http://revistas.unam.mx/index.php/entreciencias
Entreciencias 7(21): 53-68. Dic. 2019 - Mar. 2020
ISSN: 2007-8064

Entreciencias: Diálogos en la Sociedad del Conocimiento

Appropriation of information and communication technologies (ICTs) to reduce poverty in Aguascalientes, Mexico

Apropiación de las tecnologías de la información y la comunicación (TIC) para reducir la pobreza en Aguascalientes, México

Christian Iván Becerril-Velasco[a]*

[*]El Colegio de la Frontera Norte

Abstract

Purpose: The aim of this paper is to review the extent to which the institutional weakness of the Mexican state has impeded the poor from appropriating technology to obtain a sustained income in the labour market in order to overcome poverty through their own efforts.
Methodology: The methodological design of our research was sequential-exploratory and entailed a mixture of quantitative and qualitative methods.
Results: The results show that the institutional weakness of the Mexican state impedes people from appropriating ICTs to expand their opportunities to obtain a sustained income in the labour market in order to overcome poverty through their own efforts.
Limitations: The main limitation in this study is that we collected data in only one state of the Mexican Republic.
Main findings: The questionnaire we applied to ex-recipients of the anti-poverty policy *Prospera* has an acceptable confidence level to be able to make generalizations about the labour conditions of the poor people who are aged between eighteen and twenty-nine and completed high school in the state of Aguascalientes.

Resumen

Objetivo: analizar en qué medida la debilidad institucional del estado mexicano ha impedido que los pobres se apropien de las TIC para obtener un ingreso sostenido en el mercado laboral a fin de salir de la pobreza por sus propios esfuerzos.
Método: el diseño metodológico utilizado fue exploratorio-secuencial y se basó en una mezcla de métodos cuantitativos y cualitativos.
Resultados: los resultados muestran que la debilidad institucional del estado mexicano impide que las personas se apropien de las TIC para ampliar sus oportunidades de obtener un ingreso sostenido en el mercado laboral para salir de la pobreza por sus propios esfuerzos.
Limitaciones: la limitante principal en este estudio es que los datos recolectados pertenecen a un solo estado de la República Mexicana.
Principales hallazgos: el cuestionario aplicado a ex-beneficiarios de la política anti-pobreza del programa *Prospera* cuenta con un nivel de confianza aceptable para hacer generalizaciones sobre las condiciones laborales de las personas en situación de pobreza que tienen entre dieciocho y veintinueve años y que terminaron el nivel educativo medio superior en el estado de Aguascalientes.

Recibido: 9 de abril de 2019;
aceptado: 18 de septiembre de 2019.

Keywords: Information and communication technologies, conditional cash transfers, social appropriation, labour market, institutions.

Palabras clave: tecnologías de la información y la comunicación, transferencias monetarias condicionadas, apropiación social, mercado laboral, instituciones.

DOI:10.22201/enesl.20078064e.2019.21.69387

Introduction

In the last three decades, governments all over the world have fostered, to a greater or lesser extent, the adoption of information and communication technologies (ICTs) by both public and private organizations and by people. Some developing countries have been particularly successful in taking advantage of ICTs to reduce poverty. However, it is not clear why Latin American countries have not. The main purpose of this paper is to understand the way in which the weak institutional framework of the Mexican state, among other factors, prevents it from enabling the poor to appropriate the ICTs to obtain an income in the labour market through their own efforts.

The main research question is: to what extent has the weak institutional framework of the Mexican state prevented the appropriation of ICTs by the poor to obtain an income in the labour market to escape poverty in Aguascalientes, Mexico? The results show that due to its institutional weakness, the Mexican state is impeding people from appropriating ICTs and expanding their opportunities in the labour market in order to escape poverty. The paper is divided into four sections. The first section will introduce some theories about the appropriation of ICTs and poverty. In the second section, the data and the methodology of this study will be described. In section three, we shall discuss the results of the empirical analysis of the lack of social appropriation by the poor. Section four will present the main conclusions of the paper.

Appropriation of ICTs and Poverty

The links between ICTs and poverty have been widely discussed (Sreekumar and Rivera-Sánchez, 2008; Maldonado, Martínez, García *et al.*, 2010; Matus and Ramírez, 2012; James, 2016). However, it is still unclear why Latin American countries have not been able to effectively alleviate poverty through the use of ICTs. By studying the history of technology in Latin American countries, we have found that during the first technological revolutions, they imported and adopted technology following a deterministic vision.

That is, they believed that simply by importing and adopting technology from developed countries, they would accomplish similar levels of industrialization and economic development (Organisation for Economic Co-operation and Development [OECD], 2003; Neüman, 2008). However, they did not realize that the effects of technology on the economy are conditioned by several factors such as the macroeconomic circumstances, the international context and institutional and cultural environments. This was exposed during the 1980s when oil and mineral prices collapsed and the Latin American countries were no longer able to finance public spending mainly because they were incapable of producing their own technology to compete internationally (Sánchez, 2006; Teichman, 2008).

The most prevalent effects were the increase in poverty and socio-economic inequality. A new wave of reforms was then initiated in Latin America with the aim of taking advantage of the new technological revolution which was about to start, the ICT era, under the belief that state interference in the economy had been the mistake which the countries of the region had made in previous revolutions. The reforms consisted of the opening up of the economy and the reduction of the size of the state which would provide nations with a clear appreciation of the advantages of technology, thus facilitating their adoption (Qiu and Cantwell, 2016).

These changes would also bring about macroeconomic stability, increased employment, the efficient allocation of resources and better monetary and fiscal policies which, in consequence, would decrease socio-economic inequality, economic instability and social disruption (Rodrik, 1997). However, they overlooked the fact that markets are sustainable as long as they are embedded in institutions and organizations which serve at least three functions: they regulate, stabilize and legitimize market outcomes (Rodrik, 1998). Accordingly, the socio-economic inequality which the crisis of the 1980s had brought about increased considerably due to, on the one hand, the instability of the new model and, on the other hand, the digital divide created by the introduction of ICTs.

As a matter of fact, since the opening up of the economy, Mexican workers have become the assemblers, whereas developed countries provide technology for the

production of manufactured goods (Popli, 2010). Moreover, although some pockets of high productivity have been developed in the software, hardware and aerospace industries, the returns on these sectors' investments go to Multinational Corporations (MNCs) (Ghemawat, 2009). Furthermore, the lack of investment in research and development has created the situation that potentially available markets have not been taken up either by the state or by the private sector (Kuznetsov and Dahlman, 2008).

Studying the experiences of some of the developing countries which have been able to close, to some extent, the digital divide created by the introduction of ICTs, especially in relation to poverty, we have found cases such as China, India, South Korea and Scandinavian countries. These countries have strong institutions because, unlike Mexico and most Latin American countries, they have been able to form a nation-state with an institutional framework which is capable of treating the different groups in society impartially and impersonally (North *et al.*, 2009). This, as a result, gives people open access to valuable resources such as land, labour, technology and capital, or valuable activities such as trade, education and training to pursue their own political, economic and social goals (North, Wallis and Weingast, 2009). In addition, it prevents the political system from manipulating economic interests since every group in society has strong incentives to expose attempts to undermine the legal-institutional framework making it difficult for the elites to strengthen their position through rent-creation (North *et al.*, 2009).

In addition, they have been able to adjust their institutional and organizational framework to match the technological revolutions that have appeared over the course of history with their respective socio-economic regimes (Freeman and Pérez, 1988).[1] This rearrangement gradually permeates and outlines the cultural practices of the population allowing them to appropriate technology in their daily activities (Pérez, 1983). The main institutional adjustments which these countries made to contribute to reduce poverty were in the labour market where, to different degrees, they invested heavily in research and development, in the creation of infrastructure to provide universal access to ICTs, in the development of digital skills and in the establishment of different technological solutions which allowed the poor to obtain or increase their income (Cecchini and Scott, 2005; Gorla, 2009; Tarafdar, Anekal and Singh, 2012).

