



# E-PARCC

COLLABORATIVE GOVERNANCE INITIATIVE

Syracuse University

Maxwell School of Citizenship and Public Affairs  
Program for the Advancement of Research on Conflict and Collaboration

## Mapatón - A Success Story of Resolving the Public Transportation Issues in Mexico City with the help of Modern Technology Platforms, Collaborative Networks, and Citizen Participation

*“One of the most underutilized resources in a place like Mexico City is its citizen power.”<sup>1</sup>*

– Gabriella Gómez-Mont

### The Solution is with Citizens

Dr. Miguel Ángel Mancera (Mancera), mayor of the Mexico City, was in search of a solution to a problem that the city was suffering from - lack of comprehensive information about bus routes in the city. Mexico City boasted of one of the largest public transport systems in the world. This

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<sup>1</sup> “Mapping out Bus Routes in 17 Days: Mexico City’s Experimental Lab,” [www.thailandsocialinnovationplatform.org](http://www.thailandsocialinnovationplatform.org), October 09, 2019

included the metro train system, bus rapid transit system, and buses run by the government. However, 65% of the transport needs of the more than 19 million mobile individuals of the city were met by the unorganized sector, which plied more than 29,000 buses, minibuses, and vans, known as Peseros.<sup>2</sup>

Though Peseros, which started in the 1970s, were effective in bridging the gap between the available public transport and the ever increasing demand, their rapid and indiscriminate growth led to lack of information about several aspects like the operators, routes they plied on, schedules, price, etc. The way Peseros operated was difficult to decipher. The commuters who wanted to use these services had to rely on knowledge of fellow travelers. Such problems became more pronounced as the number of Peseros multiplied along with the growth of Mexico City<sup>3</sup> encompassing surrounding municipalities. Under these circumstances, providing seamless mobility across the city appeared a distant dream.

Mancera, who became a mayor of the Mexico City in 2012, concentrated on issues like equitable and sustainable development, mobility, revitalization of public spaces, open governance, and citizen dialogue and engagement. Mancera envisaged a government led department that focused on urban creativity and civic innovation, to function as an urban experimental lab. His idea was to ‘foster civic innovation by visualizing platforms where government and civic society can collaborate and harness urban creativity.’

Mancera approached Gabriella Gómez-Mont (Gabriella), a visual artist. Gabriella had been a documentary film director, a writer, and a consultant for various international projects. Mancera asked Gabriella to initiate the new government department leading to the incorporation of The Laboratorio para la Ciudad (the Lab) in 2013. The Lab, manned by 20 specialists in different areas, looked at creating links between civil society and government through multidisciplinary collaborations. The Lab took several initiatives to improve the living conditions of the city

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<sup>2</sup>The name was derived from Mexican currency Peso. These buses charged one Peso to take a passenger.

<sup>3</sup>The Mexico City or the Mexico metropolitan area consists of 16 municipalities and 41 adjacent municipalities. The Greater Mexico area consists of 18 additional municipalities.

dwellers. It encouraged the citizens to participate actively in improving their living conditions, and voice their opinions about the issues they faced. The Lab members served as mediators, found what citizens wanted, and worked with public officials to resolve the citizens' issues.

Looking at the success that the Lab achieved in addressing the issues that citizens faced, Mancera felt that the Lab could provide solution for the challenge posed by the Peseros. Preliminary studies showed that mapping these routes in a traditional manner involving external agencies would take more than a year and would cost the government dearly. He asked Gabriella to address the issue of Peseros through a collaborative problem solving process with the Lab playing the role of a facilitator.

Gabriella brought together several organizations, consultants, NGOs, university students, software developers, philanthropic organizations, and citizens. More than a year of planning, deliberations, and pilot studies resulted in an exercise called Mapatón (meaning Large Map). It was a crowdsourcing experiment to map the city's bus routes through collaboration, gamification, and technology. Mapatón invited citizens to play and track their public transit journeys by downloading the Mapatón app on their mobile phones.

