

# THE FEEBLE INSTITUTIONAL LINK BETWEEN THE INFORMATION AND COMMUNICATION TECHNOLOGIES (ICTS) AND POVERTY IN MEXICO

El débil vínculo institucional entre las tecnologías de la  
información y comunicación y la pobreza en México


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## Abstract

*In recent decades the ICTs have been recognized as enablers of development and poverty alleviation. However, there are many factors that could impede their effective adoption and appropriation by the poor. The aim of this paper is to review the effects which the institutional weakness of the Mexican state has had on the way in which the telecommunications sector is structured and, in consequence, the feeble link between ICTs and poverty in Mexico. For that purpose we carry out a documentary analysis as part of a broader research study which assesses empirically the role which the Mexican state has played in impeding the poor from accessing, using and appropriating ICTs as a way to alleviate poverty. We present some concluding remarks in relation to some of the institutional changes that must be made so that the ICTs could contribute more importantly to alleviating poverty in Mexico.*

**Keywords:** *institutions, information and communication technologies, poverty, telecommunications, Mexico.*

## Resumen

*En las últimas décadas las TIC han sido reconocidas como habilitadoras del desarrollo y reducción de la pobreza. Sin embargo, hay muchos factores que pueden impedir su adopción y apropiación efectiva por parte de los pobres. El objetivo de este trabajo es exponer los efectos que la debilidad institucional del estado mexicano ha tenido en la forma en que se estructura el sector de las telecomunicaciones y, en consecuencia, el débil vínculo entre las TIC y la pobreza en México. Para tal fin, realizamos un análisis documental como parte de una investigación más amplia cuyo objetivo es analizar empíricamente la manera que el Estado mexicano ha impedido a las personas en situación de pobreza el acceso, uso y apropiación de las TIC. Concluimos con algunos de los cambios institucionales que deben realizarse para que las TIC contribuyan de manera más importante a la reducción de la pobreza en México.*

**Palabras clave:** *instituciones, tecnologías de la información y comunicación, pobreza, telecomunicaciones, México.*

# Introduction

As far as socio-economic inequality is concerned Mexico has always been one of the most unequal countries in the world (Esquivel, 2011, Klasen and Nowak-Lehmann, 2009). During the last decades of the twentieth and the beginning of the twenty-first century, those trends worsened even more.<sup>2</sup> As noted by Centeno and Cohen (2012), scholars still disagree about the main causes of this. However, an aspect which has barely been researched is the limited access, use and appropriation which the poor have had in terms of the core technologies of the so-called *Information and knowledge society*, namely, the ICTs.<sup>3</sup>

As part of a broader research study which assesses empirically the role which the Mexican state has played in impeding the poor from accessing, using and appropriating ICTs as a way to alleviate poverty, the main question that we aim to answer in this paper is ¿How has the institutional weakness of the Mexican state affected the way in which the telecommunications sector is structured and, in consequence, the feeble link between ICTs and poverty in Mexico?

The paper is divided into four sections. In the first, we review the effects that the structural adjustment reforms which were implemented in the 1980s had on the institutional framework of the telecommunications sector. In the second, we review the main changes that the telecommunications sector has undergone in the last three decades in Brazil. In the third, we review the links between ICTs and poverty in Mexico. In the fourth section, some concluding remarks are presented.

## 1. The Mexican telecommunications sector

The relevance of studying the telecommunications sector lies in the fact that its infrastructure is vital for ICTs' development.<sup>4</sup> In this section, we shall review the economic, political and social conditions of Mexico during the 1980s and their effects on the institutional framework of the telecommunications sector. The main argument is that due to the institutional weakness of the Mexican state, the influence of a local private actor has determined the path of the telecommunications sector in Mexico and, in consequence, the feeble link of the ICTs to poverty in Mexico.

From the 1930s to the early 1970s, Mexico's economic development strategy was based primarily on state intervention by means of the Import Substitution Industrialization (ISI) system to encourage the industrialization of the country by protecting domestic manufacturers from international competition. According to Cypher and Estcatel (2014), the general objective of the period was not just to transform

2- During these decades, poverty has continued to increase and income inequality and economic growth have been volatile, which has brought about again a strong reliance on natural resources, especially oil (Campos-Vazquez, 2013).

3- Jovanovic and Rousseau (2005) explained that since the appearance of steam engines at the end of the nineteenth century, there have been four general-purpose technologies which have modified the way in which public and private organizations and individuals pursue their economic, political and social goals: steam engines, electricity, oil-related technology and ICTs.