Weak states, on the other hand, stand out through their fragile institutional structure which favours the access to resources to the elites due to the historical prevalent influence of domestic and international actors in the policy-making process (Evans 1989; Schneider 1999; Vanden and Prevost 2002; Becerril-Velasco, 2013). Most of the Latin American and African countries perfectly fit into this type of state (Evans 1989; Schneider 1999; Vanden and Prevost 2002). Accordingly, these countries have not been able to adjust their institutional structures to match their socio-economic regimes with technological revolutions that have appeared over the course of history, at least not in a timely manner (Pérez, 1983; Freeman and Pérez, 1988).

South Korea, for example, is one of the countries with the highest economic growth, poverty reduction and technology appropriation rates due to, among other things, the strengthening of its labour market institutions. They have managed, for instance, to open access to the internet and fixed and mobile telephony almost universally (International Telecommunications Union, 2016). Furthermore, over the last four decades, the South Korean state has invested heavily in research and development, universal education and technological skills, and created public institutes and organizations specialized in ICTs, thus increasing the opportunities of its poor population to face the challenges that the most recent technological revolution has presented (Boncheva, Licona Michel, Loaiza Becerra *et al.*, 2016).

In Latin American countries, in contrast, there have been some adjustments as well, such as the flexibilization of the labour market, the creation of infrastructure to provide access to ICTs and different policies to increase digital literacy. However, this has not been enough to match the progress and development of the ICT industry with economic development. Nevertheless, we cannot make the same mistakes and pretend that what other countries have done to reduce poverty through the use of ICTs will work in every context. In particular, because the creation of the institutions which are required to underpin the development of technology has to be studied throughout the advancement of technology itself (North, 1994).

[1] According to Rousseau (2008), there have been four main technological revolutions: *1)* the steam engines in the mid-nineteenth century; *2)* electricity around 1895; *3)* the technology developed to exploit oil appeared in the late 1920s, and; *4)* in the early 1970s, with the invention of the first microprocessor, ICTs emerged as the last technological revolution.

DOI:10.22201/enesl.20078064e.2019.21.69387

Moreover, as has been shown elsewhere, the weakness of the institutional capacities of Latin American states makes poverty reduction much less likely to occur since it impedes the provision of labour market policies which complement anti-poverty policies (Schneider, 2013). A similar situation occurs with ICTs in Mexico since there is a feeble institutional link between them and poverty because of the influence of a local private actor Teléfonos de México (*Telmex*) which has determined the path of the telecommunications sector (Mariscal and Rivera 2005; Ayala, Chapa, García *et al*., 2018). Besides, the policies directed towards the adoption of ICTs so far have focused only on access to and use of ICTs and have dismissed the importance of their appropriation, especially by vulnerable groups.

The appropriation of technology is a cycle which begins when people decide to adopt technology and use it as a support for their social, economic, political or cultural activities. As Bar, Weber and Pisani (2016) put it, users perform the same things using new technology. The next stage of the cycle is the appropriation of technology when users experience it, examine its possibilities and modify its characteristics to adapt their needs to it. Therefore, appropriation simultaneously transforms both the users (in their knowledge and skills) and technology (in its properties) (Andrés, 2014).

According to Bar *et al*. (2016), appropriation has at least three levels: *basic appropriation*, where users fill in the technological spaces left intentionally by suppliers so that technology can be personalized, such as changing the ring-tone of a cell phone, the installation of new software, or new ways of socializing; *intermediate appropriation,* where users recombine the components of technology with the intention of generating new practices which respond better to their needs; some examples could be manufacturing devices which improve internet reception or batteries to recharge devices, and mobile banking; and *advanced appropriation,* in which users, designers, manufacturers and service providers hold a stake over who can use the technology, the cost of it, conditions, purposes and even the consequences of using them; some examples could be hacking internet accounts to avoid paying for the service, and the construction of explosive detonators.

Now, how can the appropriation of technology contribute to reducing poverty? After the disappointing results of the opening of the economy of the 1970s and 1980s in developing countries, Sen (1999) criticized the logic behind those reforms which understood development in terms of the achievement of economic growth. According to Sen, such measures do not take into account people's interests or freedom to pursue the way of life that they wished. Therefore, he proposed the notion of functionings and capabilities which is concerned with the elimination of disadvantages or the elements that prevent freedom and equalization of opportunities in life (Anand and Sen, 1997). From this perspective, the poor lack equal opportunities to acquire or access the means to carry out the way of life that they wish the most.

In regards to ICTs, Sen (2010) argued that the important question is how ICTs can make people more functional; that is, how people can do -or be- diverse ways which allow them to achieve the life that they wish, especially the poor, who are characterized in today's society, among other things, by limited freedom in terms of their opportunities to achieve the life that they desire through the appropriation of ICTs. In brief, functionings are the set of actions which can be carried out with the help of the ICTs. Capabilities, on the other hand, are related to the necessary freedom and skills to appropriate ICTs. Neüman (2008) pointed out that for social appropriation to really take place, it is necessary that social practices associated with appropriated technology are changed and then taken a step beyond: those who appropriate must be able to control the output of the social practices.

In that regard, Gillwald (2010) argued that the experience of Scandinavian countries, the Asian "tigers" and the United States of America (USA) show that the social potential of ICTs is conditioned by the institutional systems of financing, regulation, and incentives and sanctions of the state. North, Wallis and Weingast (2007) explained that without impartial and impersonal institutions, which enable the entire population to access, adopt and appropriate ICTs; elites can adopt them in a selective way without the need to suit their own needs and interests. For example, the introduction of radio and television in the first half of the twentieth century made it much easier for people in developing countries to obtain information, but these same means also made it easier for elites to spread their opinions to the masses and control their perception of public issues.

The role of the state, then, should not be limited to

expanding opportunities for access to ICTs, but should enhance opportunities for the appropriation of these technologies in the everyday activities of the poor. For the purposes of this current research, we focused on the appropriation of ICTs by the poor so that they can be able to obtain a sustained income in the labour market in order to leave poverty through their own efforts. In the next section, we shall describe the research methods which we used to answer our research question.

Methodology

The central question that we intended to answer in this study was: To what extent does the institutional weakness of the Mexican State impede people in a situation of poverty from appropriating ICTs to obtain a sustained income in the labour market through their own efforts? According to Hancké (2010), once a research question has been established, the next step is to build an empirical study. The methodological design of our research was sequential-exploratory and entailed a mixture of quantitative and qualitative methods and was divided into three parts.

The first part consisted of forty semi-structured interviews which were carried out with different actors involved in our research question, such as government officials, private sector executive officers and two focus groups (eight people in each) of poor people who were aged between eighteen and twenty-nine and who had already completed high school. These interviews allowed us, on the one hand, to understand the lives of the poor and, on the other, to locate other relevant actors using the snowball technique in order to complement the findings from the focus groups.

The second part was a document analysis of papers related to our object of study (books, research papers, conference proceedings, official documents and so on). Finally, after completing the qualitative interviews and the document analysis from secondary sources, we developed a survey and recruited a sample to which we applied it. We applied the questionnaire to ex-recipients of the *Prospera* programme of an urban municipality in the state of Aguascalientes in mid-2018.