The data provided by the citizens through the game was consolidated to come up with a comprehensive digital map of the routes. The data were made legible leading to creation of digital maps, a database, and an application user interface. This collaborative process resulted in mapping of over 4,000 routes, running 48,000 kilometers. The cost of the whole exercise, which was completed in just 17 days, was US\$15,000. Millions of people who commute by Peseros used this data to make better informed trip choices. The data were put into use by urban planners and the government to design a better system of transport to foster seamless mobility across the city.

Mapatón offered citizens the opportunity to directly participate to address the problem of the lack of updated metadata about the city's bus routes. According to UNDP, "Projects like Mapatón would increase civic engagement as the government-citizen relationship becomes closer, more

open and innovative. From now, problems that seem impossible to solve would no longer be so.”<sup>4</sup>

## Transport System in the Mexico City

As of 2015, Mexico City, the fourth largest urban area in the world, accommodated 17% of Mexico’s population.<sup>5</sup> The population of the city, which was just 3 million in the 1950s, snowballed to 13 million by 1980s and grew to more than 21 million by 2015. Between 1950 and 2010 the territory of the city expanded 30 times. The greater Mexico City had spread across 70 different municipalities in three different states and occupied 4,887 square kilometers (*see Table 1 - Mexico City Population Growth*).

**Table 1: Mexico City Population Growth (1990 – 2010)**

Population	1990	2000	2010	% Change (1990-2010)
Federal District	8,253,744	8,605,239	8,851,080	7%
State of Mexico (59 municipalities)	7,297,758	9,745,094	11,168,301	53%
State of Hidalgo	30,293	46,344	97,461	222%
Total México City	15,581,795	18,396,677	20,116,842	29%

Source: OECD Territorial Reviews

The city accounted for 23% of the country’s GDP. Half of the city’s people worked in informal economy. The society was socially and economically divided. The city’s citizens owned one fifth of the country’s wealth. Contrastingly, the city also housed the world’s largest slum, Neza-Chalco-Itza, where 4 million Mexicans lived. Mexico had one of the lowest minimum wages in Latin America.

<sup>4</sup>Mapping out bus routes in 17 days: Mexico City’s Experimental Lab, UNDP, October 09, 2019.

<sup>5</sup> Mexico City was the third largest city in the world in terms of population

Mexico City hosted 238 universities and 4,630 civil associations. It boasted of more than 78,000 companies. There were 108 mobile phones per 100 people.

The average weekly commute time in Mexico City was 5.7 hours. Only 20% of the residents used car for their daily commute; 65% used buses or minibuses. Every day an estimated 3.3 million man-hours were wasted in traffic. Residents of Mexico City spent 18.5% of the monthly income on transport. This was the second largest expense after food, drinks, and tobacco.

The city boasted of one of the largest public transport systems in the world. This included the metro train system, bus rapid transit (Metrobús), buses run by the government (Trolebús), and buses run by numerous private operators.

The extensive metro system in the city was spread across 12 lines with track of 226 kilometers and 195 stations. The Mexico City subway was the ninth largest in the world in terms of the number of stations,<sup>6</sup> the length of the network,<sup>7</sup> and the number of people it carried (1.6 billion per year). It was one of the cheapest subway systems in the world costing only Peso 5 for a ride.<sup>8</sup>

The buses of the Metrobús had their own designated lanes and stopped next to a platform in the middle of the road, which resembled a subway station. These buses plied on their dedicated lanes at high speeds, enabling the commuters to reach their destinations in a short span of time. The ticketing process was similar to the metro train system. The commuters paid for their travel as they entered the bus station, before the bus arrived. All the buses were monitored in a Metrobús control center. The cost of travelling in Metrobús was about 6 Pesos (≈25 Cents). The commuters could also obtain a Metrobús card that could be used with the subway and the bikeshare systems.<sup>9</sup> The Metrobús moved on seven routes across the city. About 1.5 million people used it every day.

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<sup>6</sup>New York is the largest with more than 460 stations followed by Beijing with 319 stations.

<sup>7</sup>Shanghai Metro is the longest covering 548 kilometers, followed by Beijing with 527 kilometers.

<sup>8</sup>1 US\$ = MXN\$ or Mexican Peso 18.59 as of February 2020.

