

# **Balance of the Colombian policy of universal access to the Internet: evidences on the Importance of the institutional design<sup>1</sup>.**

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## **Abstract**

This essay argues that the reinforcement of the Internet access gap in Colombia's rural communities, analyzed during the period 1995-2015, is a condition resulting from the institutional design that frames the policy of universal access to telecommunications, on the basis of which an interaction between State and market has been established hindering the conditions of digital inclusion. This considering that universal access, defined as a transitional intervention that consists of enabling a public solution for access and use, represents the most basic expression of the digital divide; while the availability of the service in each household, related to the universal service policy, is the ultimate goal of public action.

The first part of the paper recreates the elements of the historical context of sectoral liberalization, which influenced the adoption of the guiding criteria of public action to meet the telecommunications needs in those regions of the country that constitute market gaps. In addition, it describes the technological bias induced by this model, and the challenges that it poses for the public investment sustainability. The second part of the essay illustrates the observed effects on the coverage, quality and affordability of the service offered through public access solutions, based on the processing of the information collected from each of the projects implemented by the Universal Service Fund in Colombia, during the mentioned period.

The paper concludes that because of the moral imperative that Internet diffusion represents for the contemporary societies, for enabling an unlimited flow of information and knowledge, stimulating human interaction, facilitating processes of democratic participation, and contributing to equal socio-economic opportunities, the digital exclusion that persists in Colombia is unacceptable. Therefore, in the interests of social equity, it is necessary to recognize that the free market paradigm that has affected the course of the state action, has failed to try to correct market failures through incentives to private investment, without these have been received in an assertive way. Finally, it outlines some alternatives aimed at closing the access gap in the Colombian countryside.

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<sup>1</sup> The present essay draws a summary view of the research project developed to apply for the PhD degree in Political Studies. The thesis dissertation was awarded.

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## **Balance of the Colombian policy of universal access to the Internet: evidences on the Importance of the institutional design**

The number of Internet connections, on fixed and mobile platforms, has grown significantly in the world over the last decade. Thus, in 2016 the number of Internet users reached 3.4 billion people, almost 47% of the world population (ITU, 2017). However, these changes also occur with notable international asymmetries. According to estimates made by the Ibero-American Association of Research Centers and Telecommunication Companies (AHCINET, 2014), to match the current Internet penetration rates of 25 European countries by 2020, Argentina, Brazil, Mexico, Chile, Colombia, Venezuela, Peru, Ecuador, Bolivia, Paraguay and Uruguay should reach, on average, 75% penetration in Households (on fixed broadband) and 95% penetration of the total population (on mobile broadband). To this end, the annual average investment of the telecommunications industry should amount to USD 44,378 million over the period 2013-2020, which is equal to USD 355,825 million of accumulated investment. This represents a 10% increase over the historical pace of growth.

In this context, the categories of access and universal service have acquired a strategic connotation in the design of public action initiatives aimed at the massification of broadband, so that the former has been defined as a transitional intervention that consists in enabling a public solution to access the service, until the market gaps that prevent its availability are overcome; While the second refers to the supply of the service in each household. Due to the above, the closest approximation to the problem of digital exclusion is given by the scope and characteristics of the universal access policy.

In Colombia, the persistence of the Internet access gap, understood as the deprivation of connectivity infrastructure that concentrates more intensely in rural areas, than due to its demographic features, socio-economic constraints, and / or geographical location do not attract the commercialization of the service, allows to infer that this policy has not been effective. At the end of 2015, the limitations of

Internet access and use in Colombia were as follows: 42.8% of households in urban areas had a fixed Internet connection; While in rural areas this percentage was only 3.2%. At the same time, the ownership of desktop, laptop or tablet computer reached 54.1% of households in urban areas and 13.4% in rural ones. Of the total rural communities in the country, 72% had a public Internet access solution (DANE, 2016).

In this sense, the hypothesis to be demonstrated poses that the reinforcement of the Internet access gap in Colombia's rural communities, analyzed during the period 1995-2015, is a condition resulting from the institutional design that frames the policy of universal access to telecommunications, on the basis of which an interaction between State and market has been established, hindering the conditions of digital inclusion. The first part of the paper presents a synthesis of this process, and the second illustrates the observed effects on the coverage, quality and affordability of the service offered in rural areas through public Internet access solutions, based on the processing of the information collected from each of the projects implemented by the Universal Service Fund in Colombia during the period in question. Finally, some lessons from this experience are outlined, by way of conclusion.

### ***1. Evolution of the universal access policy in Colombia***

The initiatives aimed at universal access to the Internet emerged as an adaptation of the social telecommunications policy, created in 1995 to respond to the challenges posed by sectoral liberalization, after welcome the General Agreement on Trade in Services. The new measures to protect competition and access to the telecommunications market led to the dismantling of the former public operator (Empresa Nacional de Telecomunicaciones TELECOM), which up to that time had been in charge of providing the telephone service both in urban and rural areas. Since the enactment of Law 142 of 1994, the provision of telecommunications services was made conditional on efficiency requirements and market expansion.