We chose the *Prospera* programme because it was the response of the Mexican government to the adverse effects of opening up the economy to equalize the socio-economic conditions of the poor. To achieve this, they adopted an anti-poverty policy which has been very popular across the world over the last twenty years; the so-called Conditional Cash Transfer programmes (CCTs) which deliver a modest income to the poorest so that they can finance the education and health of their children. Accordingly, they will be able to acquire capabilities which will enable them to continue to obtain a sustained income in the labour market and to move out of poverty by their own efforts (Becerril-Velasco, 2013).[2]

We interviewed only ex-recipients who were aged between eighteen and twenty-nine and who had finished high school as active members of the programme for the following reasons. First, high school is the minimum schooling level required in the Mexican labour market nowadays. Second, to formalize employment workers must be at least eighteen years old (Becerril-Velasco, 2013). Third, it was important to have a homogeneous age range in the sample in order to be able to make generalizations on safe methodological grounds.

Mexico is a federal country with 32 states. We selected the state of Aguascalientes because it gave us the chance to work in a context with high levels of employment in the industrial and service sectors, which would give the ex-recipients a wide range of employment opportunities.[3] In terms of the municipality, we decided to choose Aguascalientes since around 70 % of the total population of the state reside there. This assured us the opportunity to work in a large urban labour market. Moreover, the decision to work in an urban context derived mainly from the following reasons: In the last decades, poverty has concentrated mainly in the urban sector.[4] Second, the reduction of income poverty is one on the main concerns of the Mexican state due to the high levels of informality that exist in the country, particularly, in urban zones (Becerril-Velasco, 2013).

The main dimensions of our analysis were poverty, the labour market's institutions and the ICTs. Now, we required to recruit a sample of people in poverty which

[2] The CCTs were implemented in Mexico in 1997 under the name of *Progresa*; in 2001 the programme was renamed *Oportunidades* and in 2013 it was named *Prospera*. The programme currently covers more than 6,000,000 families.

[3] Aguascalientes is one of the states where automotive and metalworking industries have grown the most in recent decades. See https://www.gob.mx/cms/uploads/attachment/file/75545/150213_DS_Automotriz_ESP.pdf

[4] See *Instituto Nacional de Estadística y Geografía* (Inegi) http://cuentame.inegi.org.mx/poblacion/rur_urb.aspx?tema=P

DOI:10.22201/enesl.20078064e.2019.21.69387

allowed us to understand the relationship between them. According to Lewis and Ritchie (2003), purposive sampling is the method which enabled us to reach that goal.

To build our sample, we decided to use the stratified random sampling method. As explained above, we started our fieldwork by interviewing a focus group composed of ex-recipients. We then proceeded to interview other relevant actors involved in our research problem (from the government, the private sector and the civil society). After analysing all of this data, we prepared our questionnaire and built a representative sample of ex-recipients to interview so that we could make well-supported generalizations from our findings.[5]

Between 2001, when the programme started to give scholarships to support people to study at the high school level, and 2017, the programme gave out 6,071 scholarships in Aguascalientes. We therefore recruited a sample of 362 ex-recipients of whom 227 (62.7 %) were female and 135 (37.3 %) were male.[6] At the time that we applied the survey, most of the interview respondents resided in the municipality of Aguascalientes (342, or 94.5 %), fifteen (4.1 %) in a different municipality still in the state of Aguascalientes and five (1.4 %) in a different state; 131 (36.2 %) of our respondents were working or had a job or an occupation, 124 (34.3 %) were students, 64 (17.7 %) were studying and working simultaneously and 43 (11.9 %) were unemployed.

The poor and the labour market of ICTs

The main advantage of our perspective on ICTs and their interaction with the labour market and the state's institutions is that it helped to shed light on some of the specific causes which prevent the poor from appropriating ICTs in order to obtain a sustained income. We argue that the main issue is the weak institutional framework of the Mexican state which has prevented the poor from appropriating ICTs to leave poverty by their own efforts, as we shall see next.

Weak enforcement of telecommunications regulations

In 2013, the first comprehensive reform of the telecommunications sector was accomplished. The main idea was to increase competition in this sector – which had been dominated by a business group (*América móvil*, the owners of *Telmex*) since the late 1980s – and to open access to telecommunications-related services, which, in consequence, would benefit the lowest strata of the population. Accordingly, access to ICTs was recognized as a fundamental right, a constitutionally autonomous regulator, the Federal Telecommunication Institute (IFT), was established and a new Telecommunications Law was enacted.

However, the weak law enforcement of telecommunications regulations was exploited by the private sector to avoid IFT regulations. In 2014, *Telmex* was declared a predominant player in the telecommunications sector by the IFT and as a result was forced to share its infrastructure with the rest of the companies in the industry at no cost to them. Nevertheless, *Telmex* was able to deflect legal action and slow down the legal process using the *amparo* law. *Telmex* managed to change the regulation and become able to charge for the use of its infrastructure.

The IFT also ordered *Telmex* to make a functional separation by 2020 in order to promote investment in infrastructure by other concessionaires in the so-called last mile. *Telmex* had to be divided, functionally, into two firms, and the new company would not offer fixed telephone or internet services, but would exclusively provide wholesale services to ensure that smaller companies had access to *Telmex*'s fixed infrastructure to increase competition in the market and reach the poorest and most distant zones. However, poor areas may lack competition since concessionaires might not want to invest in infrastructure in areas where people might not be able to afford the service.

In addition, the office in charge of monitoring the imposition of asymmetric regulations (the *Dirección General de Supervision y Verificación de Regulación Asimétrica* in Spanish) was created two years after the resolution in 2016 since there was an insufficient budget and not enough mechanisms to ensure that the private firms complied with this type of resolution which is still under construction. Moreover, in order to monitor the radioelectric spectrum, the IFT employed just 47 inspectors,

[5] Before the application of the questionnaire, we tested it by surveying a small number of ex-recipients in order to be sure that the questions would elicit the information required to answer our research question.

[6] To build the sample, we used the general standards of surveys of social content and worked to the usual confidence level of 95 % and 5 % of sampling error. Regarding the degree of variability, we also used the general standard employed in this type of survey of social content: 50 % - 50 % (Becerril-Velasco, 2013).

around 1.5 for each Mexican state, and only 24 who could verify that the concessionaires fulfil their obligations in each of the 32 Mexican states.[7]

Apart from that, in spite of being the organization in charge of enforcing justice in the telecommunications sector, the IFT is not part of the judicial authority but is supposed to be an autonomous body, and this has resulted in *Telmex* still being the predominant player and in limited affordability of and accessibility to internet service.[8] As a matter of fact, 27 % of the interviewees stated that they did not have internet at home because they could not afford it, and most of them were students and/or employees (*see* table 1); a marginal 2.5 % stated that there was no service where they lived and 5 % stated that they did not need it.

Table 1. Why do you not have internet at home?

	I cannot afford it	There is no service where I live	I do not need it	Total
Students	34	4	1	39
Employees	27	2	1	30
Study and work	18	2	0	20
Unemployed (Nini)*	19	1	0	20
Total	98 (27%)	9 (2.5)	2 (.5%)	109 (30%)

Note: *Nini is the expression used in Mexico for the people who are "neither studying nor working".

Source: Author's elaboration.

Most of those who did not have internet at home went to cyber-cafés to access it (13.5 %), mainly students, as shown in table 2. Surprisingly, only 5 % of the interviewees went to *Mexico-conectado* zones, which was one of the main policies of the government to guarantee the constitutional right of access to the internet and close the digital divide between 2013 and 2018. To achieve this goal, *México Conectado* deployed telecommunications networks which provide connectivity in public places such as schools, health centres, libraries, community centres and parks.

Table 2. If you do not have internet at home, how do you access it?

