Santos took office in 2010, four main obstacles to the goal of achieving widespread Internet use in the country have been identified:

1. The Internet is not perceived as useful. Surveys have revealed that one of the reasons why the general public and micro-enterprises do not use the Internet is that they do not see it as useful or necessary.⁴ The lack of specialized and useful applications and content for the general public and micro-enterprises would explain this view.
2. The costs of installing the infrastructure are too high. In 2010, just 200 municipalities out of the country's 1,102 had access to the fiber-optic network. The use of communication networks has been restricted by geographical features and the scattered distribution of urban areas, as well as administrative problems that hinder the use of the infrastructure that is already present.
3. The resources available to the state for investing in infrastructure are limited. This adds to the previous problem.
4. The purchasing power of Colombians is limited. The costs of hardware and subscribing to the service to get Internet access are relatively high for the majority of the population, and many citizens simply do not have the opportunity, from an economic perspective, to use the Internet.

The lack of relevant content in local languages and the similar lack of interfaces that are accessible to the general public and that give people important information for their everyday lives and businesses largely explain why they perceive the Internet to be of limited use. Penetration is low because there is little demand in light of the perceived limited usefulness of the service.

On the other hand, although it has been shown that Colombia has relative advantages in terms of costs, infrastructure, business environment, and risk, the sector's development is limited by a lack of human resources and its industry's lack of experience.

AN AMBITIOUS PLAN TO WIDELY EXPAND THE USE OF THE INTERNET IN COLOMBIA

In order to grow the ICT sector in Colombia, the Plan Vive Digital—the most ambitious public policy strategy ever implemented by the Colombian government for the ICT sector—was established. This plan, to be implemented during the presidential period 2010–14, aims to give the country a technological leap through wide dissemination of the Internet and the development of its national digital ecosystem (its users, infrastructure, applications, and services). The plan responds to the challenge identified by the government of achieving

democratic prosperity through the appropriation and use of technology. Vive Digital is betting on making the Internet ubiquitous. As seen above, a direct correlation between Internet penetration and the adoption of ICTs with employment generation and poverty reduction has been demonstrated. Vive Digital uses this correlation to yield an impact with significant social and economic benefits.

Plan Vive Digital: Strategy and objectives

To achieve widespread Internet use, Plan Vive Digital has established three specific objectives for 2014:

1. Triple the number of municipalities connected to the information highway. The aim is to extend the infrastructure to connect 1,053 of the country's municipalities to the national fiber-optic network.
2. Connect 50 percent of micro-enterprises and small- and medium-sized enterprises (known as *MIPYMEs*) and 50 percent of homes to the Internet.
3. Increase the number of Internet connections fourfold. By 2014, we want to reach 8.8 million Internet connections.⁵

Strengthening the digital ecosystem

Vive Digital envisages the development of the country's digital ecosystem based on four components:

1. expanding the infrastructure,
2. creating services at lower prices,
3. developing applications and digital content, and
4. fostering ICT adoption and use.

The foregoing has the purpose of establishing a virtuous cycle, where a better infrastructure will allow more and better services at lower prices, which in turn stimulates the development of content and applications, and thus the growth of demand.

Expanding the infrastructure

Vive Digital has already achieved a great deal. Colombia has gone from 2.2 million Internet connections to 6.2 million in the last 2.5 years. In 2013, Colombia will reach 7.8 million Internet connections; in 2014, 8.8 million connections. During this period, significant progress has been made in infrastructure as the tender of the National Fiber Optics project was assigned: in 2010, only 200 municipalities were connected with optical fiber, and now there are 553 municipalities with optical fiber access. In 2013, Vive Digital will connect 226 municipalities more; and in 2014, it has the goal of connecting a total of 1,078 municipalities, reaching 96 percent of the national territory. Currently, the project has installed more than 15,000 kilometers of optical fiber.⁶

One of the fundamental tools for providing nationwide Internet access is mobile Internet connection, for which the fourth-generation (4G) spectrum auction is currently underway (although it is important to note that Colombia was the first country in the region to launch 4G mobile services). The auction process for Advanced Wireless Services (AWS) and 2.6 GHz bands, which has been under discussion since 2012, has gone through a series of steps that result in granting participation to the different interested parties and organizations. All these assignment procedures are carried out by the Ministry of Information and Communication Technologies (ICT Ministry) based on the technology neutrality principle stated in article 2 of Law 1341 of 2009. Regarding access to spectrum, that law also establishes that spectrum permits must always observe this principle and be adjusted to the ministry's policies, guaranteeing that the usage of assigned spectrum does not generate interference with other services, is compatible with international spectrum usage trends, does not affect national security, and contributes to national sustained growth.

