CUBAN SOCIETY ON THE HORIZON OF DIGITAL TRANSFORMATION: A VIEW FROM MEDIATIONS TO THE SOCIAL APPROPRIATION OF TECHNOLOGY

LA SOCIEDAD CUBANA EN EL HORIZONTE DE LA TRANSFORMACIÓN DIGITAL: UNA MIRADA DESDE LAS MEDIACIONES HASTA LA APROPIACIÓN SOCIAL DE LA TECNOLOGÍA

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Abstract

The appropriation of technologies for information and communication is deeply related to the economy, institutions, and social history. This article will propose a list of mediations to explain the characteristics of the computerisation achieved in Cuba so far, with the help of some examples that illustrate the particularities of the Cuban

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appropriation of ICT's technology. The analysis will show the relevance of regulatory frameworks, economic forms of social organisation and public policies when explaining the social appropriation of digital technology in Cuba. They express the centrality and weight of the State in Cuban society to determine the limits and forms of computerisation available to different social actors.

Keywords: ICT's, computerisation, social appropriation of technology, mediations

Resumen

La apropiación social de las tecnologías para la comunicación y la información está profundamente relacionada con la economía, las instituciones y la historia social. El artículo propondrá una lista de mediaciones para explicar las características de la informatización lograda en Cuba hasta el momento, con la ayuda de algunos ejemplos que ilustran las particularidades de la apropiación de las tecnologías digitales cubanas. El análisis va a mostrar la importancia de los órdenes regulatorios, las formas económicas de la organización social y las políticas públicas a la hora de explicar la apropiación social de las tecnologías en Cuba. Ellos expresan la centralidad y el peso del Estado en la sociedad cubana para determinar los límites y las formas de la informatización disponible para los diferentes actores sociales.

Palabras clave: TICs, informatización, apropiación social de las tecnologías, mediaciones

Introduction

Digital technologies produce changes in social and economic life. But they do not produce the same changes in all societies. The appropriation of technologies for information and communication is deeply related to the economy, institutions, and social history. The insertion of ICTs in Latin American economies, despite their impact on GDP, has failed to overcome the historical problems of productivity (Katz and Fundación Telefónica 2015: 141). The former Soviet Union could never develop a national data network, notwithstanding its computer industry and excellent theoretical developments in the field: Power disputes between different ministries condemned it to failure since its first conception by Soviet scientists in 1955 (Gerovitch 2008: 346). In Cuba, many principles of its socio-economic model laid out the challenges for ICTs development.

From early on in the beginning of the Cuban Revolution, digital technologies were identified as an essential component of the new political project. In 1963, Commander Ernesto Che Guevara, at that time Minister of Industries, in an intervention declared computing and electronics strategical for the development

of the country. In 1969 Fidel Castro created the Digital Research Center with the task of producing the first Cuban computer, and a year later CID-201, the first Cuban minicomputer, was shown (Jiménez, Morell, and Negrin 2008: 62). But it was in 2000 where the set of public policies aimed at computerisation systematically took shape in the so-called Program for the Computerization of the Cuban Society (PRIS, by its Spanish initials).

The PRIS, which had the first formulation from 2000 to 2013, proposed an ordered and intensive use of ICT's. The priorities were among others, open standards and information security (MINREX 2005). It also addressed the integration of several Cuban computer networks, mostly private networks managed at the ministerial level, to the so-called 'Cuba Network', which would promote secure, massive and organised access to information and public services at a national level.

At the closing of the First National Workshop on Computerization of the Society, which took place in February 2015, was made public the existence of the Computerization and Cybersecurity Council. This new body took the mission of proposing, coordinating and controlling policies for a comprehensive computerisation strategy, which until a few years before was carried out by a dependency of the Ministry of Communications. With the change in the hierarchy of the body responsible for the computerisation of the country, the poor performance of the policies carried out so far was recognised, especially in their coherence, speed and ability to respond to the needs of society (see Díaz 2015). A new 'Basis of the policy for the improvement of computerisation' was proposed, with the aim that digital technologies become a sector of strategic development of the nation at a considerably faster pace than before, strengthening the economy and facilitating broad access to content and digital services. All this occurs in the context of strong financial restrictions, and also the economic and financial blockade of the United States government against Cuba, which makes it difficult the investments in ICT goods.

