

GLOBAL INFORMATION SOCIETY WATCH 2018

Community Networks



ASSOCIATION FOR PROGRESSIVE COMMUNICATIONS (APC)
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This edition of GISWatch came into being alongside a brand new baby boy. Welcome to the world, Ronan Diga!

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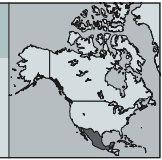
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MEXICO

COMMUNITY NETWORKS IN MEXICO: A PATH TOWARDS TECHNOLOGICAL AUTONOMY IN RURAL AND INDIGENOUS COMMUNITIES



REDES A.C., Rhizomatica and Colectivo Ik'ta K'op

Carlos Baca-Feldman, Peter Bloom, Mariano Gómez and Erick Huerta
www.redesac.org.mx, www.rhizomatica.org, www.iktakop.org

Introduction

In 2016, a national survey developed by the Instituto Nacional de Estadística, Geografía e Informática (INEGI)¹ indicated that 47% of citizens in Mexico use a computer, 59.5% are internet users and 73.6% have a cell phone. In addition, the states with the highest index in the digital divide are also those that have the greatest economic challenges: Guerrero, Oaxaca and Chiapas. In these states, where most of the countries' indigenous population is concentrated, broadband access is 17.5% and telephony is 23% on average. Although the data comes from government agencies and may not be entirely accurate, similar observations have been made in studies by non-governmental organisations.²

When these statistics are presented as inputs for public policy making, the difficulties are characterised as “market failure” – as if the solution lay in finding ways for large telecommunication companies to develop models that allow them to obtain an economic benefit while meeting the connectivity needs of the poorest populations of the country. This has shown to be unfeasible so far. Another option is for the government itself to seek solutions through its public programmes and budgets, which are usually limited by clientelist dynamics. However, as indicated in the “Toolkit of Best Practices and Policy Recommendations, Module 3: ICT for Indigenous Peoples and Communities” of the International Telecommunication Union (ITU),³ projects in which the decision

making and operation of last-mile networks are made by the community itself are the only ones that have been shown to be appropriate for connectivity in more remote areas.

In this context, there have been several communities that have sought to escape from the logic of the market or the state to solve their connectivity problems. In Mexico, there are many indigenous peoples who maintain organisational, economic and political systems that are not completely anchored in the capitalist mode of production; and their telecommunications projects reflect this way of understanding and being in the world. In this report our intention is to discuss some of the experiences that have been developed in Mexico considering this perspective: a community cellular network in Oaxaca; a community intranet in Abasco, Chiapas; and Techio Comunitario, a technicians training programme aimed at rural and indigenous communities.

Community networks as a “constant negotiation”

From a legal perspective, these projects are covered by the second article of the Mexican constitution, one that indicates the right of the indigenous peoples to develop their own systems of organisation and indigenous customary law, known as “uses and customs”.⁴ Their status is also protected by Convention 169 of the International Labour Organization (ILO).⁵ In addition to these, Article 16 of the UN Declaration on the Rights of Indigenous Peoples upholds the rights of indigenous peoples to acquire, administer and operate their own means of communication.

As Laval and Dardot⁶ point out, in addition to a legal framework, an institutional framework is required that can put into practice the sense of “the commons” in social relations. This occurs from the practice of the communities themselves and the impact on public policies that are generated from the projects that are being developed.

1 INEGI. (2016). *Encuesta Nacional sobre Disponibilidad y Uso de Tecnologías de la Información en los Hogares (ENDUTIH)*.

2 An important study on this matter was developed by the Red por los Derechos Digitales (R3D), titled *El estirón de México Conectado: ¿cuánto creció realmente el número de usuarios de Internet en 2015?* and available at: <https://r3d.mx/2017/03/12/el-estiron-de-mexico-conectado-cuanto-crecio-realmente-el-numero-de-usuarios-de-internet-en-2015>

3 International Telecommunication Union (ITU). (2011). *Toolkit of best practices and policy recommendations. Module 3: ICT for indigenous peoples and communities*. Available (in Spanish) at: connectschool.org/sites/default/files/pdf_cache/fdof754e2ab3e39da5172bc484cf4247.pdf