4- Sunkel defined ICTs as "tools and processes for accessing, retrieving, saving, organizing, manipulating, producing, exchanging and presenting information by electronic means" (2006: 8) and can include computers, programmes such as multimedia applications and database systems, telephones (fixed and mobile), fax, tablets and the internet (Mbuyisa and Leonard, 2017).

the productive structure, but also to promote the strength of the institutional capacities of the state so that it could be able to produce its own technology. Under this system, Mexico had one of the most successful economic periods ever since Gross Domestic Product (GDP) grew by 3% per year in per capita terms (Esquivel, 2011).<sup>5</sup> However, the Mexican state was not able to develop any productive sector which would allow the country to compete internationally. Furthermore, despite the fact that the country produced much of the merchandise that was traded, the technology with which the products were produced was imported.

In the 1970s, when the boom of the ICTs was about to explode in the USA and in the most industrialised countries of Europe and Asia, Mexico was attempting to produce its own technology. However, the tax structure was predominantly regressive and the revenues obtained were very low, leaving oil profits and international aid as the only sources of finance for the state's expenses, bringing about procyclical social spending and economic volatility (Teichman, 2008). Moreover, the existent technology was never entirely appropriated either by the organizations of the private and public sector or by the people, and consequently it was never adapted to the national objectives.<sup>6</sup>

In this context, the opening up of the economy during the 1980s and 1990s would not only accelerate the diffusion and adoption of ICTs by private companies, but would also revolutionize the way of doing business. Due to the process of privatization of state-run companies which began during these years all over Latin America, the private sector became the main actor in the diffusion, adoption and appropriation of ICTs. The problem was that the opening of the economic sectors was made under the belief that the high debt crisis of the 1980s had been the state's fault and that in order to adjust to the new global order it had to withdraw from coordinating the economy.

Consequently, following recommendations from international organizations such as the International Monetary Fund (IMF) and the World Bank, Mexico and the Latin American countries started the implementation of the so-called Washington-Consensus reforms which included the reduction of the state and the opening up of the economy. Paradoxically, as argued above, the socio-economic conditions of the citizens during this period were worsened. In the last two decades, Latin American countries have been trying to equalize the socio-economic conditions of the poor with the implementation of different anti-poverty programmes (Becerril-Velasco, 2014).

However, they have barely taken into account the ICTs in spite of the fact that, as mentioned before, they play a very important role in today's society and were a key factor in bringing about the globalization of the economy (Arellano, 2002, Perez, 2004). Moreover, the general vision of these reforms in respect to the ICTs is based on the belief that they are universally available and can be acquired easily, even by the lower strata of the society (Cypher & Estcatel, 2014).

As a matter of fact, during the early 1990s, the Mexican state started a process of telecommunication reform with the intention of encouraging more competition in the sector which would bring about, as a result, welfare improvement. In 1990, the state-run company Telmex (*Teléfonos de México* in Span-

5- In order to ensure the success of the ISI system, the Mexican state provided basic services such as education and health universally in order to increase the human capital of the people.

6- By appropriation we mean, in the broadest terms, that public and private organizations and people use technology to achieve their own economic, political and social goals beyond those for which the technology was invented.

ish) was privatized to the private company *America Movil*.<sup>7</sup> Aguerre and Galperin (2015) stated that the main goal of the privatization process was the development of a fibre-optic network in order to enhance internet connectivity.

Even so, competition was not fostered until 2013, bringing about a low density of services and high tariffs. According to Mariscal and Rivera (2005) policy-makers tried to minimize political costs by privatizing Telmex to only one actor or private company. They explained that a monopoly such as *America Movil* served the purpose of satisfying not only the demands of the government and other business groups – which had agreed on the way in which the state-run companies would be divided – but also of the Telmex union which could survive since Telmex was not sold regionally as different companies or into services.<sup>8</sup>

The privatization of Telmex was, to some extent, successful since mobile and fixed telephone penetration increased, the telecommunications network was technologically upgraded and tariffs reduced. However, the distribution of network penetration was very unequal, concentrated mainly in urban areas (Mariscal, 2005, Ortiz-Mena & Rodriguez, 2005). Moreover, the institutional structure of this arrangement was too weak, which allowed Telmex to become the predominant player in this sector and to influence the design of the institutional structure of the telecommunications sector.<sup>9</sup>

As an example, from 1990 to 1995 the Ministry of Communications (SCT) was the only regulator of this sector, but was more interested in helping *America Movil* to consolidate than in fostering competition. In 1995, a Federal Telecommunications Law (FTL) was enacted, creating a regulatory agency (*Comisión Federal de Telecomunicaciones – Cofetel* in Spanish) and an anti-trust commission (*Comisión Federal de Competencia – CFC* in Spanish) responsible for investigating anti-competitive behaviour.