This article will propose a list of mediations to explain the characteristics of the computerisation achieved in Cuba so far. The enumeration of these mediations considers the data and information provided by research carried out by several authors on the subject of Cuban digital culture.

In the next section of the article, I will present the general conceptual framework that supports it. For this, the concept of social appropriation of technology and the idea of mediation will be fundamental. Next, I will review some examples that illustrate the particularities of the Cuban appropriation of technology: the SNET wireless community, the circulation of digital content through USB devices, and the appropriation of web technology on a public institution. In the third and last part before the conclusions, I will return to some of the main social

mediations that emerge from the illustrations outlined, but extending them to the more general context of the formation of digital culture in Cuba.

The Social Appropriation of Technologies: Some Notes from the Mediations

The Social Studies of Science and Technology, as well as extensive literature on policies for the Information Society, show that ICTs goes beyond computers and networks. Social processes, cultural values, institutional arrangements, among many other components, should be considered as mediators in the impact of technologies. Technical artefacts participate in the organisation of human activities and the achievement of purposes, but also in the construction of meanings from the experience of their use in everyday activities. The social appropriation of the technologies of a particular society shows in a new light its potentialities, but also its contradictions.

The appropriation of technology as an object of study can be found in several academic domains: the investigation of the interaction between humans and machines, the studies on the diffusion and adoption of technological innovations, the research on information systems, and also the Cultural. The academic community seems to agree that the social appropriation of digital technologies is much more than simple access or the adoption decision Studies (Pierson, Mante-Meijer, Loos, and Sapio 2008). For example, for Proulx (2009: 296), appropriation has different components, of which use and its associated knowledge is only one part. Gallego and Ramos (2014), regarding the Ceibal Plan, state that the appropriation of technology combines several factors such as user interactions with other actors and with technology, the flexibility of technology acquiring new meanings beyond those originally intended, the social representations that the user makes, among others. As the researcher Toboso explains, significant use of technology is not limited to mere instrumental use but incorporates a socio-technological discourse related to relevant practices, representations, and values (Toboso 2013: 202).

Finally, for the Mexican researcher Delia Crovi, the processes of appropriation imply the cultural object, and also the activity condensed in that object. Thus, when the appropriation takes place, the regime of specific practices is also included (Crovi 2008: 75).

The approach of a social group to new technology is mediated by forms of technological socialisation in different fields of activity in which circulate shared social representations and practices, along with relevant values. The concept of mediation is important because it focuses on the dynamic and changing interrelations between the multiple actors and processes that intervene in the use of technology. By centring on the configurations of structuring interrelationships

within the appropriation process, the agents and their qualities (mutual effects, reactions, descriptors) are as relevant as the particular games of relationships and interactions in the negotiations of meanings, appropriations, and uses of the technologies.

Therefore, the social appropriation of technology is defined as the mediated processes of assimilation, adaptation, and incorporation of artefacts and technologies to an intentional and meaningful practice of a specific social group.

The concept of mediation (Martín Barbero 1998; Ruiz 1991; Martín Serrano 1993) has a preponderant place in the history of Latin American Cultural and Communication Studies. In the classic *From Media to Mediations*, Jesús Martín Barbero places mediations at the centre of communication studies and, at the same time, reintroduces it to the field of cultural research. For this, he proposes a methodological displacement that contemplates the entire process of communication from the appropriation and the uses that the different social groups make of the media and the communicative products, in what can be called a return to the subject (Martín Barbero 1998).

The epistemological value of the concept of mediation comes from its attention to relationships, rather than to the properties of the agents involved in the communication process. In this way, the concept allows the incorporation of technological qualities into the analysis, but through the practice of agents ('technicalities' named by Martín Barbero). It also allows the inclusion of the institutional framework and power relations, as essential elements in any analysis of the media and their role in society.

For Martín Serrano (1993), mediation is a central category to understand stability in the social order. For him, mediation is the producer of adjustment models that operate with resources, practices, and purposes to reduce the contradictions between social systems and communication systems. In other words: mediations produces models of social adjustment and the theory of social mediation helps to understand how adjustment mechanisms are carried out in the social system, facilitating their production and reproduction, helping to determine the degree of rigidity or elasticity of the social organism, its vulnerability or strength.

In what follows, mediation will be understood as what enables or limits the process of appropriation of digital technology within cultural practices in a given society.