	Cyber-cafés	School	*México conectado*	Share with neighbours	Mobile	Family or friends	Plan	Total
Student	29	6	1	0	3	0	0	39
Employee	7	0	0	0	17	6	0	30
Study and work	10	2	1	1	4	3	0	21
Unemployed	3	0	0	0	12	3	2	20
Total	49 (13.5%)	8	2 (.5%)	1 (.25%)	36 (9.9%)	12	2	110

Source: Author's elaboration.

There was, however, some level of appropriation although basic and minimal since 9.9 % of the interviewees used their mobile phones to access the internet in spite of the fact that they did not have an internet-fixed plan designed to do this. They filled in the technological spaces left intentionally by mobile suppliers for using the internet. Mainly, either to download or to use an application and so on whenever they needed. However, this method is more expensive in the long run than setting up a fixed plan either through their telephone or at home. So, this would mean that they only used it for emergencies.

Weak unions

During most of the twentieth century, public-private collaboration and coordination in Mexico, as in most of Latin America, was always achieved through corporatist arrangements (Teichman, 2008). It was stated that unions required authorization from the Ministry of Labour to register and employers were able choose the union with which they wanted to work. Consequently, the organization of unions was merely a façade since their leaders helped the government to control workers in exchange for seats in the legislative authority (Leyva and Pichardo, 2009).

Even so, unions were widespread and the collective capacities which they had acquired over time allowed them to bargain with both the firms and the government. The onset of globalization posed a challenge to countries all over the world since a new wave of unionism was needed both to protect workers' rights and to adjust to the new economic conditions (Bensusán and Middlebrook, 2012). A particular case is the Danish unions which, instead of opposing globalization and the different labour practices which it brought about such as outsourcing and offshoring, collaborated with the government to adjust the institutional framework of the labour market and

[7] The radio-electric spectrum is the part of air space of the Mexican state which enables the propagation of electromagnetic waves which are used for the transmission of information in the services of wireless telecommunications and broadcasting.

[8] In 2016, the IFT renewed the concession for *Telmex* until 2056 and the conditions will be established in 2023.

DOI:10.22201/enesl.20078064e.2019.21.69387

establish what they called 'flexicurity'.

Flexicurity basically consisted of easing the way for labour schemes such as outsourcing and offshoring but also pushing for training in the workplace, training of the unemployed, and combining firms' and government educational programmes. This enabled them not only to help workers to adjust to the new conditions – mainly the shift from manufacturing jobs to service sector jobs – but also to generate employment and to produce an attractive environment for Danish firms to keep their production and employment inshore rather than sending all their manufactured production to China, Korea or Taiwan as many European firms did. Danish firms such as Lego offshored the manufacture of their product to Eastern Europe and Mexico to ensure a rapid response to consumer demand but kept specialized manufacturing inshore and developed a production technologies research and development unit with workers whose jobs had been outsourced (Daemmrich and Kramarz, 2012).

A similar situation has occurred in the USA recently since some of the most important brands there such as Whirlpool, Otis and General Electric (GE) have brought back their manufacturing production from China to the USA. They realized not only that salaries in China had been increasing – at least five times – in the last twenty years, as well as other costs such as shipping, but also that offshoring limited their technological innovation and consequently their ability to respond quickly to consumer demands. Accordingly, American unions played an important role since they flexibilized their demands in exchange for the creation of more jobs and greater investment in Research and Development (R&D) (Fishman, 2012).

In Latin America, on the other hand, the arrival of globalization and the structural reforms to open up the economy weakened unions in different ways and to different degrees, especially since most of the jobs were concentrated in the service sector where unions are scarce (Ruiz, 2009). Although there have been some efforts to adjust to new conditions, these have been futile. In Brazil, for instance, following the Danish example, unions have used their corporatist legacies to continue to protect workers while allowing firms to adjust to current conditions in what has been called *soft corporatism*, however, it is not clear whether this has been effectively institutionalized so that it can be sustained in the long run (Bensusán, 2016).

Mexico, for its part, requires a complete institutional reform which gives unions power to bargain since the current institutional design favours mainly employer and union partnerships, which has brought about an erosion of their credibility since they are no longer capable of delivering the customary benefits to their members (Bensusán and Middlebrook, 2012). For example, in 2018 the IFT ordered the functional separation of *Telmex* by 2020 without taking the union into account. In consequence, the *Telmex* union has firmly stated that the separation goes against workers' rights and that they would go on strike if the IFT did not change the resolution.[9]

The *Telmex* union has been one of the key players that has helped the government to maintain labour peace since 1947 when *Telmex* was founded, becoming, then, the only telephone service provider in the country. It has around 40,000 active employees and around 20,000 who are receiving a pension. In 1990, *Telmex* was privatized to *América Móvil* and the union agreed to this since it was established that the company was not going to be split up and sold as different companies or into services, thus allowing the union to continue to exist (Mariscal and Rivera, 2005). The IFT resolution stated precisely that the company must separate in order to promote investment in infrastructure by other concessionaires in the so-called last mile, but with this resolution the collective contract might have to be dissolved, going against the workers' rights. So far, the conflict has not been resolved. We shall have to wait and hope that this is not part of the traditional corporatist practices by which union leaders and employers, with backing from the authorities, simulate a non-existent negotiation, which has been a regular practice since the opening up of the economy, especially in service franchises (Bensusán, 2016).

Due to weak unionism and the lack of effective law enforcement, labour mobility has become greater (Becerril-Velasco, 2015). According to Beccaria and Maurizio (2018), labour mobility -when a worker becomes unemployed or finds another job- accounts for 25-31 % in Brazil, Argentina, Ecuador and Mexico. The percentage of formal workers accounts for 25 % - 37 % in Ecuador,

[9] See https://www.razon.com.mx/mexico/sindicato-de-telefonistas-emplaza-a-huelga-para-el-25-de-abril-telmex-incremento-salarial-francisco-hernandez-juarez/ and https://www.elsoldemexico.com.mx/finanzas/posible-huelga-en-sindicato-de-telmex-para-abril-en-riesgo-60-mil-telefonistas-3221629.html. Accessed: August 2019

Mexico, Paraguay and Peru but most of them are temporary. High-skilled workers, on the other hand, account for 20 % - 27 % of the total employment in Mexico and Peru, whereas in Paraguay and in Ecuador the percentage is even lower. The rest of the workers are informal.

Table 3. What do you do?

What do you do?	Access to unions?	Economic sector					
		Industrial	*Service*	*Government*	*Student*	*Unemployed*	*Tota*
Student	Student				124		124
	Total				124		124
Employee	Yes	10	11	0			21
	No	11	97	2			110
	Total	21	108	2			131
Study and work	Yes	2	0				2
	No	9	53				62
	Total	11	53				64
Unemployed	Unemployed	0	0			43	43
	Total	0	0			43	43
Total		32	161	2	124	43	362

Source: Author's elaboration.

Table 3 shows that of the 362 interviewees, 195 (54 %) had a job, most of them (161 or 44.5 %) in the service sector, 32 (9 %) in the industrial sector and two (5 %) in the government. However, only 23 (6 %) had access to unions in both the industrial and the service sectors. As seen in table 4, most of the women had had between one and three jobs and had been unemployed for less than six months. Surprisingly, the case of men is more or less similar since most of them had also had between one and three jobs and have been less than six months unemployed. The reasons for this have to do not only with weak law enforcement and unionism but also with their labour skills and job conditions, as we shall see in the following sections.

Table 4. How many jobs have you had?