As part of the country's infrastructure development activities, content distribution network infrastructure will be acquired and content companies will be encouraged to deploy this infrastructure. Infrastructure protocols for home telecommunications will be created that are confirmed to be both feasible for the industry and favorable for users; the coverage of communications in the country will be expanded through the universalization of access to public television and the launch of digital radio with the purpose of determining its implementation feasibility at the national level. Finally, improvements to the Disaster Prevention and Assistance Telecommunication Network are being implemented in order to allow for faster, more efficient, and more effective responses when facing emergencies and disasters in Colombia.

Creating services at lower prices

Services are a vital component of the development of digital connectivity. The infrastructure allows operators to expand their service offerings, increasing coverage as well as technological engagement on the part of users. Some examples of services are Internet service, mobile phone service, and text messaging services.

To ensure that by 2014 the country will have competitive offerings of new-generation technology, Vive Digital envisages doubling the number of Internet access terminals and updating regulations with the purpose of promoting new services, the wider use of ICT infrastructures, and ensuring massive citizen access to IT. Colombia has implemented measures that have allowed, through public-private actions, the widespread use of the Internet; these measures include subsidies for Internet access aimed at lower-income inhabitants. As

a consequence, broadband connections grew by 180 percent in the country in 2.5 years.⁷

The penetration of personal computers (PCs) has also increased recently, thanks to the policy that eliminated the sales taxes and duties on computers. The result is that Colombia is now the place where the cheapest computers in the region can be found.⁸

In addition, according to the latest study, the penetration rate in mobile telephony is 105.3 percent.⁹ Household connections grew from 17 percent in 2010 up to 33.8 percent in 2012.¹⁰ By 2013, Colombia expects that 43 percent of households will be connected; the target for 2014 is to connect 50 percent of households. In addition, Vive Digital has given 82,000 computers to children and youth in more than 3,500 educational sites through the *Computadores para Educar* (the Computers to Educate Program, or CPE). Approximately 7 million children have benefited from the purchase of 577,000 computers, which are being delivered to more than 13,500 educational centers. This is the largest purchase of computers ever made by the Colombian government.

In another instance of Colombia's progress, on August 28, 2008, Colombia adopted the European digital terrestrial television standard, DVB-T, using MPEG4 H.264, with a channel bandwidth of 6 MHz. Following the recommendation of the Comisión Nacional de Televisión (National Television Commission, or its acronym in Spanish, CNTV) to migrate from the DVB-T standard for digital terrestrial television delivery to the more advanced DVB-T2 standard, the Colombian government officially adopted DVB-T2 on December 20, 2011. Regulations for the adoption of this more advanced standard for digital terrestrial television in Colombia are established in Acuerdo CNTV 002/2012 (a regulation issued by the CNTV—Hoy en Liquidación).¹¹

Developing applications and digital content

The expansion of applications and digital content offerings, focused on local needs, will yield greater productivity on the part of consumers as well as an increase in development opportunities.

Applications are computing tools that allow users to communicate, execute procedures, and learn and work from different types of terminals, such as computers, tablets, or mobile phones. *Digital content offerings* refers to the content that can be accessed by the applications. Together, advances in these two areas are essential for a healthy digital ecosystem and are already well under way.

Since 2010, the ICT Ministry's e-government program, *Gobierno en Línea*, has framed its activities in the National Development Plan 2010–2014 and in the Plan Vive Digital, especially in the applications, content, and users components defined by the digital ecosystem of Vive Digital.

The e-government department promotes the implementation and use of the e-government strategy by means of two initiatives: (1) encourage good government through the use of ICTs, and (2) give citizens the power to interact with the state through the use of ICTs.

- **Encourage good government through the use of ICTs.** This initiative is intended to strengthen e-government in public administration institutions and to promote the implementation of the strategy in the legislative and judicial branches of the public power, in the autonomous public organizations, and in the rest of public sector. The initiative is supported by three processes in order to fulfill its objective: (1) design and innovate to collect and create the directives, products, and services of the strategy; (2) provide technical services and solutions; and (3) appropriate e-government in the state to promote knowledge, implementation, and use of online government tools by public officials and employees.
- **Give citizens the power to interact with the state through the use of ICTs.** This initiative is intended to strengthen the capacities of citizens and businesses to relate to public organizations and to create opportunities for collaboration, participation, and information for social development. This process is called *Adoption of e-Government in Society*.