However, Aguerre and Galperin (2015) state that, although the FTL was supposed to open competition to all providers in the market, Cofetel's role was limited to issuing opinions to the SCT, which belonged to the executive power, who then made the final decision, making the regulatory process biased, slow and ineffective.<sup>10</sup> Moreover, Mexican legislation allowed private enterprises to demand a temporary suspension of regulatory actions when they considered that their constitutional rights had been violated. The result was a temporary suspension of most regulatory decisions (Mariscal & Rivera, 2005).

According to Ortiz-Mena and Rodriguez (2005), this was mainly due to the fact that before the conclusion of NAFTA negotiations in 1994, *America Movil* was guaranteed that it would face limited competition

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7- The telecommunications sector reform was part of the first generation reforms of the Washington Consensus during the late 1980s, which included tariff and budget cuts, privatization and the like, and it was reformed to enhance the openness of the economy and achieve macroeconomic stability and fairness in income distribution.

8- Jilberto (2000) argued that Carso group, owner of *America Movil*, was one of the main domestic groups that played an important role in the liberalization of the economy in Mexico along with the Televisa group, the Zambrano Group, owners of CEMEX, and the Salinas group, owners of TV AZTECA. Cypher and Estcatel (2014), on the other hand, stated that the few Mexican successful transnational companies such as Telmex, TVAZTECA, TELEVISA, CEMEX and FEMSA developed their technological capacities during the ISI period.

9- As explained by Schneider (2009), the opening of the economy in Latin America through the neo-liberal reforms in the 1980s brought about a business-led development project in which the multinational corporations (MNCs) took control of high technology sectors, and the business groups (BGs) of lower technology and the service sectors, becoming so powerful that they have influenced the adjustment of the institutional structure and the policy process of the states in Latin America.

10- Mariscal and Rivera (2005) explained that different worldwide telecommunications giants such as Vodafone and Verizon were attracted by the Mexican market due to its large population and the commercial agreements of NAFTA. However, in spite of having invested US\$ 2000 million, they left the country four years later in 2004 since they could not compete against Telmex. Even more, along with the Spanish company Telefónica, Telmex has become a predominant player all over Latin America.

during a transition phase so that the company could adjust to the new circumstances.<sup>11</sup> As a matter of fact, by 1997 *America Movil* was a predominant player in five markets: local services, national and international long-distance services, interconnection and the resale of long-distance services (Mariscal & Rivera, 2005).<sup>12</sup>

In 2006, Cofetel became a decentralized administrative body of the SCT with full autonomy to dictate resolutions and it was established that the provision of internet services would be offered within a competitive market. However, Aguerre and Galperin (2015) state that new providers found it very difficult to acquire a concession, meaning that Telmex continued to be the predominant player. In 2013, a new constitutional reform was approved followed by a new Telecommunications Law in 2014. This law was intended to increase, finally, competition in the sector and to improve the infrastructure to provide more and better services, which, again as a result, would bring about welfare benefits.<sup>13</sup> The reform consisted of establishing the ICTs access as a fundamental right, including internet; a constitutionally autonomous regulator, the Federal Telecommunications Institute (IFT is the Spanish acronym) to replace Cofetel, with a remit to impose asymmetric regulations on dominant firms which control more than 51% of the market share in the sector; the promotion of ICTs' infrastructure building; and the empowerment of the SCT as the policy-maker in the telecommunications sector (Organization for Economic Cooperation and Development [OECD], 2017).

Accordingly, in 2014 the IFT declared *America Movil* the predominant player in the telecommunications sector (with 70% of the fixed and mobile market), and forced it to share its infrastructure with the rest of the firms in the industry free of charge in order to encourage competition (Instituto Federal de Telecomunicaciones [IFT], 2014). The IFT also got rid of the charges for national long-distance calls for all companies aligning these tariffs with local calls (Ayala, Chapa, García *et al.*, 2017).<sup>14</sup> It cannot be denied that the most recent reform has enabled the telecommunications sector to grow considerably.

According to Ayala *et al.*, "mobile telephony and broadband internet access grew at annual average rates of 10.2% and 37% respectively between 2005 and 2015" (2017: 2). They also argued that a "decline in the relative price of fixed telephony (34%) and mobile telephony (41%) occurred after the implementation of the 2013 reform" (2017: 9-10). Even so, despite the fact that Mexico had reached a 100% digitalization of the telecommunications network, (Mariscal & Rivero, 2005), the market remained highly concentrated in all services, prices are still high in relation to the marginal costs, and *America Movil* is still the predominant player (Ayala *et al.*, 2017, OECD, 2017).

Furthermore, the fibre-optic infrastructure owned by *America Movil* (more than 167,000 kilometres) is at least twice the amount that the Mexican state is building to ensure competition (Ayala *et al.*, 2017, Mecinas, 2016). As Mecinas (2016) commented, the state is only building the basic infrastructure, which means that internet providers will still need to invest in their own infrastructure in the town where they

11- As a matter of fact, Ortiz Mena & Rodríguez (2005), state that in July 2000, the US Trade Representative (USTR) started a consultation procedure at the World Trade Organization (WTO) alleging that Mexico was imposing barriers to competition in that sector.