In Cuba, and relying heavily on the contributions of Latin American communication studies, a line of work is being consolidated that studies digital media, especially those of a journalistic nature, mostly produced at the Faculty of Social Communication of the University of Havana.

For example, Alonso (2010: 15) understands the appropriation of the internet as a symbolic construction of personal and social meanings rooted in their

socio-cultural contexts. She warns that appropriation of the internet is a very multifaceted process: The global network has a double articulation in the economy and culture, and a double status, as an object and a means. The most important aspect of her contribution is the notion of appropriation strategies, such as personal modes and schemes of use, under which individuals consume, appropriate and make sense of the computer and the internet. Based on case studies conducted with young university students in Mexico and Ecuador, Alonso explores several mediators who structure the appropriation of the internet. The language and technical attributes of the medium, or technicality, is one of them. The micro and macro-social contexts, membership groups or social structure, are others mentioned by the author.

Proulx (2009: 296) examines the idea of significant practical use as a key to understanding the appropriation of technologies. He establishes a prerequisite and five necessary conditions. The prerequisite is understood by itself: access to the technological device. The five conditions are:

1. Expertise in the use of the device.
2. Fit integration of the device into everyday practices.
3. Innovative social practices.
4. Community driven learning and support in the use of the device.
5. Adequate representation and consideration of the practices from public policy.

This list suggests a set of possible mediations that can be theoretically justified in two movements: The first, taking each of the components listed by Proulx as processes that mediate and are mediated by the appropriation of technology and not merely as a series of static data. The second movement consists of noticing how the set of conditions goes through different levels of structures in the social life (from individual to group practice to the policy that regulates it) which reminds of Martín Serrano's model of the Social Theory of Communication (1993). Based on this can be introduced the following preliminary list of mediations:

1. Infrastructure and equipment.
2. Use competences.
3. Social meanings.
4. Socio-economic forms.
5. Regulatory frameworks.
6. Public policies.
7. Political culture.

In the next sections, we will see how some of these mediations are manifested in the case of Cuba, where state institutions have so much weight in the social, cultural and economic life of the country.

The Social Appropriation of Digital Technologies in Cuba through Three Examples

As examples of the peculiarities of the social appropriation of technologies in Cuba, three experiences are presented that illustrate both the potential and the difficulties of the Cuban environment. The experiences are the reticular distribution of digital audiovisual content, the SNET community telecommunication network and the institutional uses of web technology.

The reticular distribution of digital audiovisual content through physical media, such as external hard drives or pen drives, has its best example in the so-called El Paquete (The Package), a digital compilation of video, software, music and digital books from the main creative industries in the world of almost a terabyte. These contents are downloaded and organised thematically by folders, with added commercial advertisements of small Cuban businesses. El Paquete is distributed once a week, by copy to pen drives or hard drives. It offers a wide variety of products from various countries. The United States mainly, but also Mexico, Spain, India, France, among others. According to some testimonials (Concepción 2015), its distribution is estimated to reach the entire country. Although it can be studied as a case of the so-called 'Mobile Media', as does the author Ana Cristina Pertierra (2012: 404), here I prefer to highlight its reticular, nonlinear nature, sometimes circulating in exchange of money, but also distributed through networks of friends or acquaintances for free.

The growth in recent years of internet access in Cuba does not seem to threaten the vitality of this form of media consumption. In this, several factors could be of consideration. The first is the Cuban telecommunications infrastructure. It is still weak to support the high traffic associated with audiovisual content. Also, the level of income of the population, in addition to the internet access prices, makes it very expensive to download large files (more than 500 Mb, for example) or to consume by streaming, if this were possible despite the US blockade. It is important to remember that the blockade of the US government to Cuba also means that the Cuban population cannot access several online services of US companies. The price of The Package in this regard is extremely competitive: two dollars for a terabyte of varied information; a Cuban peso (equivalent to 0.5 cents) for an episode of shows such as *The Witcher*; or 5 to 10 Cuban pesos for a movie in high definition. The second factor is the role of package distributors as curators and compilers, which facilitate

access in a single place to a multiplicity of content, rich in type and origin, but with wide acceptance, which saves search time for users.