			How many jobs have you had?								Total
			0	1	2	3	4	5	6	7	
Women	*Time unemployed*	.6	39	59	35	26	9	2			170 (47%)
		1.0	4	19	6	6					35
		2.0	1	8	5	2	0	0			16
		3.0	0	3	1	0	0	0			4
		4.0	0	0	0	0	1	0			1
		5.0	0	0	0	0	1	0			1
	Total		44	89	47	34	11	2			227 (63%)
Men	*Time unemployed*	.6	14	54	27	15	2	2	1	1	116 (32%)
		1.0	0	5	0	2	2	0	0	1	10
		2.0	0	1	2	2	0	0	0	0	5
		3.0	0	1	0	1	1	0	0	0	3
		5.0	0	0	1	0	0	0	0	0	1
	Total		14	61	30	20	5	2	1	2	135 (37%)

Source: Author's elaboration.

Low skills levels

The arrival of ICTs during the 1980s and 1990s in Mexico and most Latin American countries meant not only a change in production systems, as in previous technological revolutions, but it also moved jobs from the manufacturing to the service sectors (Blinder, 2005). During the first technological revolutions, steel, steam engine, electricity and oil related jobs were mainly concentrated in the manufacturing sector. However, the adoption of ICTs pushed jobs from the manufacturing sector to the service sector all over the world, but especially in developing countries for two main reasons.

On the one hand, firms became more efficient as a consequence of the technological advances which the different industrial revolutions brought about, every time requiring fewer workers to manufacture their products. On the other hand, the opening up of the economy, e specially in Latin American countries, meant a reconfiguration of the type of capitalism which had been implemented at the beginning of the twentieth century. Throughout the main part of this era, the capitalist system in Latin America was dominated by state intervention mainly based on the Import Substitution Industrialization (ISI) system.

The inception of globalization in the 1980s and 1990s brought about a change in the capitalist system in that both the MNCs and local business groups came to dominate and control the economy, giving rise to perverse consequences (Schneider, 2013). MNCs easily foresaw the extent to which ICTs would affect and influence the economy worldwide and used their economic power and political influence to take over high-tech and advanced manufacturing, especially in companies directly related to ICTs and/or finance, such as Apple, Alphabet, Microsoft and J.P. Morgan. As a consequence, local business groups had to look for market niches where they are able to compete by focusing mainly on natural resources, commodities and low technology services.

Accordingly, business groups are characterized by being diversified into subsidiaries with no relation at all either between them or with the high-tech sector (Schneider, 2013). For example, Carso Group owns not only *América Móvil*, the most important telecommunications company in Mexico and Central America, but it also has investments in the commercial sector (department

DOI:10.22201/enesl.20078064e.2019.21.69387

stores), the industrial sector (telecommunications and automotive), the infrastructure and construction sector and the energy sector (oil, gas and electricity).[10]

Table 5 shows that the service sector is the one where most of the interviewees worked (44 %) in comparison with only 9 % in the industrial sector. The main problem that this has brought about is that most of the jobs in the service sector require low-qualified workers, which is why employees barely invest in acquiring new skills. All this, along with the low levels of education in Mexico, hinders MNCs from investing in production processes which require skilled workers because they are scarce. As far as social spending is concerned, education is one of the areas on which Mexico spends the most, at around 6-7 % of Gross Domestic Product (GDP) (Scott, 2011). However, the Programme for International Student Assessment (PISA) (2015) ranks Mexican students as some of the worst prepared for life among the Latin American countries.[11]

Table 5. Type of contract

		Type of contract						Total
		Undefined	*Temporary*	*No contract*	*Business*	*Student*	*Unemployed*	
Less than 1500	Industrial sector	0	0	0	0			0
	Service sector	1	3	25	2			31
	Total	1	3	25	2			31 (8%)
From 1500 to 3000	Industrial sector	1	4	5	0			10
	Service sector	2	8	30	1			41
	Total	3	12	35	1			51 (14%)
From 3000 to 5000	Industrial sector	9	2	1	0			12
	Service sector	17	15	25	1			58
	TIC	0	1	0	0			1
	Total	26	18	26	1			71 (20%)
From 5000 to 10000	Industrial sector	8	1	0	0			9
	Service sector	7	5	16	1			29
	Government	0	2	0	0			2
	TIC	0	2	0	0			2
	Total	15	10	16	1			42 (12%)
Students						124		124 (34%)
Unemployed							43	43 (12%)
Total	Industrial sector	18	7	6	0	0	0	31
	Service sector	27	31	96	5	0	0	159
	Government	0	2	0	0	0	0	2
	TIC*	0	3	0	0	0	0	3
	Student	0	0	0	0	124	0	124
	Unemployed	0	0	0	0	0	43	43
	Total	45 (13%)	43 (12%)	102 (28%)	5 (1%)	124 (34%)	43 (12%)	362 (100%)

Note: *Two of them worked in the service sector and the other in the industrial sector.

Source: Author's elaboration.

Likewise, according to Scott (2011), in Mexico there is an educational gap of nine years between the richest and the poorest, which would mean that the poorest population barely has access to elementary or secondary school, whereas the richest population has access to, at least, high school and the university levels.

As shown in table 6, of the 362 interviewees, only eight (2 %) had completed either a Bachelor of the Arts (BA) or an engineering degree, 32 % were studying either a BA or an engineering course, 34 % were employed without having finished a BA or an engineering course, 18 % were studying either a BA or an engineering course and working at the same time, and 12 % were neither studying nor working.

Table 6. Education of the ex-recipients

	Student	*Employee*	*Student and employee*	*Unemployed*	Total
Finished high school	0	20	0	4	24 (7%)
Finished technical high school	0	40	0	1 4	54 (15%)
Finished a BA	0	7	0	0	7 (2%)
BA student	67	0	36	0	103 (28%)
Engineering student	49	0	25	0	74 (20%)
Finished engineering	0	1	0	0	1 (.2%)
Unfinished BA	0	9	0	0	9 (2%)
Unfinished engineering course	0	1	0	4	5 (1%)
Unfinished high school	3	50	0	21	74 (20%)
Other	5	3	3	0	11 (3%)
Total	124 (34%)	131 (36%)	64 (18%)	43 (12%)	362 (100)

Source: Author's elaboration.

Perhaps the most outstanding outcome is that only 2 % of the interviewees had completed either a BA or an engineering degree, particularly given the fact that the programme started to give grants to finish high school in 2001, which would mean that only a few of them had continued to this level of education. Actually, only half of the interviewees were studying for a BA or an engineering degree and at least 18 % of them were working and studying at the same time, which could make it difficult for them to finish their university studies.

The informal sector

In Mexico, almost half of the economically active population works in the informal sector. The main reasons which have been put forward for this are the low productivity of firms (especially of high-tech goods) and the low creation of jobs needed by the labour force (Peralta, 2004; Levy, 2007; Escobar and Gonzalez, 2008; Cárdenas, 2009; Moreno-Brid, Pardinas and Ros, 2009). In November 2012, the first thorough reform of the Employment Law (LFT) since 1970 was enacted with the idea of making the Mexican labour market flexible which had impeded any increase in the productivity of firms and the creation of employment (Moreno-Brid, Sánchez and Salat, 2018).

[10] Among other local business groups in Mexico, we find *FEMSA* (drinks and restaurant and commercial sector), the *Grupo Financiero Banorte* (banking and financial services), the *Grupo México* (mining), *Televisa* (media), *TVAzteca* (media), *Cemex* (cement) and the *Grupo Inbursa* (banking and financial services).

[11] See: http://www.oecd.org/education/skills-beyond-school/EAG2017CN-Mexico-Spanish.pdf

However, the changes introduced primarily served the interests of the private sector by incentivizing the informalization of employment even more.