<sup>9</sup> ECOBICI is the public bike sharing system in Mexico City. It allows registered users to take a bike at any bike station and return it to the bike station closest their destination.

Another system was Trolebús, which was similar to a tram. This service connected some of the important metro stations. There were buses known as RTP (*Red de Transporte de Pasajeros del DF*), which were subsidized by the government. These covered a broader area of the city than the Metrobús.

Buses from the surrounding suburban centers were not allowed into the Mexico City. The passengers need to transfer from the suburban buses to the city buses at 47 Intermodal transfer centers, also known as CETRAMs. These were used by 4 million people per day on an average.

## **Peseros**

Though there were several public transport systems, the Peseros were the backbone of the local transport in Mexico City. With a wide variety, each vehicle accommodated 18-50 passengers on an average. There were over 29,000 buses and minibuses running in 1,500 routes, which accounted for 65% of all the city transport. 14 million riders used these buses every day. However, using Peseros for regular commuting was a challenging task. According to the website of the Mexico City, “[Peseros] currently serve the entire city but figuring them out can be complicated and is not always the most comfortable way to go. If you’re not used to getting around in big cities, it may be best to avoid using them”<sup>10</sup> (see *Table 2 - Daily trip distribution in Mexico City*).

**Table 2: Daily Trip Distribution**

<b>Mode of Transport</b>	<b>%</b>
Autobuses RTP	2%
Suburban buses	7%
Metrobús	0.5%
Trolebús	1%
Metro	8%
Taxi	17%
Peseros	65%

Source: SETRAVI

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<sup>10</sup>[www.mexicocity.gob.mx](http://www.mexicocity.gob.mx) (accessed in 2016)

Peseros were the most convenient form of transport for the Mexico City dwellers, as they connected the interiors and the hinterlands of the city. But there was one problem in using them. In the absence of any organized information about the location of bus stops, routes, timings, and ticket prices, it was impossible for anybody to figure out which bus to take to reach the destination. Most of the commuters relied on the knowledge of fellow travelers.

Peseros began in the 1970s as a government-led initiative but run by private operators. With growing demand for the services, hundreds of routes were added to the existing routes. In the absence of any formal procedures about which route to ply on, many bus operators just started operating on new routes based on demand. The operators ranged from those who owned and operated a single vehicle, to travel companies or concessionaires that operated several buses, with the permission of the local authorities. Private operators who just owned a van or a truck could start operating it. It was estimated that there were more than 20,000 concessionaires, apart from individuals who operated these buses.

As the revenue was directly proportional to the number of passengers, the operators filled the buses beyond capacity, and stopped wherever customers demanded without following the designated stops or signs.

Since the 1980s, five agencies have tried to collect data about the passengers, who travelled on these routes, the licenses for these routes, travel times, locations, and so forth, but the data could not be assembled.

The city and the Mexico City's Public Transit Authority (SETRAVI) asked the concessionaires for information of the routes where they operated. But not many operators provided the required data. Hence the governments were not sure how to institutionalize such data. A major study was carried out in 2012 in association with the World Bank, SETRAVI and technical assistance from GTFS (General Transit Feed Specification), an open standard for recording data. Selected representatives from SETRAVI travelled across the city and used an app TransitWand<sup>11</sup> to collect

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<sup>11</sup>TransitWand is used to collect GPS data about routes and stops. It is used for recording the make-up of public transport networks.

real-time data. But this experiment was not successful, as the app, which had rigid standards, was not able to incorporate the data of the Peseros.

The city desperately needed data maps for the Peseros. In the absence of centralized data, the SETRAVI could not coordinate different modes of transport and plan seamless trips. This could be done by providing origin and destination maps but creating these was an expensive and time-consuming affair. In the absence of proper data, the government was unable to leverage the Peseros system in spite of its vast potential.

Mancera was of the view that mapping the Peseros was necessary for the future of the city, given the fact that the city would be growing further in the coming years. Looking at the previous unsuccessful efforts to map the routes, Mancera was of the view that 'the Lab' would be in a better position to handle the issue.