12- In the cellular market, Telmex was granted the only nation-wide licence to operate.

13- The reform started in 2012 with the creation of the National Digital Strategy. As part of the President's office, it was designed to coordinate all the efforts directed towards promoting the adoption and development of ICTs. As a result of the implementation of this strategy, different internet stakeholders (civil society organizations, private companies and the government itself) formed the Initiative Group, an organization responsible for discussing internet governance issues. Data obtained from the website of the National Digital Strategy: <https://www.gob.mx/mexicodigital/>. Accessed: April 2018.

14- The IFT also declared the TELEVISA group (with around 70% of television and broadcasting) a predominant player in the broadcasting sector (OECD, 2017).

want to provide the service, which is known as 'the last mile'. Also, since new competitors can decide where to invest, they will be attracted by places where people can pay for the services which they provide and not by those places where there is poverty. As a result, those places will depend on the predominant player Telmex (Chávez-Ángeles & Sánchez-Medina, 2013, Mecinas, 2016).

The most benefitted people will therefore be those who are already connected. It will be necessary for the state to intervene in those places which are not attractive to private companies because of their small population, more difficult terrain, greater poverty and similar disadvantages. Moreover, even if the state does manage to increase access to basic infrastructure, there is still a huge gap to fill, which is to enable the poor to adopt and appropriate the ICTs effectively so that they can obtain income in the labour market and leave poverty by their own means.

In the next section, we shall explore the Brazilian case in order to be able to come to better conclusions in relation to the way in which the Mexican state has institutionalized the telecommunications sector. The Brazilian case is outstandingly interesting because, as in much of Latin America, the state also carried out the Washington-Consensus reforms suggested by the IMF and the World Bank. However, they made sure of institutionalizing this sector before opening up the economy, as we shall see next.

## 2. The telecommunications sector in Brazil

As in most of the Latin American countries, before the onset of globalization in the early 1980s, the Brazilian economy was mainly based on the ISI system. The state was heavily involved in the development of the country and the telecommunications sector was no exception.<sup>15</sup> As a matter of fact, it was one of the most advanced in the region (Mariscal & Rivera, 2005). However, the economic crisis of the 1980s hampered the Brazilian state from investing in developing this sector.

In consequence, a privatization process was initiated, and in 1995 the entry of national and international private capital was authorized. Unlike Mexico, the telecommunications sector was strongly institutionalized before the privatization process took place.<sup>16</sup> The main targets of the reform were very similar to those in Mexico: to enhance competition, to provide a universal service, and to raise privatization revenues to reduce public debt (Mattos & Coutinho, 2005).<sup>17</sup> Accordingly, in 1997 the National Telecommunications Agency (ANATEL) was created with the purpose of correcting market failures by means such as pricing control, interconnection rates and rules for the different modality of services offered in the market (Mariscal & Rivero, 2005, Mattos & Coutinho, 2005).<sup>18</sup>

15 - As in Mexico, different companies in Brazil took advantage of the ISI system and the institutional changes of the liberalization period to become predominant companies, such as EMBRAER (the aerospace industry), PETROBRAS (petroleum), ODECRECHT (construction) and VALE (mining), among others (Mattos & Coutinho, 2005).

16- In recent decades, there has been a general consensus that within developing and developed countries, strong institutionalization has also been more important in alleviating poverty than investing in education or other basic services (Dumont, Stojanovska & Cuyvers, 2011). For instance, in Brazil the positive results of the CCT programme (Bolsa Familia) have been in part the result of the strengthening of their institutional capacities, which allowed them to complement the programme effectively with training and labour market policies, which enabled the ex-recipients to obtain sustained income.

17- According to Mattos and Coutinho (2005), the Brazilian reform was based on mixed elements drawn from the British and American experiences. Among the main institutional changes were: a) the Constitutional Amendment no. 8, of 1995, which eliminated the Brazilian statutory monopoly in telecommunications; b) concessions to private entrant mobile operators in 1996; c) the enactment of the General Law of Telecommunications in 1997 and; d) the issue of licences to private entrant operators in wired telephone services.