As an instance, a very important change of the new law is that now it covers outsourcing. Even so, it introduced new contracts that can be used by private companies to avoid formalizing employment. For instance, firms can now offer probationary and initial training contracts for short periods of time. Moreover, the new law does not establish any kind of mechanisms to monitor the violation of labour rights through the use of outsourcing (Becerril-Velasco, 2013).

According to Moreno-Brid *et al.*, (2018), between 2013 and 2018 around 4.6 million formal jobs were created, but most of them were precarious jobs and had low wages. Table 7 shows that of the 362 interviewees, 28 % were employed but had no contract, 12 % had a temporary contract and only 12.5 % had a fixed or undefined contract; the rest had a business (1.5 %), were full-time students (34 %) or were unemployed (12 %).

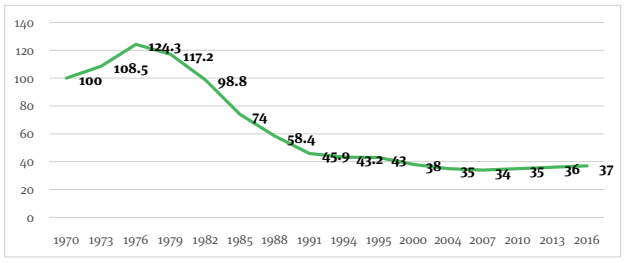
Table 7. Wages of the ex-recipients

Size of firm	Wage (pesos)	Type of contract						Total
		Undefined	*Temporary*	*No contract*	*Business*	*Student*	*Unemployed*	
Micro	Less than 1500	0	1	19	2			24
	From 1500 to 3000	0	4	29	1			34
	From 3000 to 5000	4	5	18	1			28
	From 5000 to 10000	0	0	15	1			16
	Total	4	11	82	5			102 (28%)
Small	Less than 1500	1	0	5				6
	From 1500 to 3000	1	2	0				3
	From 3000 to 5000	1	7	7				15
	From 5000 to 10000	4	3	1				8
	Total	7	12	13				32
Medium	Less than 1500	0	1	1				2
	From 1500 to 3000	1	2	5				8
	From 3000 to 5000	0	3	0				3
	From 5000 to 10000	5	3	0				8
	Total	6	9	6				21
Big	Less than 1500	0	0	1				1
	From 1500 to 3000	1	4	1				6
	From 3000 to 5000	21	4	0				26
	From 5000 to 10000	6	4	0				10
	Total	28	12	3				43
Student	Student					124		124
Unemployed	Unemployed						43	43
Total	Less than 1500	1	3	25	2	0	0	31 (8.5%)
	From 1500 to 3000	3	12	35	1	0	0	51 (14%)
	From 3000 to 5000	26	18	26	1	0	0	71 (20%)
	From 5000 to 10000	15	10	16	1	0	0	42 (11.5%)
	Student	0	0	0	0	124	0	124 (34%)
	NINI	0	0	0	0	0	43	43 (12%)
	Total	45 (12.5%)	43 (12%)	102 (28%)	5 (1.5%)	124 (34%)	43 (12%)	362 (100%)

Source: Author's elaboration.

Unfortunately, the most critical issue in the informal job sector is the low wages. The *Consejo Nacional de Evaluación de la Política de Desarrollo Social* (Coneval), the organization responsible for measuring poverty, uses two lines of income: the Extreme Poverty line for Income and the Income Poverty Line. In August 2018, when this current research was carried out, the first line was $1,516.63 Mexican pesos and the second line was $3,001.17 Mexican pesos. Chart 1 shows that since the mid-1970s, the average minimum wage has suffered a sharp decline in real terms and is now (Samaniego, 2018) among the lowest in Latin America.[12]

Chart 1. Purchasing power of minimum wage in Mexico, 1970-2016.
Base year: 1970



Source: López, 2006; Conasami, s.f.

Of the 362 interviewees, 8.5 % earned less than 1,500 Mexican pesos, which is not enough to satisfy their basic food needs, 14 % earned from 1,500 to 3,000 Mexican pesos, barely enough to satisfy their basic food and non-food needs per person per month, 20 % earned from 3,000 to 5,000 Mexican pesos and 11.5 % from 5,000 to 10,000 Mexican pesos; the rest were either students (34 %) or unemployed (12 %). This would mean that only 31.5 % of the interviewees had moved out of income poverty, 34.5 % were still poor and 34 % were still studying.

An important reason for this is that since the opening up of the economy, Mexico's main offer to attract foreign direct investment and compete internationally has been cheap labour, mainly in low and mid-technology manufacturing rather than higher value-added manufacturing (Musacchio, Vietor and García-Cuellar, 2010). Leading countries such as the USA, Germany, Japan and South Korea are addressing these changes by supporting their main industrial firms in the development of new

[12] See Comisión Nacional de los Salarios Mínimos (Conasami) https://www.gob.mx/conasami

DOI:10.22201/enesl.20078064e.2019.21.69387

technology platforms for industrial competitiveness. They are creating public-private partnerships and, in some cases, industrial policies for infrastructure, capacity development, testing bench and the generation of standards. Along with the advanced manufacturing area, they are also supporting advanced services related to software and telecommunications activities where the leading companies interact with the advanced manufacturing sectors, in particular with industrial automation activities (Castillo, 2017).

In addition, the Mexican labour market presents problems such as inefficient credit provision, since around 60 % of Mexican businesses have financed their operations through trade credit (with interest rates close to 100 %) rather than bank loans, since lenders continue to face hurdles in being able to seize assets from borrowers who default, which hinders credit provision (Hanson, 2012). Table 7 shows that of the 362 interviewees, only five (1.5 %) had their own business. All this creates a perverse cycle which impedes the appropriation of technology since high-tech firms do not invest in Mexico because there are no qualified people there to perform their activities and people at the same time find it difficult to appropriate technology because of the economic insecurity which they experience.

Conclusion

The main question which we set out to answer in this paper was 'To what extent has the institutional weakness of the Mexican state impeded the appropriation of ICTs by the poor in order to obtain a sustained income in the labour market through their own efforts in Aguascalientes, Mexico?' We have shown that it is the institutional weakness of the Mexican state which impedes the appropriation of ICTs by the poor in order to obtain a sustained income in the labour market through their own efforts. For instance, the weak law enforcement of telecommunications regulations prevents the poor from achieving an intermediate or advanced appropriation of important technological services such as the internet since they find it difficult to access the service.

Moreover, unionism is disappearing and what is left has been used to keep workers under control rather than as an instrument to support firms to upgrade their production processes using the new platforms of information technologies such as the internet of things, cloud computing, big data and artificial intelligence (Castillo, 2017). This is reinforced by the low skills levels of the general population and the fact that digital disruption has pushed jobs from the manufacturing sector to the service sector where most of the employment is low-qualified, informal and precarious. We conclude that due to its institutional weakness, the Mexican state is impeding people from appropriating ICTs and expanding their capabilities and functionings in the labour market in order to leave poverty through their own efforts.

References

Anand, S., and Sen, A. (1997). Concepts of Human Development and Poverty: A Multidimensional Perspective. In R. Jolly (Coord.). *Poverty and Human Development: Human Development Papers 1997* (pp. 1-20). Nueva York: United Nations Development Program.

Andrés, G. D. (2014). Una aproximación conceptual a la "apropiación social" de TIC. *Questión, 1*(43), 17-31.