Community telecommunication networks are based on the ability of computers to communicate with each other, either wirelessly or through physical interfaces. The most notorious and consolidated example of these community networks in Cuba was the so-called SNET, which according to some measures reached almost all of the City of Havana (Pujol, Scott, Wustrow and Halderman 2017). The SNET can be considered a self-managed response from some sectors of society (with the knowledge and resources to do so) to the contradiction between the slow deployment of public data networks for citizens by state institutions and the ease of digital technologies to facilitate networking. These networks, initially created to play online or share files, eventually grew in services, to the point of hosting social sites, microblogging sites, and multiple forums, recreating the internet intense social dynamics of online exchange (Rodriguez 2016). With the promulgation in May 2019 of Resolutions 98 and 99 by the Ministry of Communications, the legal ambiguity that allowed the existence of these networks was eliminated. These resolutions established the technical specifications of a network owned by a natural person, restricting its reach to the house or the block where that person resides. Thus, the existence of SNET was banned, and although it is underway a process of migration of the videogames and communities' services previously housed in SNET to a state network, the medium- and long- term effects of the loss of such experience are still to be seen.

Finally, it is necessary to show the social appropriation of web technologies by state institutions – in this case in the institutions of the Cuban Ministry of Culture.

The history of the state cultural websites in Cuba is linked to the creation of the Cubarte network by the Cuban Ministry of Culture. The Center for Information Technology and Systems Applied to Culture was created in 1993 through resolution 74 of November of the same year, by the Ministry of Culture. It has the mission of promoting the appropriation of ICT's for cultural purposes, the extension of ICT's to the entire national territory and the training of human resources in ICT's related skills. The Cubarte network emerged in 1997 as a ministerial network with national coverage. In 1998, each Municipal Directorate of Culture was provided with a computer, a modem, and was interconnected to the Cubarte network through new provincial nodes. At the same time, access to the Internet was made available to intellectuals and artists.

In 1998, the Cubarte website was published, and in 2001 became the Cubarte Portal, initially providing access to the cultural sites and web pages of ten provinces and forty municipalities, a number that would gradually increase. In particular, the creation of provincial portals was encouraged to support the

promotion of the cultural values from each Cuban region, and also to promote local cultural events. A similar process took place at the national level, with the creation of several thematic portals maintained principally by the Institutes and Councils of each main artistic manifestations (e.g. Visual Arts, Theatre, Dance, and so on). In the following five years the number of cultural websites grew significantly, and the main portals began to gain international visibility. At the same time occurred the technological transition from static to dynamic HTML, now supported by databases and programming languages. Nevertheless, the novelty of the technologies used, the relations between websites reproduced the same hierarchy and institutional structure of the existing Ministry of Culture 'offline'. Also, several websites were created without the necessary equipment, infrastructure, and personnel. For this reason, some sites survived with very poor quality.

The Cuban policy towards the national websites identified the State as the only responsible in the generation of content and provision of services at a national level. Since 2003, state cultural institutions were oriented to create a computer area, where one of their functions was to be the administration of the institutional site or portal, generate content as well as update them, which has prompted the publication of numerous websites of cultural institutions throughout the country. At the same time, this impulse from the government placed the directors of the institutions as important mediators in the appropriation of digital technology. Its ability to become leaders and promote the use of the website, or on the contrary, to assume it as another task, appreciably determines the strength of the digital culture formed in the institution (López 2015).

But the infrastructure and the availability of technological equipment also mediate the appropriation of web technology. The obsolescence of the computers owned by the State institutions, their low technical conditions and in some cases their simple absence, in addition to the difficulties in their connectivity, dictates the pace of technological improvements and the functionalities offered. For example, RSS syndication services are available in a large part of the institutional sites of the Ministry of Culture, but the possibility of watching videos is much less widespread (López 2015).

Social Mediations to the Appropriation of Digital Technologies in Cuba: Between the State and Society

In the examples mentioned, the weight of the State and the regulations as mediating elements are notable. Cuban public policies define digital technologies and their role within the country's development in a fairly comprehensive way. In the draft of the National Plan for Economic and Social Development until 2030,

computerisation is defined within the Strategic Infrastructure axis. Within it, telecommunications infrastructure is considered as a means to achieve universal access and productive use of ICTs. In the same document, ICTs are defined as a strategic sector, and therefore, together with other sectors, sharing the capacities to ensure sovereignty and security, the development of the productive forces, the increase in efficiency, among other characteristics.