18- The Brazilian organization which draws together all the internet stake holders, the Internet Steering Committee (CGI),

Before the privatization process started, the telecommunications sector in Brazil was mainly operated by TELEBRAS. When the auctions of the 54 branches of TELEBRAS took place, the groups that were already providing telecommunications services were not allowed to more companies, at least until 2004, and the merging of companies was forbidden (Mariscal & Rivero, 2005, Mattos & Coutinho, 2005). The telecommunications sector turned into a system of twelve companies: three fixed regional operators, one long-distance (EMBRATEL) and eight mobile companies. In order to promote competition in the long-distance service, the regional operators were allowed to offer this service but only for their specific region, whereas EMBRATEL offered the service between the different regions and for international calls. For the mobile service, the country was divided into ten different regions and it was established that there would be two rival companies in each area (Mariscal & Rivero, 2005, Mattos & Coutinho 2005).

As Cypher and Estcatel (2014) commented, the success of the Brazilian state in the promotion of technology was due to the fact that neoliberal programmes were not followed as recipes, as happened in most of the Latin American countries. As a matter of fact, some of the most successful developing countries in recent history in terms of economic growth and wealth distribution realized that, contrary to neoliberal ideology, state intervention was necessary to coordinate the economy in the global era. In South Korea, for example, the intervention of the state in the expansion of its telecommunications infrastructure between the 1980s and 1990s has allowed them to have a coverage of almost 100% in access to ICTs such as internet and fixed and mobile telephony as shown in Tables 2 and 3. In Brazil, following the South Korean example, neo-liberal policies were replaced by a strategy focused on technological innovation with the creation of key organizations such as the National Council for Industrial Development (CNDI) and the Brazilian Agency of Industrial Development (ABDI).<sup>19</sup> This allowed them to increase penetration of telecommunication services with a lesser degree of inequality (Mariscal, 2005).

According to the International Telecommunications Union (ITU), internet penetration in Mexico is very similar to that of Brazil. However, as can be seen in Table 1, this was mainly achieved after the most recent reform (2013) in Mexico which was intended to institutionalize the telecommunications sector following the Brazilian experience. Nevertheless, in both countries it represents less than half of the population, especially in marginalized areas, whereas South Korea has almost 100%.

**Table 1.** Percentage of households with Internet

Year	Brazil	South Korea	Mexico
2006	15.4	94	12
2007	20.1	94.1	12
2008	23.8	94.3	13.5
2010	27.1	96.8	22.2
2011	37.8	97.2	23.5
2012	39.6	97.4	26
2013	42.4	98.1	30.7

created in 1995, was the first one of its kind in Latin America. See: [www.cgi.br](http://www.cgi.br). Accessed: March 2018.

19- See Lopez-Aymes (2010) for a complete account of the South Korean example.



Year	Brazil	South Korea	Mexico
2014	49.6	98.5	34.4
2015	50.9	98.8	39.2
2016	52.4	99.2	47

Source: International Telecommunication Union (ITU) 2007, 2009, 2010, 2011, 2012, 2013, 2014, 2015 and 2016

The transitional articles of the constitution established that, by the end of 2018, the Mexican government aimed to extend internet access with a real speed to download information in accordance with the average registered in the member countries of the OECD, to reach 70% of Mexican households and 85% of all micro, small and medium enterprises at the national level (Secretaría de Gobernación [SEGOB], 2013: s/p). However, according to the National Survey of the Availability and Use of Information Technologies in Households (ENDUTIH is the acronym in Spanish) which is applied annually by the Mexican National Institute of Statistics and Geography (INEGI is the acronym in Spanish), by the end of 2017 internet access had reached only 50% of Mexican households (INEGI, 2017). In relation to the micro, small and medium enterprises, the situation was even worse since most of these enterprises in Mexico are informal, which makes it very difficult to know the real percentage that has been reached.

**Table 2.** Fixed broad band internet prices

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016
Brazil	9.6	4.58	2.5	2.2	2.0	1.42	1.3	0.93	2.1
South Korea	1.2	1.41	1.5	1.6	1.6	1.27	1.32	1.29	1.5
Mexico	5.3	1.95	2.3	2.5	2.3	1.5	3.17	2.68	2.3

Source: ITU 2009, 2010, 2011, 2012, 2013, 2014, 2015 and 2016

In terms of prices, Mexico has been more volatile, as can be seen in Table 2. However, similar to the internet penetration, the most recent reform (2013) seems to have had a positive impact on stabilizing and lowering prices. Even so, Mexico is among the most expensive countries in broadband prices per megabit per second in the OECD (OECD, 2015). As for the number of people who have access to internet through smartphones, there is not enough data that would allow us to make global comparisons. Nevertheless, according to the International Union of Telecommunication, by 2013 the price of accessing internet through smartphones (500 MegaBytes/month) in Mexico represented 15% of the income of the poorest households in the country whereas in other Latin American countries like Brazil, Costa Rica or Chile represented only 11%, 5.57% and 5.42%, respectively (ITU, 2014).