## **The Laboratorio para la Ciudad**

In Mexico, government consumption accounted for 12% of the GDP. The relationship between the government and the citizens was not collaborative. The citizens held an opinion that governments do not consult citizens about their initiatives.

In 2012, Mancera was elected as the mayor of Mexico City, which had a massive government machinery of 280,000 civil servants. Most of the Mexicans were extremely unhappy about the high levels of corruption in the country, according to a survey by Transparency International. The citizens felt that any public-private initiative, or programs like open government, were not executed properly due to the involvement of civil servants. About 50% of the Mexicans felt that political parties and police were the main reason for corruption. Mancera, who came to power with 63% votes, had promised to bring citizen-centric, collaborative, and inclusive governance to the city.

At that time the city was under transition. It was one of the most vibrant cities in Latin America and was redefining itself as a progressive city. Half of the city's inhabitants were less than 26 years of age and were extremely progressive and wanted a government that was agile and



relevant. Mancera thought of a government-led department as a part of the city, without any bureaucratic hassles, to function as an urban experimental lab and a creative think tank of the Mexico City.

Mancera met Gabriella in 2012 when he participated in TEDxCentroHistorico event that Gabriella had organized (see Table 3 - About Gabriella). At that time Mancera was contesting for the position of the mayor of Mexico City and spoke about his plans for the city. Several prominent people from the city had participated in the event and put forth their ideas for a progressive and dynamic city.

**Table 3: About Gabriella**

<ul style="list-style-type: none"><li>• Visual artist</li><li>• Director of Documentary films</li><li>• Creative advisor to several cities and universities</li></ul> <p><b>Awards / Recognition</b></p> <ul style="list-style-type: none"><li>• Audi Urban Future Award</li><li>• Best Art Practice Award by the Italian Government</li><li>• TED City 2.0 prize</li><li>• Yale World Fellow</li><li>• TED speaker</li><li>• TED Senior Fellow</li><li>• MIT Director’s Fellow</li><li>• Institute for the Future Fellow</li><li>• World Cities Summit Young Leader</li><li>• One of the 100 most Creative People by Fast Company Magazine.</li></ul>
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Compiled from various sources

In 2013, Gabriella was planning to move to the USA, when she got a call from Mancera. He spoke to her at length about a project for the city government, and asked her to start a new government department that focused on urban creativity and civic innovation. Gabriella who was enthusiastic about working outside the boundaries of institutions took up the project. This led to the establishment of The Laboratorio para la Ciudad or Laboratory for the City (the Lab), a place where citizens and government can work together to find unique solutions for the problems of the city. According to Gabriella, “I’ve always worked in a multidisciplinary way but it was just

related to the creative fields. This time, the challenge was trying to figure out what happens when you bring in scientists, city people and other disciplines into a conversation that was related to one of my biggest artistic desires: Mexico City itself.”<sup>12</sup>

Mancera gave Gabriella six years to creatively connect citizens and the local government, to prototype creative ways of addressing urban challenges that Mexico City was facing, and to improve the quality of life of the people in the city. According to Gabriella, “We actually studied for months before we finally decided to establish an innovation lab. It’s similar to a think tank, with a goal to imagine what a new government, based on urban planning and civic tech would look like.”<sup>13</sup>

Gabriella had a time line of six months to come up with a scheme for the Lab. She was of the view that transformation cannot happen by the government alone, and citizens need to play an active role in realizing what they want from the city. She conducted a survey asking 31,000 citizens about what they think of Mexico City, and their expectations from the city. With the clear idea of citizens’ needs and demands, the Lab started off with focus on areas like mobility, governance, civic tech, and public spaces, among others.