In 2012, the national government online website, Gobierno en Línea, had the following results:

- An increase in the offerings and quality of online procedures and services to approximately 1,024 partial and total online procedures and services throughout the country.
- The promotion of e-government culture through electronic channels: 50 percent of citizens and 78 percent of businesses interacted with the state through electronic channels in 2012.
- A total of 19,222 public officials and contractors were taught and made familiar with ICTs.
- Policies and directives to promote e-government development: directives were implemented in security, usage, interoperability, data access, and zero paper.
- Improvements in the information exchange between public organizations: 56 public organizations released information exchange services in the interoperability platform.

- Promotion of mechanisms to optimize the technological infrastructure of the organizations: the Government Intranet Data Center has 77 applications from 12 organizations that have on-demand computing services, generating savings of US\$3.3 million on infrastructure services.
- Now 137 organizations use the state's high-speed network.
- The launch of the Urna de Cristal (Crystal Ballot Box) has made the government more open to oversight and has elevated the level of accountability of government officials.¹² Meanwhile, hiring processes at both the national and regional levels are monitored by the Electronic Hiring System.¹³

Strengthening the digital content industry is of paramount importance to a successful digital ecosystem. Colombia is currently implementing a digital content policy to address this need. One of the main goals of this policy is that, by the end of 2014, there will be 17 digital centers all across the country (called Vive Labs). These centers will provide a place in which anyone can learn digital content skills and will empower new entrepreneurs with high-quality equipment and licensed software.

In another example, Fortalecimiento de la Industria TI (FITI) is a program that aims to contribute to the transformation of the IT industry in a world-class sector.¹⁴ In order to fulfill this aim, the program works through different action lines that integrate a systemic model.

In addition, the MIPYME Vive Digital program seeks to boost competitiveness, productivity, and employment in the country by widely expanding the use of the Internet among micro-, small- and medium-sized enterprises in Colombia. Vive Digital's objective is to increase Internet penetration among micro-enterprises to 50 percent. When President Santos took office, only 7 percent of micro-enterprises were connected and used the Internet, mainly because they were not aware of how the Internet could be helpful to them. The initiative has centered its efforts on deploying applications for micro-enterprises through medium-sized and large enterprises that can improve their business relationship and processes using these applications with hundreds or thousands of micro-enterprises, which are their providers or distributors. In this way, micro-enterprises see the real business value of the Internet and appropriate its use in their daily operations. The government is also working with ICT providers (such as telecommunication operators, PC vendors, and software developers) to change and complement their products so that they include business applications specifically for micro-enterprise sectors. Internet penetration among micro-enterprises had increased almost threefold by December 2012, and is now at 20 percent.

The Apps.co program seeks to have a strong digital entrepreneurship ecosystem in Colombia. The results are very impressive: more than 21,000 Colombians are learning how to code, and more than 480 projects are looking for business opportunities. All these projects are being supported by accelerators and institutions that have been trained by Bob Dolf and Steve Blank, two of the most successful entrepreneurs in the world. Currently the ICT Ministry is supporting 70 companies looking for venture capital investment. In that way, the ministry aims to foster both ICT entrepreneurship and private investment within the country.

Fostering ICT adoption and use

The model is based on the premise that it is necessary to encourage the offering of and demand for digital services at the same time. The objective is to create a virtuous cycle: expanding the infrastructure promotes the offer of low-cost services, which encourage the development of digital applications and content, which in turn stimulate demand for these two products on the part of users, who will then have more incentives to acquire and use these services—thus increasing the size of the market.

The CPE program is responsible for bridging the social and regional gap of Colombia by bringing ICTs to children in rural and remote zones and by training teachers to be better acquainted with technology. The aim is to improve the quality of education in public schools. This program also helps the environment by recycling obsolete computers. According to an impact evaluation, the CPE reduces dropout rates, raises standardized test scores, and increases the probability that a child will enroll in higher education.