Ayala, E., Chapa, J., García, L., and Hibert, A. (2018). Welfare effects of the Telecommunication Reform in Mexico. *Telecommunications Policy*, 24-36. Recovered from https://doi.org/10.1016/j.telpol.2017.07.013

Bar, F., Weber, M. S., and Pisani, F. (2016). Mobile technology appropriation in a distant mirror: Baroquization, creolization, and cannibalism. *New Media & Society, 18*(4), 617-636. Recovered from https://doi.org/10.1177/1461444816629474

Beccaria, L., and Maurizio, R. (2018). Labor turnover in Latin America How intensive is it and how differently does it behaves across countries? *International Labour Review*. Recovered from https://doi.org/10.1111/ilr.12105

Becerril-Velasco, C. I. (2013) *The role of the state in alleviating poverty. The Mexican case and Oportunidades*. (PhD Thesis). United Kingdom: University of York.

Becerril-Velasco, C. I. (2015). The experience of the Mexican state with the conditional cash transfer programmes to alleviate poverty. *Espacios públi-*

cos, 18(44), 71-100. Recovered from http://www.redalyc.org/articulo.oa?id=67644589004

Bensusán, G. (2016). Organizing Workers in Argentina, Brazil, Chile and Mexico: The Authoritarian-Corporatist Legacy and Old Institutional Designs in a New Context. *Theoretical Inquiries in law, 17*(1), 131-161. Recovered from https://doi.org/10.1515/til-2016-0006

Bensusán, G., and Middlebrook, K. (2012). *Organised Labour and Politics in Mexico: Changes, Continuities and Contradictions*. London: Institute for the study of the Americas, University of London.

Blinder, A. (2005, December). *Fear of Offshoring*. Working paper No. 119. Princeton University. Recovered from http://81.47.175.201/flagship/attachments/Blinder.pdf

Boncheva, A. I., Licona, Á., Loaiza, M., Mendoza, E., Rangel, J. E., and Uscanga, C. (2016). Las políticas gubernamentales de ciencia y tecnología en el Asia Pacífico en la posguerra: los casos de Japón y Corea del Sur. *Portes, Revista mexicana de estudios sobre la Cuenca del Pacífico, 10*(20), 105-136. Recovered from http://revistasacademicas.ucol.mx/index.php/portes/article/view/1282

Cárdenas, O. J. (2009). Poverty Reduction Approaches in Mexico since 1950: Public Spending for Social Programs and Economic Competitiveness Programs. *Journal of Business Ethics, 88*, 269-281.

Castillo, M. (2017). El estado de la manufactura avanzada. *Competencia entre las plataformas de la Internet industrial*. Santiago, Chile: Cepal. Recovered from: https://www.cepal.org/es/publicaciones/43124-estado-la-manufactura-avanzada-competencia-plataformas-la-internet-industrial

Cecchini, S., and Scott, C. (2005). Can information and communications technology applications contribute to poverty reduction? Lessons from rural India. *Information Technology for Development, 10*(2), 73-84. Recovered from https://doi.org/10.1002/itdj.1590100203.

Comisión Nacional de los Salarios Mínimos (Conasami). (s.f). *Incremento al salario mínimo en las últimas tres décadas*. Recovered from https://www.gob.mx/conasami/articulos/incremento-al-salario-minimo-en-las-ultimas-tres-decadas?idiom=es.

Consejo Nacional de Evaluación de la Política de Desarrollo Social [Coneval]. (s.f) *Medición de la pobreza*. Recovered from https://www.coneval.org.mx/Medicion/MP/Paginas/Lineas-de-bienestar-y-canasta-basica.aspx

Daemmrich, A., and Kramarz, B. (2012). Denmark: Globalization and the Welfare State. *Harvard Business School Case*, 709-015. Recovered from https://www.hbs.edu/faculty/Pages/item.aspx?num=37042

Escobar, A., and González, M. (2008). Choices or Constraints? Informality, Labour Market and Poverty in Mexico. *IDS Bulletin, 39*(2), 37-47. Recovered from https://doi.org/10.1111/j.1759-5436.2008.tb00443.x

Evans, P. (1989). Predatory, Developmental, and Other Apparatuses: A Comparative Political Economy Perspective on the Third World State. *Sociological Forum, 4*(4), 561-587. Recovered from https://www.jstor.org/stable/684425?seq=1#page_scan_tab_contents

Fishman, Ch. (2012, December). The Insourcing Boom. *The Atlantic*. Recovered from https://www.theatlantic.com/magazine/archive/2012/12/the-insourcing-boom/309166/

Freeman, C., and Pérez, C. (1988). Structural Crises of Adjustment: Business Cycles and Investment Behaviour. In Dosi, G., Freeman, Ch., Nelson, R., Silverberg, G., and Soete, L. (Eds.), *Technical change and economic theory* (pp. 871-900). Londres: Pinter.

Ghemawat, P. (2009, October 14). Why the World Isn't Flat. *Foreign Policy*. Recovered from https://foreignpolicy.com/2009/10/14/why-the-world-isnt-flat/

Gillwald, A. (2010). The Poverty of ICT Policy, Research, and Practice in Africa. *Information Technologies & International Development, 6*, 79-88.

Gorla, N. (2009). A Survey of Rural e-Government Projects in India: Status and Benefits. *Information Technology for Development, 15*(1), 52-58. Recovered from https://doi.org/10.1002/itdj.20064

Hancké, B. (2010). The Challenge of Research Design. In D. Marsh and G. Stoker (Eds.), *Theory and Methods in Political Science* (pp. 871-900). Basingstoke: Palgrave Macmillan.

Hanson, G. (2012, August). Understanding Mexico's

Economic Underperformance. Woodrow-Wilson International Center for Scholars – Migration Policy Institute. San Diego: University of California and National Bureau of Economic Research. Recovered from https://www.migrationpolicy.org/research/mexico-economic-underperformance

Instituto Nacional de Estadística y Geografía [Inegi]. (s.f). *Población rural y urbana*. Recovered from http://cuentame.inegi.org.mx/poblacion/rur_urb.aspx?tema=P

International Telecommunication Union [ITU]. (2016). Measuring the information society report 2016. Recovered from https://www.itu.int/en/itu-d/statistics/documents/publications/misr2016/misr2016-w4.pdf

James, J. (2016). *The Impact of Mobile Phones on Poverty and Inequality in Developing Countries*. Switzerland: Springer.

Kuznetsov, Y., and Dahlman, C. (2008). *Mexico's transition to a knowledge-based economy: challenges and opportunities (English)*. Washington, D.C: World Bank.

La Razón. (2019, April 3). Sindicato de telefonistas emplaza a huelga para el 25 de abril. *La Razón*. Recovered from https://www.razon.com.mx/mexico/sindicato-de-telefonistas-emplaza-a-huelga-para-el-25-de-abril-telmex-incremento-salarial-francisco-hernandez-juarez/

Lewis, J., and Ritchie, J. (2003). Generalizing from Qualitative Research. In J. Ritchie and J. Lewis (Eds.), *Qualitative research practice. A guide for social science students and researchers* (pp. 263-286). London: Sage.

Levy, S. (2007). *Productividad, Crecimiento y Pobreza en México: ¿Qué sigue después de Progresa-Oportunidades?* Washington, D.C: Inter-American Development Bank.

Leyva, M. A., and Pichardo, S. (2009) Conflictos y lucha de los trabajadores durante el gobierno de Calderón. *El Cotidiano, 154*, 107-121.

López, M. (2006). El Sindicalismo mexicano contemporáneo. In I. González (Coord.), *Los sindicatos en la encrucijada del siglo XXI* (pp. 13-38). México: Friedrich Ebert Stiftung.

Maldonado, G., Martínez, M. d. C., García, D., Aguilera, L., and González, M. (2010). La influencia de las TICs en el rendimiento de la PyME de Aguascalientes. *Investigación y Ciencia*, (47), 57-65.