4 www.ordenjuridico.gob.mx/Constitucion/articulos/2.pdf

5 www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C169

6 Laval, C., & Dardot, P. (2015). *Común. Ensayo sobre la revolución en el siglo XXI*. Barcelona: Gedisa Editores.

The telecommunication projects outlined in this report are community-based, and as such, they contain and reinforce the values and ways of life of the community. They also repurpose and appropriate technology according to each community's economic, political and social organisational forms. In this way, the technology does not determine existing social relations, but rather is transformed to give way to new modes of use, generation of content and particular and novel infrastructure. Jaime Martínez Luna gives us a clear idea of these statements when explaining the concept of *comunalidad* (or communality), the way of life of the indigenous peoples of the Sierra Juárez in Oaxaca, that is based on four pillars: land and territory, collective work or *tequio*, participatory political organisation, and the festival. For him, life in these communities is not completely isolated from the globalised system; on the contrary, it finds itself in a constant negotiation between the local and that which is foreign.⁷

For this reason, following Belli,⁸ community networks serve different logics both in their use and in the very way in which they are built. Since each community imprints its way of life through its appropriation of the network, we cannot generalise from these projects, as each one has particularities that make it different from the others explored in this chapter.

The community cellular network in Oaxaca

In 2013, a connectivity project using mobile telephony emerged in Talea de Castro, Oaxaca, from a meeting between indigenous communities, hackers and activists. This experience is based on the relationship that exists between *communalidad* as a way of life characteristic of Oaxacan indigenous peoples and the possibilities that emanate from the use and transformation of certain technologies. As pointed out by Peter Bloom,⁹ the system of community government, the notion of autonomy and the commons are elements that were key in the construction and development of the process. Today there are 14 operating communities with coverage in 63 localities that have, for the first time, built a federated, autonomous cellular telephone network that is managed and operated by and for the communities. In total, 3,500 users are currently served.

7 Martínez Luna, J. (2013). *Textos sobre el camino andado (Vol. I)*. Oaxaca, Mexico: CSEIIO.

8 Belli, L. (Ed.). (2017). *Community networks: the Internet by the people, for the people. Official Outcome of the UN IGF Dynamic Coalition on Community Connectivity*. Rio de Janeiro: FGV Direito Rio.

9 Bloom, P. (2015). *La Telefonía Celular Comunitaria como Alternativa al Sistema Hegemónico de las Comunicaciones en México: Un estudio de caso de las nuevas iniciativas de la Sierra Juárez de Oaxaca*. [Master's thesis not published]. Mexico: UAM-X.

In this process, various organisations have collaborated in the construction of the community cellular model. Rhizomatica¹⁰ is the organisation that created the model and started the operation in the communities. Projects like Osmocom¹¹ in Germany have been very important for the development of the free software used in the project. The legal framework and systematisation has been created through collaboration with Redes por la Diversidad, Equidad y Sustentabilidad A.C. (REDES A.C.).¹²

In 2016, the operating communities, Rhizomatica and REDES A.C. founded a stand-alone, non-profit entity called Telecomunicaciones Indígenas Comunitarias A.C. (TIC A.C.).¹³ This entity brings together the member communities of the network for technical support, peer-to-peer support and maintenance of their networks. TIC A.C. is a fully licensed, social-indigenous operator of cellular services.

For the development of these cellular networks, it was necessary to establish different approaches in the economic, organisational, technological and legal dimensions while drawing on a generic model for the network. For more detailed information on each of them, you can consult the *Community Mobile Telephony Manual*.¹⁴ Some of the key features of the model are:

- Network architecture: It is a hybrid network integrated by three different networks, a first-mile local network managed by the community, consisting of a cellular base station that operates in the 850 MHz band providing cellular coverage and services to standard mobile phones, as well as providing inbound and outbound calling over VoIP; middle-mile IP transport provided by small wireless internet providers; and the fibre backbone and core internet infrastructure operated by large telecoms companies that allow for the interconnection and transportation of data.
- The legal model has two fundamental components: broad self-regulation based on the internal norms of the communities themselves and the association they have created (TIC A.C.); and an indigenous social-use concession, which is comprised of a concession or licence to use spectrum in the 850 MHz band in five states of the country and a single concession to provide telecommunications services throughout the nation.