She then started looking at what was happening in other cities and found that several cities across the world were trying to make their citizens an active part of the government. Some of the ideas that inspired her included New Urban Mechanics in Boston, Mind Lab in Copenhagen, and Helsinki Design lab. She, along with the co-founder of the Lab Clorindo Romo who is an architect, looked at several citizen participation initiatives in Brazil and Columbia. They found that governments across the cities, though seeped in bureaucracy, were harnessing huge potential from people, generate ideas, involving people in conversations, and engaging civic society in finding solutions to the challenges it faced. She said, “I was very heartened by the fact that there were these spaces for creativity and experimentation that were being born in other cities. I

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<sup>12</sup>Kursty Groves, Oliver Marlow, “To Foster Innovation, this Lab uses Mexico City’s Best Active Ingredient: its People,” [www.frameweb.com](http://www.frameweb.com), January 05, 2019

<sup>13</sup>Chih-hsin Lu, Aaron Wytze, Laboratorio Para La Ciudad: Re-Imagining Mexico City through Civic Tech, <https://g0v.news>, May 30, 2017

thought that it would be a very interesting model, taking into account that fortunately or unfortunately, there's no way taking a model of any other city and trying to replicate it exactly in Mexico City because, as you can imagine, these cities are incredibly different than Mexico City.”<sup>14</sup>

Gabriella then spent some time towards creating administrative and legal structure for the Lab and to build a team. The Lab mainly consisted a multidisciplinary team of 20 people, who included designers, artists, historians, software experts, film makers, urban psychologists, and people from the fields of urban planning, civic tech, social innovation, humanities, and international relationships, among other. The average age of the employees of the Lab was 29 years. The team looked at bringing systematic change and looked at the city as a network of systems.

The Lab was developed into a gathering space where people could come together and work on projects. It was a place to reflect about the city and explore for better future of the city by working on areas like urban creativity, mobility, governance, civic technology, and public spaces.

The Lab functioned as a link between government and civil society, brought together representatives from ministries, local industrialists, NGOs, and citizens, and created a platform to discuss problems, possibilities, and solutions. According to Gabriella, the Lab had its task cut out. She said, “We research areas that might not necessarily be on the minds of other members of the local government—new types of themes and best practices, things that Mexico City could be doing differently, etc. We look at international best practices but also try to see what is going on at the local level.” All this was achieved by bringing people from different walks of life and talking to them to know the ground realities about the challenges the city is posing. Gabriella said, “we start conversations between civil society and government, and in starting these conversations we have a whole myriad of different formats. The goal is to spur citywide conversations in order to create a common language and a common interest. Third, what we also do is prototype and pilot projects.

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<sup>14</sup> Rebecca Greenwald, Q&A: Gabriella Gomez-Mount, Laboratorio Para la Ciudad (Part 1), [www.metropolismag.com](http://www.metropolismag.com), January 08, 2016.

Gabriella, explaining the way the Lab functioned and the tasks it carried out said, “we function as a good lab of sorts—we mitigate risk for the rest of government ... our lab—along with the handful of other government labs that exist internationally—try to create that safe space to try out different things without risk. Last but not least, once these projects are proven successful, what we do is create a handover mechanism so that other ministries can adopt this model.”<sup>15</sup>

## **‘The Lab’ Takes Off**

The first task the Lab took up was to create ‘Code for Mexico City’<sup>16</sup> where people with knowledge of computer programming were asked to come up with proposals to solve city’s problems. It attracted 253 applicants from people who wanted to work for the city. From them 6 programmers were selected along with 16 additional volunteers. These programmers and volunteers started working with ministries of environment, health, tourism, transportation, and economic development. They worked for nine months to build apps and mine data from the departments. This resulted in programs for monitoring air quality, finding spaces for children from poor neighbourhoods to play, and for controlling pollution.

This task gave Gabriella an idea to dwell deeper into finding the ways of harnessing the talent available in the society to address the challenges that people faced. She wanted assemble people from different walks of life and have them brainstorm to find fresh approaches to tackle the problems that the city faced. For Gabriella, government was a platform that belongs to all the citizens. It was a platform where people can accomplish tasks that cannot be done individually by working together. Another important aspect of the Lab was urban creativity, which was inventing spaces for ingenuity to promote a creative society.

In that direction, Gabriella and the other members of The Lab started with questions: “What would an experimental government’s office be like?” “What is the city for?” “How do you find the points of intervention that will shift not only what’s happening, but also the way people

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<sup>15</sup>Rebecca Greenwald, Q&A: Gabriella Gomez-Mount, Laboratorio Para la Ciudad (Part 1), [www.metropolismag.com](http://www.metropolismag.com), January 08, 2016.