Mariscal, J., and Rivera, E. (2005). New trends in the Latin American telecommunications market: Telefonica & Telmex. *Telecommunications Policy, 29*(9-10), 757-777. Recovered from https://doi.org/10.1016/j.telpol.2005.05.007

Matus, M., and Ramírez, R. (2012). *Acceso y uso de las TIC en áreas rurales, periurbanas y urbano-marginales de México: una perspectiva antropológica*. México: Infotec.

Moreno-Brid, J. C., Pardinas, J. E., and Ros, J. (2009). Economic development and social policies in Mexico. *Economy and Society, 38*(1), 154-176. Recovered from https://doi.org/10.1080/03085140802560652

Moreno-Brid, J., Sánchez, J., and Salat, I. (2018). Las reformas estructurales de 2012-2018: avances y pendientes en la ruta de México hacia un crecimiento económico robusto e incluyente. In Arroyo, J.P., Islas, I., Díaz, A., and Cortés, M.A (Coords.), *Balance de las Reformas Estructurales*. Mexico: Instituto Belisario Domínguez.

Musacchio, A., Vietor, R., and Garcia-Cuellar, R. (2010). Mexico: Crisis and Competitiveness. *Harvard Business School Case* 710-058.

Neüman, M. I. (2008). Construcción de la categoría "Apropiación social". *Quórum Académico, 5*(2), 67-98. Recovered from https://www.redalyc.org/pdf/1990/199016835004.pdf

North, D., Wallis, J., Steven, W., and Weingast, B. (2007). Limited Access Orders in the Developing World: A New Approach to the Problems of Development. *Policy Research Working Paper, 4359*. Washington: World Bank. Recovered from https://openknowledge.worldbank.org/handle/10986/7341

North, D., Wallis, J., and Weingast, B. (2009). *Violence and Social Orders. A Conceptual Framework for Interpreting Recorded Human History*. Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, Sao Paulo: Cambridge University Press.

North, D. (1994). Institutions and Productivity in History. *Economic History*, (9411003). Recovered from http://hdl.handle.net/10535/4381

Organisation for Economic Co-operation and Development [OECD]. (2003). *The e-government imperative*. Paris: OECD.

Organisation for Economic Co-operation and Development [OECD]. (2017). *Panorama de la educación*

2017. Recovered from http://www.oecd.org/education/skills-beyond-school/EAG2017CN-Mexico-Spanish.pdf

Peralta, E. (2004). The Mexican Labor Market on the 2000-2020 Horizon: A real Challenge... Only for Mexico? NAAAS 2004. Conference organized by the National association of African American studies [NAAAS]. Scarborough, United Kingdom.

Pérez, C. (1983). Structural change and assimilation of new technologies in the economic and social systems. *Futures, 15*(5), 357-375. Recovered from https://doi.org/10.1016/0016-3287(83)90050-2

Popli, G. K. (2010). Trade Liberalization and the Self-Employed in Mexico. *World Development, 38*(6), 803-813. Recovered from https://doi.org/10.1016/j.worlddev.2010.02.016.

ProMéxico. (2014). *Industría Automotriz*. México: Secretaría de Economía, ProMéxico. Recovered from https://www.gob.mx/cms/uploads/attachment/file/75545/150213_DS_Automotriz_ESP.pdf

Qiu, R., and Cantwell, J. (2016). The international geography of general purpose technologies (GPTs) and internationalisation of corporate technological innovation. *Industry and Innovation, 25*(1) 1-24. Recovered from https://doi.org/10.1080/13662716.2016.1264065.

Reyes, M. (2019, March 23). Posible huelga en sindicato de Telmex para abril; en riesgo 60 mil telefonistas. *El Sol de México*. Recovered from https://www.elsoldemexico.com.mx/finanzas/posible-huelga-en-sindicato-de-telmex-para-abril-en-riesgo-60-mil-telefonistas-3221629.html

Rodrik, D. (1997). Sense and Nonsense in the Globalization Debate. *Foreign Policy*, (107), 19-37. DOI:10.2307/1149330.

Rodrik, D. (1998, November). The Global Fix. *The New Republic*. Recovered from https://newrepublic.com/, October, 2019.

Rousseau, P. L. (2008). General Purpose Technologies. In S. N. Durlauf, and L. E. Blume (Eds.), *The New Palgrave Dictionary of Economics* (pp. 2425-2428). London: Palgrave Macmillan.

Ruiz, C. (2009). Mexico: the dimensions of labour flexicurity. In Weller, J. (Ed.). *Regulation, Worker Protection and Active Labour-Market Policies in Latin America*. Santiago, Chile: ECLAC.

Samaniego, N. (2018). *El desafío del empleo y los salarios*. México: Conacyt, El Colegio de México, Centro Tepoztlán Víctor L. Urquidi, AC, Foro Consultivo, Científico y Tecnológico, AC.

Sánchez, O. (2006). Tax system reform in Latin America: Domestic and international causes. *Review of International Political Economy, 13*(5), 772-801. Recovered from https://doi.org/10.1080/09692290600950654

Schneider, B. R. (1999). The Desarrollista State in Brazil and Mexico. In M. Woo- Cumings (Ed.), *The developmental state* (pp. 276-305). New York: Cornell University Press.

Schneider, B. R. (2013). *Hierarchical Capitalism in Latin America. Business, Labor, and the Challenges of Equitable Development*. Cambridge: Cambridge University Press.

Scott, J. (2011). Gasto público para la equidad: del Estado excluyente hacia un Estado de bienestar Universal. *México Evalúa*. http://www.mexicoevalua.org/descargables/cc9720_Gasto-Publico-para-La-Equidad-27-Oct-2010rev.pdf, February, 2019.

Sen, A. (1999). *Development as freedom*. Oxford: Oxford University Press.

Sen, A. (2010). Reflections from and on the forum. The Mobile and the World. *Information Technologies & International Development*, 6, 1-3. Recovered from https://itidjournal.org/index.php/itid/article/view/614/254

Sreekumar, T., and Rivera-Sánchez, M. (2008). ICTs and Development: Revisiting the Asian Experience. *Science Technology & Society, 13*(2), 159-174. Recovered from https://doi.org/10.1177/097172180801300201

Tarafdar, M., Anekal, P., and Singh, R. (2012). Market development at the bottom of the pyramid: examining the role of information and communication technologies. *Information Technology for Development, 18*(4), 311-331. Recovered from https://doi.org/10.1080/02681102.2012.690172

Teichman, J. (2008). Redistributive Conflict and Social Policy in Latin America. *World Development, 36*(3), 446-460. Recovered from https://doi.org/10.1016/j.worlddev.2007.04.010

Vanden, H. E., and Prevost, G. (2002). *Politics of Latin America. The power game*. Oxford: Oxford University Press.

DOI:10.22201/enesl.20078064e.2019.21.69387

Author's bio

[a] He holds a PhD Degree in Political Science from the University of York, United Kingdom. He is currently a Professor at the National Council of Science and technology (Conacyt for its acronym in Spanish). His research interests are: Labour market, poverty and ICTs, among others.

His latest three publications are:

- Becerril Velasco, C. (2019). The feeble institutional link between the information and communication technologies in Mexico. *Noesis Revista de Ciencias Sociales y Humanidades, 28*(55-1), pp. 43-60.
- Becerril Velasco, C. (2018). Estado, apropiación social de las tecnologías de la información y comunicación y pobreza. *Revista Espiral Estudios sobre Estado y Sociedad, 25*(7), pp. 47-78.
- Becerril Velasco, C. (2015). The role of the state in alleviating poverty in the neo-liberal age: a theoretical approach. *Revista Mexicana de Ciencias Políticas y Sociales, 60*(225), pp. 369-393.