For those areas where there would be no network and service providers, the supply would be coordinated by a Universal Service Fund, a special administrative unit attached to the Ministry of Communications (now the Ministry of Information and Communication Technologies), whose resources would come from the fees paid by operators in the sector for licenses, permits, concessions, and fines. These sectoral reforms reflected the belief or desire to achieve significant advances in the coverage and affordability of services, through the promotion of competition, with which the country would close a cycle carried out by the state monopoly of communications. In 1999, sectoral liberalization resulted in 41 local telephone operators (with 8,397,393 fixed telephony lines installed); 3 long distance operators; 6 cellular mobile telephone operators; and 10 value-added service companies (CRT, 2002).

This optimism, related to the growth prospects of the sector, justified the selection of public action instruments adopted by the Universal Service Fund. To begin with, there was a need to promote the adoption of new technologies that would increase technical efficiency at reasonable costs. In addition, the resources for telecommunications supply in non-market areas would then be allocated through periodic public tenders, so that operators could carry out the deployment, operation and maintenance of infrastructure, retaining ownership of the infrastructure for themselves to exploit it commercially. This expects operators to extend their services, leveraging investment and operating costs through public procurement (DNP, 1995). However, the results obtained during the implementation of these initiatives have moved away from what was anticipated.

Since its inception, universal telecommunication access projects have been captured by satellite technology providers, given the technical advantages of using their signal transmission, and reception equipment to carry out rapid installations in remote areas, compared to other systems that demand a more complex deployment of infrastructure. The Very Small Aperture Terminal (VSAT) networks manage to overcome the topographic difficulties and the conditions of geographic

isolation to provide telephony and Internet services, establishing double-hop satellite communications through a land earth stations (Gateway); so, that outgoing traffic (VSAT-terrestrial network), incoming (VSAT-terrestrial network), and internal (VSAT-VSAT) is conducted through said station interconnecting with Switched Public Telephony networks and Internet nodes.

On the other hand, bandwidth, coverage areas for earth stations, and the power required for the reception of VSAT antennas, are negotiated by the operators of these technological solutions with satellite capacity providers or their suppliers, increasing the cost of providing telecommunication services. At the end of the contractual term established for the service operation, the equipment of the satellite provider is withdrawn, therefore the public investment is not translated into the deployment of networks for future uses.

The absence of electrical interconnection is another factor that has contributed to the positioning of satellite technology in the supply of universal access solutions to telecommunications, due to its ability to easily operate with alternative energy sources. In 1999, the non-interconnected areas of the country reached an extension close to 52% of the national territory (600,000 km<sup>2</sup>), where 72 urban localities and around 857 rural communities were located. The energy supply in these areas, characterized by a low population density (3 inhabitants per sq. km), lasted no more than 12 hours a day in municipal localities and 5 hours in rural areas, through diesel plants or hydraulic micro centers (DNP, 1999).

Thus, by simplifying planning, installation, operation and maintenance of infrastructure, the weaknesses in quality, associated with lower effective transmission speeds and vulnerability to atmospheric phenomena that affect the propagation of signals (i.e. rainfall and gas absorption), did not prevent this from being the preferred technological option for the development of social telecommunication projects. In 1999, for example, the differences between technological solutions for value-added services available in the Colombian market, from the time required to send 15 Mb of information, ranged from 15 seconds for

ATM (Asynchronous Transfer Mode) systems, 1.5 hours in the case of a modem, and 18 hours for satellite media with a capacity of 2.4 Kbps (Meneses, 2000).

As a result, the market segment constituted by satellite technology operators and social telecommunications policy have acted as complementary institutions. A detailed review of the installation and commissioning deadlines for universal access solutions established in each of the Fund's tenders, which generally do not exceed 6 months, shows how this linkage has strengthened over time, which has made less attractive the attendance of suppliers of technologies, other than satellite, in the selection processes. Likewise, the accumulation of experience of the contractors (satellites), gives them an advantage for the accreditation of requirements in sub-following processes of public procurement.

Considering the difficulties related to telecommunication infrastructure deployment (difficult access geography, public order risks, logistical restrictions, among others), the use of satellite technology is undoubtedly necessary in some cases. However, it should be noted that the investment model adopted by the social telecommunications policy represents a loss of efficiency that requires reevaluating the temporal horizons of public intervention and its implications in terms of sustainability. This is confirmed by the limited supply of satellite capacity and the recurring operating costs of these access solutions, which in the last five years have reached an annual average of USD \$ 53 million.