A policy document for the improvement of the computerisation of society in Cuba, published by the Ministry of Communications on its website and based on the project of the National Plan for Economic and Social Development, provides more information about the role assigned to digital technologies (MINCOM 2019). The document lists seven principles, which can be grouped in four for a better analysis. The first group is focused on security and defence, and list three principles: the defence of the Revolution, the guarantee of cybersecurity and the assurance of sustainability and sovereignty. The second is dedicated to citizens and announce the objective of enhancing access to ICTs. The third group is related to the economic sphere and contains two principles: to preserve the human capital of the sector and to develop and modernise all spheres of society, according to the country's priorities and economic conditions. The fourth and final group is also composed of a single principle: to integrate research and development into the production of services and content in the field of ICTs.

Several elements are important to highlight from these principles: its emphasis on cybersecurity, the relationship established between economic conditions and the possibilities of extending the modernising effects of ICTs to other spheres of society, and finally the most important: the establishment of the centrality of the State in the development of ICTs.

Cybersecurity is an unavoidable element in Cuban public policies towards ICTs, which drives the advance conditioned not to increase the country's vulnerability. It is the response to the hostility of the successive governments of the US since the triumph of the Cuban Revolution in the second half of the last century, renovated in recent years with the incorporation of digital technologies as an additional way to try to subvert the internal order of the island. Therefore, network security, sovereignty over infrastructure and the capacity to respond to cyberattacks mark the development of ICTs in the country, reflecting an undeniable international element.

In the case of relations between the economy and ICTs, if documents are compared, and especially those related to the computerisation policy, with similar documents produced by other countries and regional institutions (for example, see Cimoli 2010), it is striking the absence of more defined statements about the relations between ICTs and the increase in productivity. It should be noted that the only explicit mention made in the Program document for the economic

effects of ICT's is on the reduction of expenses and the release of the expected workforce in sectors such as education, health, and procedures in general.

It is also pertinent to call attention to the role assigned to state agencies, especially the Ministry of Communications, in the process of computerisation of the country. The Ministry, in addition to the fundamental authority in its accomplishment, has a leading role in supervising, integrating and directing the work of other state agencies related to the ICT sector. The non-state sector is mentioned only once, to express the possibility of participating in the process of computerisation of society. The state is, therefore, the only protagonist in the computerisation process.

The State as the main actor has four fundamental roles: Origin and conduct of computerisation policies; financer and manager of the infrastructure; the main producer of content and services; as well as responsible of the regulatory body. A difficulty of this design is that it reproduces a vertical and highly centralised model, with difficulties differentiating between State and society. Therefore, the current policy design does not provide much space for social participation, which coincides with findings by other Cuban authors for other sectors of Cuban life (see for example Guanche 2012 or Valdés Paz 2009). One of the consequences of this model is the impossibility of integrating experiences of social appropriation of technology, self-managed and self-organised, as illustrated by SNET.

The mediation from socio-economic forms is also relevant in the Cuban case. There are appreciable differences in the modes of technological appropriation that exist between the state sector and the non-state sector.

The poverty in the uses of internet resources that can be seen in a part of the websites of the Cuban state institutions is not entirely attributable to deficiencies in the regulatory frameworks under which these organisations operate. The use of the web mostly as an online presentation of the organisation, without support in interactivity, hypermedia or community formation, can be traced both in the organisational culture shared by the Cuban state institutions and in the difficulties to adapt its staff and budgets flexibly without relying on centralised decisions. In this scenario, given the decision to have a website, the organisation understandably chooses what is most optimal, which is to publish it with the minimum of functionalities according to the resources it has. With some exceptions, notably the provincial and municipal governments under the official push for e-government, Cuban state organisations do not need a website to fulfil their state orders.

For its part, the emerging private sector in Cuba is proving to be extremely dynamic in the appropriation of digital technology, through a growing capacity to generate content, sales channels and audiovisual products specially adapted to

the technological conditions of the country. The above can be illustrated with the AlaMesa and Ke Hay Pa 'Hoy applications, which are among the best known and downloaded apps among Cuban users.

AlaMesa is a directory of restaurants in Cuba. It consists of a website, an electronic newsletter and a mobile application (Díaz 2015). It started as a website in 2011 but gained popularity with the launch of its mobile application, which has versions for Android and iOS. It contains geolocated information of about 1000 gastronomic services, with the ability to filter the results according to prices, type of cuisine, location or type of establishment (Sánchez 2018). For its part, Ke Hay Pa 'Hoy provides information on cultural events in Havana, with the possibility of updating offline, through a file copied to the mobile phone, or via a Wi-Fi connection. Both show the ability of the non-state sector to create applications that provide value to the user, adapted to operate in an environment of poor connectivity and with high quality in the design and programming of the software, which is demonstrated by the fact that both passed the Google certification processes and are offered on GooglePlay.