Beyond that, the Mexican state has to realize the advantages of investing in wireless communications. As a way of an instance, wireless radio stations were crucial and decisive to the outcome of the Mexican

Revolution since they were used by leaders of different factions to spread their ideas among the poorest population (Castro, 2016). Investment in wireless internet can be an important way of opening access to knowledge for the poor, especially due to the fact that every time is easier to purchase a smartphone even by the poorest segments of the Mexican population.<sup>20</sup> In the next section, we shall review the feeble link that exists between the ICTs and poverty in Mexico.

### 3. ICTs and poverty in Mexico

According to Lira (2005), the diffusion of the ICTs in Mexico started in 1957 when the National Autonomous University of Mexico (UNAM in Spanish) installed the first computing equipment. Later, during the 1970s, the federal government started to invest in computing equipment as a way of modernizing their organizations. In 1992, Mexico established for the first time an internet connectivity infrastructure, with three different networks distributed across major urban areas (Aguerre & Halperin, 2015). Unfortunately, it came to an end one year later in 1993.<sup>21</sup>

Since 2001, the Mexican state has launched different policies and programmes (e-Mexico, Agenda Digital.mx, Universal digital inclusion policy) with the prime intention of inserting Mexico into the so-called *Information and Knowledge Society* and closing the digital divide in access to the ICTs. The main goals have been, in the broadest terms, opening access to broadband internet (mainly in state-run schools, health centres, government offices and public places), e-government (administrative procedures), open data (access to public information) and the promotion of the use of ICTs. However, as argued above, the rationale until now has been that the benefits of the ICTs will, eventually, trickle down to the poor.

In recent years, some technological innovations have been implemented to different anti-poverty programmes in Latin America. Among them, we find the anti-poverty Conditional Cash Transfer programmes (CCTs). The main idea behind these programmes is to provide a minimum income to the poorest so that they invest it in the well-being of their children, who would acquire capabilities that would enable them to keep on obtaining an income in the labour market in the mid and long-term in order to move out of poverty by their own efforts (Becerril-Velasco, 2014).<sup>22</sup> Evaluations of the Mexican CCTs *Progresá*, *Oportunidades* and *Prospera* have been quite promising (for example, Molyneux, 2008, Lloyd-Sherlock, 2008, Soares, Pérez & Guerreiro, 2010, González de la Rocha, 2012).<sup>23</sup>

There is, however, little evidence that shows that the programme's ex-recipients are able to obtain sustained income in the labour market and leave poverty by their own efforts. In recent decades, the ICTs have been recognized as enablers of development and poverty alleviation (James, 2015, Maldonado et al., 2010, Matus & Ramírez, 2012, Sreekumar & Rivera-Sánchez, 2008, Torero & Von Braun, 2006).

20- See [http://www.inegi.org.mx/saladeprensa/aproposito/2017/internet2017\\_Nal.pdf](http://www.inegi.org.mx/saladeprensa/aproposito/2017/internet2017_Nal.pdf).

21- This infrastructure was formed between the Technological Institute of Higher Studies of Monterrey (ITESM it is the acronym in Spanish) in Monterrey and the University of Guadalajara; the UNAM network was located in Mexico City; and RUTYC, which conjoined thirty-five public universities spread throughout the country (Aguerre & Halperin, 2015).

22- The first Mexican CCT programme was implemented in 1997 under the name of PROGRESA; in 2000 it was renamed OPORTUNIDADES and in 2013 its name was changed again to PROSPERA.

23- In Latin America, CCTs benefit approximately 113 million people which accounts for about half of all people living in poverty in the region (220 million). The programmes with the widest coverage are the Brazilian Bolsa Escola (with around 50 million recipients) and Mexico (with around 27 million recipients) (Maldonado et al., 2011).

Nevertheless, the efforts to link the ICTs and the anti-poverty programmes in Mexico have been mainly oriented towards improving their efficiency rather than enabling the poor to obtain sustained income in the labour market through the appropriation of the ICTs.

The first aim has been to open access to the financial system (credit and savings) to the poor. Chiapa and Prina (2017) argued that the poor might even require a more diversified basket of financial products and services than the rest of the people in order to be able to generate income by their own efforts by starting a business, to cope with the shocks of the economy or health problems, and to increase their financial planning. Demirguc-Kunt and Klapper (2012), however, pointed out that in OECD economies, personal bank account ownership is almost universal whereas in Latin America and the Caribbean, only around 50% of the economically active population have a bank account.

In recent years, some Latin American countries have amended their legislation to promote the opening of bank accounts by the poor at low or no cost. Accordingly, in Mexico all recipients of the CCT programme *Prospera* have been banking on their own account since 2012. According to Chiapa and Prina (2017), however, in Mexico only around 15% of those living in urban, semi-urban, or rural areas close to an urban zone are able to use their accounts to save or to require a credit.