When President Santos took office in August 2010, there was a ratio of 20 students per computer. On December 2012, this ratio was reduced to 15 to 1, thanks to the delivery of more than 250,000 terminals (including laptops, PCs, and tablets). The program has also trained 14,000 public school teachers in the use of ICTs. Aligned with environmental initiatives, the program has refurbished 753 tons of obsolete computers (approximately 36,600 computers) in order to reduce the impact that ICTs have on the environment.

In 2013, the CPE program plans to deliver 266,147 terminals to 12,100 public schools, libraries, and community centers (which includes 4,500 new establishments that had not received this benefit earlier). It also plans to provide 150 hours of teacher training in ICTs (at least one teacher in each establishment), and to train 180,000 parents for 12 hours in order to develop their ICT skills. Finally, in 2013, CPE expects to set a record in terms of environmental strategy by refurbishing more than 29,800 obsolete computers (612 tons) taken from public schools.

Another initiative from the ICT Ministry, En TIC Confío is a nationwide program that seeks to promote confidence and security in the use of the Internet and other ICTs in Colombia, as well as divulging and appropriating content concerned with the productive, creative, safe, respectful, and responsible use of ICTs in order to help improve the quality of life for all Colombian people.

Through this ICT Ministry program, we seek to recognize and prevent behaviors that occur every day and are present in the virtual world as sexting, cyberbullying, phishing, Internet addiction, and child pornography. En TIC Confío is focused on guardians, teachers, parents, and children in the educational community. To date, it has reached 78,915 people through interactive conferences. Since 2011, it has produced over 700 pieces of related content that aims to empower the fight against these unwanted behaviors.

In 2012, 1,476 URLs to sites containing child pornography were published by the ICT Ministry platform so they could be blocked by Colombian ISPs.

By the end of 2014, it is expected that 150,000 people will have been effectively reached by the conference for the responsible use of ICTs. Furthermore, 300 new pieces of content for the program will have been generated, and outreach campaigns such as Ciberpapaya, Cibercuidado, and Monstruos en Red will allow us to achieve at least 20 million impacts in media (print, radio, television, and the web).

Another project, the Digital Citizenship Program, seeks to promote access, use, dissemination, and adoption of ICTs among public servants and in the public education sector. The initiative aims to increase levels of incorporation, adaptation, and integration of technologies as required for achievement of sustainable growth in Colombia, ensuring increased productivity and competitiveness while consolidating the quality of the Colombian educational system. Every public servant and teacher in Colombia is to be trained and certified under the program by 2014.

To date, there have been 300,000 people registered for the Digital Citizenship Program; by 2014, 700,000 are expected to have completed their digital citizenship training.¹⁵

Redvolucion is another interesting social project aimed at encouraging and inspiring a significantly heightened use of the Internet by community members through stimulating education and training. It also aims to promote the use of ICTs to meet various everyday needs, thereby creating an emotional engagement with technology.¹⁶ The online portal is equipped with a variety of learning activities related to ICTs on an interactive multimedia web platform. Training is targeted at the lower strata of society and is carried out by high school students.

To date, over 110 educational institutions are included in Redvolution's project. The goal for 2014 is to reach 3,000 educational institutions.

REGIONAL IMPACT

The goal of the ICT Ministry is to impact all 32 departments in Colombia through three strategies:¹⁷

1. Promotion of the ICTs offered in each of the departments of Colombia through:
 - promoting the creation of regional ICT institutions,
 - providing support for the integration of the different ICT issues into the development plans of both departments and towns, and
 - representing ICTs in the regions via ICT regional advisers.
2. Joint financing of regional projects through the Vive Digital Regional initiative, which would entail:
 - providing technical support in the development of projects to be presented in official announcements,
 - developing nationwide announcements for joint financing of regional projects, and
 - supporting the execution of regional projects through a local supervision support scheme.
3. Regional research development, which would include:
 - developing regional research studies as a tool for the decision-making process, and
 - developing best-practices studies in the execution of regional agreements.

To date, the ICT Ministry is working in 26 of the country's 32 regions on the joint financing of projects to strengthen regional digital ecosystems. The budget for the joint financing of ICT regional projects to support Colombian regions grew nearly sevenfold, from US\$26 million (47 billion pesos) in the previous quarter to US\$180 million (323.5 billion pesos) in the current one.

Additionally, a public policy for the regionalization of ICTs, which considers the equity in available opportunities for the regions and the elimination of boundaries, the encouragement of innovation, and good governance as basic performance principles, has been structured.