10 <https://www.rhizomatica.org>

11 <https://osmocom.org>

12 <https://www.redesac.org.mx>

13 <https://www.tic-ac.org>

14 <https://archive.org/details/MANUALTICENGINAL>

- The technological base of the network focuses on two principles: the ease of operation and affordability of infrastructure (approximately USD 5,000). To this end, the project has integrated software from Osmocom in addition to that developed by Rhizomatica such as an administration interface. All code is free and open source software and is accessible through public repositories and documentation.¹⁵ Regarding the infrastructure of the network, the local network consists of a cellular base station which the community owns and manages as communal property.
- The organisational base, as already mentioned, takes as a central element the organisational forms of local indigenous communities. First, the decision to form a new local network is made by the general assembly of each community. Second, the governing structure of the association (TIC A.C.) is composed of a members' assembly and an executive body, which are reinforced by staff working in strategic areas like operations, administration, community relations, innovation and maintenance.
- The economic basis of the project is best understood through the lens of Braudel's writings¹⁶ on the three-level distinction of economies: global, regional/local and subsistence. The local network operates at the subsistence level and is managed by the community itself, the transport network¹⁷ is operated by a local company, and the backbone network is operated by a global company. In this model the community is part of an association that can deal in a global economy given its integration. The cost of the service is approximately USD 2 per user per month, of which USD 1.25 is direct income to the community and USD 0.75 is set aside for the association. This includes unlimited calls and text messages inside the network, with outbound long-distance calling requiring credit top-up.

Although a great advance has been made in the way towards the technological autonomy of these communities, there is still a long way to go and many ways to continue to improve the process. Some examples of these challenges are technological, others are social, such as the participation of

women. At present, issues such as the expansion to other states of the country, the development of locally relevant applications, the elimination of legal barriers derived from the current regulation, and the production of content for the network, are being addressed in conjunction with the communities and ally organisations.

Community intranets: The case of the Tzeltal community of Abasolo in Chiapas

Community intranets are projects that indigenous communities have developed in Mexico to cope with the lack of connectivity or limited connectivity. They are characterised by a semi-closed and local system of Wi-Fi links that provides wireless access to locally hosted content that they consider culturally, educationally and socially relevant. Through this type of project, a lack of connectivity or very limited access to the internet becomes an opportunity to define what content is necessary to produce and share locally, and what content from outside the community is relevant. They also provide an opportunity to redefine the characteristics of the network architecture that are the most appropriate, all based on the way of life of each community.

Since 2017, as part of a project supported by the Internet Society's Beyond the Net initiative and awarded to Rhizomatica,¹⁸ a model of community intranets is being developed in four communities in Mexico: Abasolo in Chiapas, Guadalupe Ocotlán in Nayarit and Santa María Tlahuitoltepec and Santa María Yaviche in Oaxaca. This is being done with the support of REDES A.C., the Telecommunications Postgraduate Programme of the Universidad Autónoma Metropolitana Iztapalapa (UAM-I), the Boca de Polen Communicators Network, and AlterMundi, among others.

The project is still in the construction stage in the four communities, and currently the intranets in the communities are disconnected from each other. In the medium term, the general intention is to establish a network of intranets that allows the sharing of content among the communities that participate in the project. The most advanced case to date is that of the Tzeltal community of Abasolo in Chiapas, which is why we take it as a reference in this report.

The precursor to this intranet project arose seven years ago, at the community high school, where a computer science teacher, Luis Ramón Alvarado

¹⁵ https://wiki.rhizomatica.org/index.php/Main_Page and <https://www.github.com/rhizomatica>

¹⁶ Braudel, F. (1980). *On History*. Chicago: The University of Chicago Press.

¹⁷ The middle-mile or backhaul network.