In response to this concern, in 2009 the Ministry of Communications conducted an analysis of public intervention alternatives, indicating that due to the high concentration of the market in the fixed satellite service industry (72% of which was then distributed among four operators), and the patterns of its global demand (26% generated in North America, 14% in Europe, 22% in Asia Pacific, and just 10% in Latin America), the satellite capacity in the region was beginning to saturate. The Colombian demand, being smaller than the one of Mexico and Brazil, ran the risk of not being satisfied. In the country, the monthly cost of Internet connectivity of 512 Kbps was, by that time, less than USD \$50 using terrestrial interconnection

technologies, while exceeding USD \$250 using satellite technologies. Consequently, it was proposed to boost the acquisition of a Colombian satellite and thereby generate savings of around US \$165 million over a 15-year period (DNP, 2009).

Therefore, the Ministry of Communications made two attempts to allocate, through public tender, the project called "Satellite System of Social Communications of Colombia, SATCOL", which contemplated the design, manufacture, launch and put into orbit the Colombian satellite. Both processes failed and were abandoned. According to projections of the National Spectrum Agency (2013) the demand for satellite capacity in Colombia between 2015 and 2021 will be equivalent, on average, to 72 transponders (36 MHz each), 3 less than those used in 2011; a decrease due to the recent deployment of fiber optic networks and their impact on traffic trunks (cellular backhaul, voice and IP). In turn, 46% of this demand corresponds to the trunk traffic; 29% to social programs; 22.6% to companies; 1.3% to television services; and 1.1% to the defense sector. This distribution shows that, to guarantee the availability of satellite capacity and at efficient prices, it is necessary to reformulate the investment model of social telecommunications policy, even more so when supply is still concentrated by five providers (67.7% Intelsat, 15% by Telesat, 13.8% by Satmex, 2.6% by SES, and 0.9% by Hispasat).

## ***2. Derived effects on digital exclusion in the Colombian countryside***

The effects generated by the path of the social telecommunications policy can be classified based on the coverage, quality, and affordability of the services offered through universal access projects. Regarding to the first criterion, it is noted that only from 2003 the public Internet access solutions for rural communities were included in the Universal Service Fund's projects, because in previous years those were reserved for urban areas with a population of more than 8,000 inhabitants. Since then, the supply of public Internet access in the country's rural communities

has fluctuated between 5% and 72%, considering that the contracts signed by the Fund have an average duration of 36 months (ICT Fund, 2015).

The quality criterion, on the other hand, is associated with the minimum effective speed of transmission provided by the satellite solutions, on which the navigation experience of the users depends. These technological systems are characterized by the differential delay caused by latency (the amount of time that takes a signal during its movement from one point of the network to another), as well as the effects on the availability of the service generated by atmospheric factors that affect the transmission of signals. Through universal access projects for rural areas, minimum effective speeds have restricted the use of the Internet to sending emails, telephone calls, simplified navigation, and downloading of low-content files. Interactive applications, such as online games and conferences, and download of high-definition videos, overflow the available capacity. The minimum speeds contemplated in the projects of the Fund, started at 4 kbps, increased to 64 kbps in 2006; 128 kbps in 2008; 256 kbps in 2010; until reaching 1 Mbps since 2012.

This difference in quality of service remains in force, even by provision of the regulatory committee. Thus, Resolution 3067 of 2011 defines broadband as sufficient capacity to simultaneously allow the provision of voice, data and video, with effective minimum access speeds of 1024 Kbps Downstream and 512 Kbps Upstream, except in the case of satellite providers in which the Downstream / Upstream ratio is 1024/ 256 Kbps. However, in its Article 5.3. explicitly states that *"the services referred to the contracts for the provision of the Internet access service that are associated with the National Government's social telecommunications policy are excluded from this definition, for which it will be maintained as a broadband regulatory definition: 512 Kbps Downstream, and 128 Upstream Kbps for satellite connections"* (CRC, 2011).

In terms of affordability, the comparison between the public tariffs defined in each of the contracts of the universal access projects, assuming that the total income available in rural households for communications services is allocated to the use of Internet, allows to conclude that in a month, the maximum number of hours to use

the service in public access centers has gone from 3,1 in 2002 to only 10.7 hours in 2015.

In light of the above, and considering the possibilities of replacing the means of access to the Internet in urban areas (with mobile Internet coverage, connectivity solutions in educational institutions, workplaces, libraries, Internet cafes, and WiFi zones), it is clear that in Colombia the most severe expression of digital exclusion is concentrated in the rural areas of the country, whose population by 2016 was projected in an amount close to 24% of the national total (DANE, 2008); It can also be said that this access gap has been strengthened due to the design of the universal access policy.