Second, to reduce the transaction costs of the funds transfer process. Maldonado, Moreno, Giraldo *et al.* (2011) explained that the CCTs use three different payment systems: cash payments on pre-announced days, prepaid debit cards and savings accounts. Currently, the latter two are the main form of payment used by the CCTs in Latin America (around 56%).<sup>24</sup> According to Chiapa & Prina, “in Brazil the transition to electronic delivery of the transfers of the *Bolsa Familia* programme reduced delivery costs from 14.7% to 2.6% of the value of transfers” (2017: 28). The main disadvantage is the low coverage of the ATM in Latin America where only Chile has over 20 ATMs per 100,000 inhabitants (Mariscal & Rentería, 2013).

Third, to improve the operation of the programme. In order to determine whether a household can be part of the programme or not, there is an extensive study of people’s socio-economic conditions. As signaled by Mariscal & Renteria (2013), ICTs could reduce potential data-collection errors while preparing the databases of the socio-economic conditions of the recipients and to generate and process information to monitor both the programme operation and the progress of the recipients.

As we have seen, the Mexican state has made a significant effort in order to strongly institutionalize the telecommunications sector and, in this way, open access to the ICTs. Moreover, ICTs are starting to be implemented into the anti-poverty policies in Mexico as a way of improving the operation of the programmes and offering the recipients financial services. However, these efforts have yet to reach the labour market so that the poor can be incorporated into the so-called *Information and Knowledge Society* by leading their economic destiny with the ICTs.

For instance, on 11 June 2013, the first thorough reform of Mexico’s telecommunications sector was enacted. It was asserted that the reform would bring the state back into the coordination of the telecommunications sector. As has been revealed in this article, however, the main gap in the reform is perhaps the absence of the state from the coordination of the telecommunications sector since the reform is entirely directed towards promoting competition between private companies. This is especially relevant

24- In Mexico, the 2010 federal expenditure budget established that all subsidy programmers’ payments to their corresponding beneficiaries would have to be made electronically by December 2012 (Presupuesto de Egresos de la Federación [PEF], 2010: 19).

since, as we saw earlier, there is still a lack of access to internet services because providers might not have incentives to invest in neighbourhoods and towns where people cannot afford the services which they provide. For this very reason, the state has to intervene by investing in the so-called 'last mile'. In Chile, for example, to solve this problem the government invited private companies to invest in poor areas in return for small subsidies. Consequently, different telecommunications services have been installed and offered all over the country at low cost (Cecchini & Scott, 2003).

Furthermore, since the North American Free Trade Agreement (NAFTA) came into force in 1994, there has been an emphasis on the growth of the manufacturing sector to generate employment. This has brought about some pockets of high productivity in the textiles, shoes and clothing industries, and to some extent in the software and hardware and aerospace industries (Bayón, 2009). Even so, these sectors are not intensive in employment and/or do not have many links to the rest of the economy. Kuznetsov and Dahlman (2008) pointed out that there are many other potentially accessible markets which have not been taken either by the state or by the private sector because of the lack of investment in research and development since the smallest industries have been hampered from accessing the new technologies. In addition, in spite of the fact that the IFT declared *America Movil* the predominant player in the telecommunications sector and forced it to share its infrastructure with the rest of the firms in the industry free of charge, *America Movil* has found a way to delay this process due to the weak law enforcement of the IFT (OECD, 2017). In South Korea, on the other hand, the government and business groups realized that their survival in the global era would depend on its technological and knowledge levels. Accordingly, they institutionalized long-term development strategies in order to achieve independence from foreign technology in key areas such as in the automobile, ICTs and aerospace industries. As far as the ICTs industry is concerned, they invested heavily in research and development, education, training and infrastructure to achieve universal access to ICTs and reduce the digital divide (Lopez-Aymes, 2010).

Moreover, along with the telecommunications reform, the Mexican CCT incorporated some changes in order to officially link *Prospera* to other programmes of different ministries, which would allow the beneficiaries either to continue studying or to join the labour market, especially those beneficiaries who have graduated from the programme. In relation to the educational component, the recipients are to have open access to scholarships and grants from the Ministry of Education, which would allow them to continue studying to bachelor's level. In terms of their incorporation into the labour market, recipients have priority access to two programmes of the Ministry of Employment: the National Service of Employment (*Servicio Nacional de Empleo* in Spanish), which helps people to find jobs advertised by public and private organizations, and the *Bécate* programme which provides capacitation. They also have priority access to programmes of different ministries that allow them to generate income, and women have open access to financial services.<sup>25</sup> However,