¹⁸ <https://www.internetsociety.org/beyond-the-net>

Pascasio, developed IntraBach,¹⁹ an educational initiative that allows students to access relevant and quality content to reinforce their studies. This initiative continues to operate today in 15 communities in the region and is constantly nourished by content. Mariano Gómez, a former student of Luis Ramón, and Neyder Domínguez, co-founder of the group, supported the development of IntraBach and later formed a collective called Ik'ta K'op²⁰ whose purpose is to develop a model of community connectivity for internet access in Abasolo,²¹ one which simultaneously provides access to a database of local content resources through the community intranet. This model is known as the Yaj'noptik Intranet, and provides around 1,000 users in Abasolo and five neighbouring communities with internet connectivity and local content.

The elements that make up the model of the Ik'ta K'op collective are:

- The technological aspect works as follows: global internet connectivity is provided through a connection to Telmex, the incumbent telco in Mexico, in the municipality of Oxchuc, 27 km away. Point-to-point links were installed to the community of Abasolo, where it is distributed through 19 nodes, covering 60% of the population. A hotspot server running free software is connected to the local intranet and gives users access to the internet.
- The economic aspect is governed by the principle of collective acquisition of equipment, through what is known in Tzeltal as “Mankomun”.²² The economic model that allows the project to be sustainable is based on providing internet access to users at a relatively affordable cost, with packages from USD 0.50 per hour to USD 10 for a monthly package. However, if a person does not have the economic capacity to pay for the service, they can still use the service in exchange for their collaboration as volunteers in the care and maintenance of the nodes, painting towers, loading equipment, and even as blacksmiths and carpenters that enable the network to continue functioning.

- The organisational base is in the process of being built and includes the project developers and people in the community interested in the project. At the moment it is composed of “care-takers of nodes”, people in charge of giving maintenance and having a node in their houses that connects to the network and gives service to the users in that area. Also included are activities such as taking care of the equipment so that it is not stolen, warning the operators about technical issues, selling access coupons, giving service to users and providing a space for the safeguarding of the equipment. Each of these caregivers also has the right to access the internet at no cost as in-kind payment for their services.

The development of this project has allowed the community to make calls to their relatives and acquaintances in other parts of the country or in the United States without the need to walk to the telephone booth or travel approximately 40 minutes to the nearest municipality. Likewise, economic development has been encouraged by allowing the sale of products over the internet, the use of online banking and payment services, and tourism promotion. The promotion of education is another key element in the group's objectives, so the high school has a free connection and the local content server provided through IntraBach²³ is constantly updated.

The challenges currently faced by the Ik'ta K'op collective relate to issues such as the project's relationship with the community, and the creation and integration of local content on the server.

Attention is also being given to the technological, economic and sustainability needs of the project.

The Techio Comunitario training programme

Although this last case is not a community network, we believe it is important to include because the training and capacity building of people from rural areas who wish to develop projects related to telecommunications is crucial to improve access conditions in rural and indigenous communities.

The Techio Comunitario²⁴ project is composed of three elements that aim to train technicians specialised in telecommunications in rural and indigenous communities: the Diploma for Community Telecommunications and Broadcasting Promoters, four

¹⁹ www.intrabach.org

²⁰ www.iktakop.org

²¹ Before the emergence of this project, the internet was available in a small cybercafé using a voucher system, but the model in which it was distributed was not based on community principles.

²² An analogy allows us to understand this principle. In some festivities, such as the All Souls' Day, a cow is bought for the celebration. This is done by the community sharing the costs, and, subsequently, the animal is sacrificed and the meat is distributed equally. The community selects a day for the sacrifice, and everyone who participates in the work is also fed.

²³ At the moment there are two intranets in Abasolo: IntraBach and Yaj'noptik Intranet. IntraBach only serves the high school.

²⁴ <https://techiocomunitario.net>

technological laboratories, and an online learning platform. In the first diploma course, held between October 2016 and May 2017, a total of 36 people from six states in Mexico participated, all of whom committed to assist ongoing communication initiatives in their communities. In total there were 17 participating organisations and the general coordination was overseen by REDES A.C. and Palabra Radio.

The training process is based on participatory research carried out from 2012 to 2015 with trainers of indigenous and community communicators. The initial intention was to systematise the needs that existed at the training level through a series of interviews and participatory meetings with key actors in these areas. Based on the results of the research, the creation of a capacity-building programme for technological capabilities was envisaged.