## **Conclusions**

More than two decades ago, the emergence of mobile telephony, Internet, computer software, and other telecommunications innovations, led to denominating them "*technologies of freedom*", for making effective an unprecedented flow of information and knowledge; stimulating human interaction, thereby generating new links and identities; facilitating democratic participation processes; and improving equal socio-economic opportunities (Pool, 1983). Since then, the conditions of their access and use have been subordinated to the policies of regulation and public intervention.

At present, technological diffusion is conceived as a moral imperative. Based on the transversality and relevance of the use of Information Technology and Communications, for the performance of daily activities, Bastian and Haslam (2010) describe cybernetic ostracism in the context of interconnected societies as a disruption of the sense of belonging to the human community. Van Den Hoven and Rooksby (2008) define deprivation of access to information infrastructure and services as a problem of distributive justice, and propose to recognize them as a primary good, in terms of the Rawlsian theory. That is, a universally required good as a condition for the well-being of the human being. Among the four categories of

materials goods of the Rawlsian system (fundamental rights and freedoms, opportunities, income and wealth, and social bases of dignity), authors locate information, understood as an informational object to produce knowledge, in the first (fundamental rights and freedoms), Indicating that this position gives it an absolute priority over any other substantive dimension of equality.

Therefore, the manifestations of digital exclusion that persist in Colombia are unacceptable. The reconstruction of the universal access policy in Colombia shows that faith in the market, beyond economic rationality, leads to ineffective and unsustainable interventions. The expectation of stimulating market development in areas that do not meet the basic criteria of profitability for private investment has resulted in a significant loss of public resources. Thus, instead of promoting the closure of the telecommunication access gap through the deployment of durable and scalable infrastructure, universal access policy has generated a technology bias that is counterproductive to the objectives of coverage, quality, and affordability, hindering the constant development of technological adoption processes.

On the other hand, the instruments defined to guide the offer of public access to the Internet were in line with what was planned in terms of public telephony, at a time of sector restructuring, without considering the essential differences between the two services. The implications of this historical accident are easily understood today, taking into account that, unlike the use of telephony, the adoption of the Internet demands greater efforts in learning and, therefore, demands the regular availability of the service and an operation of optimum quality.

The decade of the 1990s was, without a doubt, a period of notable transformations for the state model in all Latin American countries, and the wave of privatization was not exclusive to the telecommunications sector. Nevertheless, institutional design options remained open to the political preferences of each country. According to the study of the Inter-American Telecommunication Commission -ITEL-, entitled "Universal Service in the Americas", in 1999 the majority of member countries of the organization (Argentina, Brazil, Canada, Colombia, Chile, United

States, Mexico, Peru , Dominican Republic, Costa Rica, Ecuador, Venezuela, Uruguay, Nicaragua and Panama) had included among their sectoral policies the development of specific access and / or universal service initiatives with noticeable regulatory differences. While the first nine had accepted a system of free competition, applicable in all market segments, in Costa Rica, Ecuador, Nicaragua and Uruguay the basic services were exclusive to the established public operator, and in Panama and Venezuela exclusivity was held by the Operator to which the concessions had been granted. On the other hand, the mechanisms to finance social programs (including universal access) were also diverse.

Only Argentina, Canada, Chile, Colombia, Dominican Republic, the United States, El Salvador, Ecuador, Guatemala and Peru had Universal Service Funds at that time; whose ordinary source was the resources coming from telecommunications operators. In Chile prevailed a financing model supported in the national budget; In the United States, only inter-state telecommunications carriers contributed to the fund, and long-distance operators in Canada. Moreover, the ministerial authorities oversaw managing such funds in Chile, Colombia, El Salvador, Ecuador and Guatemala; While that was a responsibility of the regulatory entity in Peru and the Dominican Republic. In Argentina, Canada and the United States, the administration of funds was carried out by a private actor (CITEL, 2000). This report illustrates how, despite the common elements of sectoral liberalization driven by the trends of world trade at that time, the countries of the region took different directions.

For the above reasons, it is possible to affirm that the conditions of digital exclusion that persist in the Colombian countryside are the result of the institutional arrangement on the basis of which was designed the policy of universal access to the Internet. Now then, the preponderance of the short-term projections that characterizes the decision-making of the public administration in Colombia, the lack of political influence of rural communities, and animosity to interventionist models of public action that has taken root over time in the country, make it difficult to

reverse the process of historical dependence that has marked the course of the universal access initiatives.

Consequently, it is necessary to explore mechanisms of collective coordination as an option to respond to the shortcomings of the State. This scenario poses significant challenges, given the excessive costs associated with deployment, maintenance and operation of infrastructure, as well as the need to build a civic culture less assistentialist. However, it is a promising alternative because it leads not only to solve digital inclusion requirements, but also to strengthen bonds of social trust that can promote fundamental transformations in aspects of social equity and political participation.

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