The ICT Ministry motivated the departmental and town governments to include ICTs as part of their development plans, with the destination of services resources for more than US\$44 million (78 billion pesos) for the joint financing of regional projects.

GENERAL ACHIEVEMENTS

- On February 28, 2012, Colombia won the award for the government with the most innovative telecommunication policies in the world. It won

the Government Leadership Award 2012 for the Plan Vive Digital at the Global Telecommunications Conference in Barcelona, based on "the management and strategies established by solid telecommunication regulators, based on clear principles that encourage private investment and healthy competition in the last twelve months." Winning this award highlights Vive Digital as an innovative telecommunication policy with a high economic and social impact. The CPE program of the ICT Ministry was designated as a world model for exemplary performance in access to technologies and knowledge at the opening of the World Summit on the Information Society that is held in Geneva, Switzerland. In addition, the CPE program was chosen as a project that generates lessons that can be replicated elsewhere in the world. For CPE, the fundamental principle is to reach the teachers with training in their own context, so that they get the most out of technology. That is the added value of this social program, as well as the care and maintenance that allows educational venues in Colombia to have technical support.

- Colombia is the second highest ranked country in Latin America and the Caribbean for e-government, according to the Survey of the Economic and Social Department of the United Nations.
- Colombia is the sixth highest ranked country worldwide for electronic participation, according to the Survey of the Economic and Social Department of the United Nations.
- Colombia is the tenth best ranked country worldwide on electronic services, according to the Survey of the Economic and Social Department of the United Nations.

The technological challenges that face the country are significant. However, we have identified these challenges and we have the desire and willingness to do what it takes to overcome them. To that end, we rely on a highly qualified technical team and on the support of the national government. The goals have been established and we are on track. Little by little, we have witnessed how the investments we have made in infrastructure have improved the development of the digital ecosystem in Colombia.

These investments are an indispensable stepping stone in moving forward with the adoption and ownership of IT as an important tool for decreasing unemployment and poverty, while increasing the country's competitiveness. The impact of the Plan Vive

Digital can also be seen in the latest study of digital consumption in Colombia, released in February 2013.¹⁸

NOTES

- 1 See <http://www.mintic.gov.co/index.php/english-life-digital> and studies from Raul Katz (Columbia University). For more information regarding Katz's work, visit <http://www.udesa.edu.ar/files/UAAdministracion/CV%20profesores/RAUL%20KATZ.PDF>.
- 2 See studies by Raul Katz, Columbia University, 2010; <http://www.mintic.gov.co/index.php/english-life-digital>; UNCTAD 2010.
- 3 World Bank 2010; World Economic Forum 2011.
- 4 For the attitude of the general public, see the ICT Ministry's 2010 survey of 2,300 low-income inhabitants in 43 municipalities; Ipsos Media IT's 2012 survey of 1,005 inhabitants in major cities of Colombia. For the attitude of small and medium-sized businesses, see the ICT Ministry's 2010 survey of 1,500 small and medium-sized enterprises in 43 municipalities. These surveys were conducted by McKinsey & Company while assessing the ICT diagnosis for the Plan Vive Digital in October 2010.
- 5 The definition of *Internet connections* in Plan Vive Digital includes wired connections of speeds of more than 1,024 kb/s and 3G/4G wireless connections.
- 6 ICT Ministry data.
- 7 ICT Min 2013.
- 8 Intel, 2012 notebook price comparison study, Colombia-USA, November 22; IDC, 2012 notebook and PC price comparison study, Latin American countries.
- 9 ICT Ministry 2013.
- 10 ICT Ministry 2013.
- 11 CNTV 2012. Acuerdo No. 002 of 2012 is published on the Authority's Internet site at http://www.antv.gov.co/normatividad/acuerdos/2012/acuerdo_002.pdf.
- 12 More information about the Crystal Ballot Box is available at <http://www.urnadecristal.gov.co/>.
- 13 For more information, visit <http://www.colombiacompra.gov.co/>.
- 14 For information about FITI, see <http://www.fiti.gov.co/>.
- 15 For information about the Digital Citizenship Program, see <http://web.unad.edu.co/ciudadaniadigital/>.
- 16 Details about Redvolucion can be found at <http://redvolucion.gov.co/s/inicio>.
- 17 Colombia is divided into 32 departments. These in turn are divided into municipalities.
- 18 See the presentation of the survey (in Spanish) at <http://www.slideshare.net/DiegoMolanoVega/encuesta-de-consumo-digital>.

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