The academic structure of the diploma was based on eight modules. First, a common core that covered the topics of community communication and technologies, electricity, electronics and free software. Subsequently, participants had the possibility to choose between one of the three specialties offered: radio broadcasting, wireless internet networks, and community cellular telephony. Finally, an integration module was carried out in which the issues of licensing and regulation and sustainability were addressed. Each of these modules was carried out in different locations that included the states of Oaxaca, Chiapas and Puebla, and the coordination of each was carried out by an organisation belonging to the advisory committee.

The methodology used was based on the educational practices of indigenous peoples regarding the transmission and socialisation of knowledge. The pedagogy was also inspired by the *milpa* (a millennial agrosystem in which the basic ingredients of Mexican cuisine are harvested) that has substantive elements: praxis, daily life experience, creation and sharing. It also drew from general experiences in popular education models and the approaches of free knowledge societies. The methodology of this training process is systematised in the book *Haciendo Milpa*.²⁵

The challenges in the construction of this training process have been the breaking of paradigms about teaching and the ways of evaluating learning. Another important challenge was the inclusion of women in the process. Although there was an important effort to get more women to participate

in the diploma programme, only one of a total of seven that were accepted to enter the programme finished the course. Despite this, some of the benefits are palpable. These include, for example, the planning of the community intranet through the participation of members of the Ik'ta K'op collective in the diploma, and the installation of community radios by the participants. Finally, the planning of future projects based on the knowledge and relationships built in the training process will be one of the key elements to be developed in the short term.

Conclusions

In Mexico, community networks have been processes that sought to address the digital divide that exists in rural or indigenous communities. That the solutions have come from the communities themselves has ensured the appropriation of technology by communities, and the inclusion of their values and ways of life in the solutions. Using this approach, we can articulate experiences that go beyond the utilitarian vision of the market and the state that have proven to be incapable of serving communities with particularities such as those discussed in each of these projects. In this sense, these projects reaffirm the premise that when the decisions and the operation of technological projects are in the hands of the communities themselves, the projects can be very successful.

Additionally, the three experiences presented contain particularities in which the choice of technologies and ways of proceeding are in constant dialogue with local values and organisational forms. As such – as the first two projects show – technology can become a tool of social transformation, rather than being an end in itself.

Action steps

We cannot generalise about community networks in Mexico from what has been presented here, as space limitations have not allowed us to share all of the experiences, some successful and others not so much.

However, the challenges of community networks in Mexico are many. First, it is very important to encourage the participation of women in technological issues. There is still a very strong belief in the communities that men are the ones who should attend to these issues. Second, in terms of legislation, although a good stretch of the road has been covered, it is still necessary to influence secondary regulations and laws that allow for the application of constitutional laws in regards to the right to

²⁵ https://docs.wixstatic.com/ugd/68af39_802ae1ae674783bba4cd8dfa102do3.pdf

communication and information. Third, it is necessary to develop even more technologies that allow connectivity at low cost and with simple operating modes for people in general. And fourth, and finally, we believe it is essential to create organisational and economic models that allow these experiences to be sustainable over time and not depend on only one or two people for their realisation.

Although the challenges are many, we believe that the path towards technological autonomy in rural and indigenous communities in Mexico has advanced steadily in recent years. What remains is to continue walking together with the communities and articulating efforts at the local, national and international level.²⁶

²⁶ We recommend watching a video on public policies from indigenous peoples that is available in Spanish at: <https://fimic.wordpress.com/2017/08/15/videos-sesiones-del-fimic>

Community Networks

THE 43 COUNTRY REPORTS included in this year's Global Information Society Watch (GISWatch) capture the different experiences and approaches in setting up community networks across the globe. They show that key ideas, such as participatory governance systems, community ownership and skills transfer, as well as the "do-it-yourself" spirit that drives community networks in many different contexts, are characteristics that lend them a shared purpose and approach.

The country reports are framed by eight thematic reports that deal with critical issues such as the regulatory framework necessary to support community networks, sustainability, local content, feminist infrastructure and community networks, and the importance of being aware of "community stories" and the power structures embedded in those stories.

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