25- The programmes are: from the Ministry of Agriculture, Livestock, Rural Development, Fishery and Food (SAGARPA): the programme for the productivity of entrepreneurial women, the programme of productivity and competitiveness of agrifood, the programme to promote agriculture, the component of access to productive and competitive financing and the integral programme of social development. From the Ministry of Social Development (SEDESOL): the programme of productive options, the programme to promote social economy and the national fund for the promotion of handcrafts. From the Ministry of Economy (SE): the national fund for entrepreneurs. From the STPS the programmes commented on above; from the Commission of Indigenous Peoples (CDI) the programme for the improvement of indigenous production and productivity. From the Ministry of Agrarian, Territorial and Urban Development (SEDATU): the programme to support young people for the productivity of future rural enterprises and the fund for the support of productive projects in agrarian contexts. Data obtained from the websites of the different Ministries of the Mexican Executive power: <https://www.gob.mx/presidencia/>. Accessed: April 2018.

at the time of the writing of this paper, there was no ministry that had a record of any of the recipients of *Prospera* who had been linked to any of the programmes that would allow them to join the labour market.<sup>26</sup> The only Ministry that has been linking the recipients of *Prospera* to its programmes is the Ministry of Education, which has allowed some of the recipients to continue studying to bachelor's level. In this context, the ICTs could contribute importantly to alleviating poverty also by enabling inter-institutional coordination between the different ministries of the executive power, allowing them to share relevant information about the poor. To cite an instance, the effectively institutionalized bureaucratic apparatus of the East-Asian states has been more important in alleviating poverty than high educational levels since it has allowed them to protect workers' rights while helping the private high-technology sector to increase their productivity to foster employment generation (Chang, 2010, Stiglitz, 2002).

Finally, despite the fact that ICT programmes in universities have become one of the bachelor's degrees with increased demand in the whole country (Lira, 2005), technological change has surpassed educational change (Lopez-Calva & Lusting, 2010, Rodríguez & Sánchez-Riofrío, 2017). For instance, according to Chiapa and Prina (2017), the low level of financial literacy is one of the main reasons why recipients of *Prospera* do not save money. Even more, according to Garcia-Murillo and Velez-Ospina (2017), ICTs positively affect the creation of new businesses since they remove the barriers to entry while also providing information related to government programmes, training and business resources. Even so, micro, small and medium enterprises in developing countries have not been able to adopt and appropriate ICTs due to constraints such as lack of awareness about ICTs and, especially, lack of ICT skills (Mbuyisa & Leonard, 2017). In some countries, public or community-based ICTs facilities have been created to provide digital skills training and/or advice. By way of illustration, in India a business-to-consumer platform built by a local government enabled small and medium enterprises to sell travel and mobile phone services to tourists and visitors (Gorla, 2009). By the same token, in some rural areas computerized milk collection centres with integrated electronic weights and electronic fat testing machines have saved time and ensured fair prices for farmers who sell milk to dairy cooperatives (Tarafdar, Anekal and Singh, 2012). In this line of thinking, anti-poverty policies must be accompanied by digital education policies aimed at helping recipients understand the different ways in which the ICTs could enable them to join the labour market as well, especially because of the high levels of informality that exist in Latin America.

## Concluding remarks

The main question that we aimed to answer in this paper is ¿How has the institutional weakness of the Mexican state affected the way in which the telecommunications sector is structured and, in consequence, the feeble link between ICTs and poverty in Mexico? We have shown that the influence of a local private actor (Telmex) has determined the path of the telecommunications sector and, in consequence, the feeble link of the ICTs to poverty in Mexico. For instance, in spite of the many advances in the digitalization of the telecommunications network, the market has remained highly concentrated in all services, prices are still high in relation to the marginal costs, and Telmex is still the predominant player. Moreover, the constitutional reform

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26- Data obtained from the different ministries of the executive power requested through IFAI in 2018.

of 2013 was intended to increase competition in the sector and to improve the infrastructure to provide more and better services, which would bring about welfare benefits. However, the state is only building the basic infrastructure and since new competitors can decide where to invest, they will be attracted by places where people can pay for the services which they provide and not by those places where there is poverty.

It will be necessary for the state to intervene in those places which are not attractive to private companies because of their small population, more difficult terrain and greater poverty. Furthermore, even if the state does manage to increase access to basic infrastructure, there is still a huge gap to fill, which is to enable the poor to adopt and appropriate the ICTs effectively so that they can obtain income in the labour market and leave poverty by their own means. Unfortunately, the efforts to link the ICTs and the anti-poverty programmes in Mexico have been mainly oriented towards improving their efficiency rather than enabling the poor to obtain sustained income in the labour market through the appropriation of the ICTs. In this line of thinking, we conclude that empirical analyzes of the links between the anti-poverty policies, the ICTs and the Mexican labour market are required to be able to contribute to enabling the poor to obtain income by their own efforts.

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