The dominant political culture in the last fifty years in Cuba supports and legitimises the fundamental principles of public policies for computerisation proposed so far. However, the social meanings and practices emerging around digital technologies will necessarily imply revisions, adjustments and new nuances for that political culture. For example, as a consequence of the centrality of the State in the computerisation process, accompanied by greater penetration of digital technologies in society, have been some recent disagreements between demand and official forecasts on the use of ICT's.

On 3 March 2014, the Cuban Telecommunications Company ETECSA began offering access to its 'Nauta' email account service through mobiles for Cuban users. From March to June 2014, 238,687 contracts were signed for the new service, and 173,098 new mobile phones were grown. All this generated traffic of around 400 thousand emails per day, for a total of 29 million emails and two terabytes of information in those four months. Mobile phone networks became congested, and mobile phone users experienced difficulties in the service, ranging from the inability to communicate with another mobile to failed SMS sending. As the director of Institutional Communication of ETECSA said in an interview with the press:

> By creating the facility that these accounts can be consulted from a mobile terminal, it has brought an opening of more than 200 thousand accounts in three months. It was planned that the growth would not be so abrupt and that the accounts would be disseminated throughout the year, not in just three months. (CubaSí 2014)

Five years later the disagreement between the official expectations of the social appropriation of technologies and their reality was manifested again. In this case, it was following the inauguration of the mobile internet service. On 6 December 2018, the Internet connectivity service started for Cuban mobile users, using 3G technology. According to figures released in March 2019, out of a total of 5.4 million mobile lines, 1,870,000 users enabled the Internet service for mobile data, and in the first months of 2019, about 5,000 new users were incorporated daily. The increase in the number of users exceeded the initially planned capacities and the service experienced difficulties since the beginning of the year 2019 (Antón 2019). As part of the ETECSA company's strategies to decongest and improve the service, begun the installation of a fourth-generation network in some sectors of the Cuban capital and other regions of the country.

Conclusions

In the last two years, the presence of the Internet in Cuban society has improved notably. From January 2019 to January 2020 the number of Cuban internet users increased by 7%. In 2019, 7.1 million Cubans were connected to the internet, 63% of the country's population, according to We Are Social and HootSuite (2020), exceeding the world average. An important component of this increase is the growth in mobile data services. At the end of 2019, the Cuban telecommunications company ETECSA reported 3.7 million mobile lines with access to data. These figures make Cuban advances in e-government more relevant: a citizen's portal for each province and the online presence of all ministries and institutions of the central state administration. They also support the state policy of progress towards digital commerce, with the development of mobile banking apps and national payment gateways. Notwithstanding these advances, the mediations analysed in the article remain valid.

The mediations analysed show the relevance of regulatory frameworks, economic forms of social organisation and public policies when explaining the social appropriation of digital technology in Cuba. They express the centrality and weight of the State in Cuban society to determine the limits and forms of computerisation available to different social actors. Although the state institutions have the governmental mission of carrying the fundamental weight of computerisation, they do not have sufficient incentives to develop it innovatively and flexibly. On the other hand, non-state actors that innovate and adapt technologies to Cuban socio-technological conditions in a creative way, do not yet have support from the legal and institutional framework that allows them to stabilise their existence and disseminate their learning experiences. The separation between both trajectories of social appropriation of technology should be

addressed from public policies, seeking synergies and complementarities that will eventually strengthen the technological capacities and the digital transformation in the development of the country.

For this, it is essential to go beyond the incorporation of computers and networks to the economy and politics and make society a protagonist, from its diversity, in the creation, consumption, and circulation of new content and services. Protagonist, in this sense, means the possibility of taking part in the evaluation of what has been achieved in the ICT's policies, based on relevant and updated public statistics. It is also essential to consider the formation of a prepared citizenry aware of their rights and duties; autonomous as far as possible in its uses of technology and the exploration of new functionalities, and capable in sum, of providing solutions, while at the same time elucidating in the public sphere, the interrelationship that we must build between ICT's and development.

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