<sup>16</sup>This was done in partnership with Code for America.

imagine the city?” The members of the Lab looked at the city from a humanist perspective and treated the city as a cultural artifact. This made them identify six areas of priority:

- Open City
- Creative City
- Participatory City
- Playful City
- Pedestrian City
- Global City

Before they could go ahead with the plans, the Lab found that it had to tackle with several existing laws and come up with new laws, including the Law for road safety. To bring out the law, The Lab worked with 40 organizations in the society. As a part of Playful city initiative, the Lab conducted a spatial analysis to come up with playgrounds for children. This was deemed essential as Mexico City had more than 5 million children. This resulted in establishment of Secretariat of Urban Development and Housing in Mexico City to make playgrounds a part of the urban development plan of the Mexico City. The Lab also looked at the possibility of using streets as playgrounds in some of the localities. Thus, roads in some of the localities occupied by the poor were closed for traffic on Sundays and were converted into playgrounds.

The Lab came out with an initiative of creating hundreds of maps providing block-by-block statistical reading of Mexico City. This made the Lab rethink on the lines of spatial justice. In some areas, inhabitants only had half a meter, while UN specified an area of 9 square meters per individual. The led to creation of programs for better access to public space to the citizens (*see Exhibit 1 - More about Open City, Creative City, Participatory City, Playful City, Pedestrian City, and Global City*).

## **Right to Mobility**

One of the projects that the Lab took up as a part of the Open City initiative was to provide meeting places for citizens to share knowledge, concerns, and proposals about important issues

for the city. Open City discussed practices like transparency, openness, participation, collaboration, and civic innovation. A meeting held as a part of Open City in February 2015 was attended by 65 people from the civil society who represented 27 organizations. The event also attracted 91 public servants from 48 different governmental agencies.

Dialogues on Open City triggered discussions and debates to understand the problems and challenges related to transportation. According to Mobility Law that was passed in 2014, “mobility is the right of each individual and of the society to move freely and access goods through the different modes recognized in this law.” The law gave priority to public transport along with walking and cycling over private automobiles. The focus of the plan was on creating complete streets that prioritize active and public transit and foster transit-oriented development. This plan was a part of the city’s efforts to improve economic development and social inclusion and also reduce the CO<sub>2</sub> emissions.

One of the issues that Gabriella put forth during the discussion was that of private transport and the need to map the existing routes, as envisaged by Mancera. The members of the Lab then decided to use the existing ideas and also bring in the expertise of different participants. This resulted in a dialogue, where the participants decided to develop an interactive map of all the routes between 47 CETRAMs. This was to be done using the existing databases and by noting the experiences of different participants.

Thus, an initiative was designed to represent the routes visually, along with the details of destinations, schedules, fares, and so forth, to integrate the public transport system through a collaborative effort. The effort was called Mapatón. The main objective of Mapatón was to create an open database of public transportation routes in Mexico City in collaboration with the government officials, civil society, private companies, and the citizens.

There were three deliverables from Mapatón for the government.

- Database of the routes on which Peseros travelled.
- An Application Program interface to interact with the database generated.
- An open source database for the use of third parties.

To execute Mapatón, Gabriella brought together 12 organizations and 35 collaborators to form a work group that consisted of government departments, academicians, private companies, think tanks, and NGOs. The objective of this group was to improve urban mobility and transport in the city. The project cost was estimated at 350,000 Pesos and was funded by the British embassy and Hewlett foundation (*see Exhibit 2 - More about the Collaborators*).

The Mapatón team held regular meetings every week – over the course of 11 months, 50 such weekly meetings were held. The group began with discussing the reasons for the absence of such important data about transport routes in the city. Every member of the team could voice and vote. Members of the team along with citizen volunteers visited some prominent localities like Cetram Zapata, Mixcoac, Bosque de *Chapultepec*, Pantitlán, El Rosario station, and others to understand the ground situation.

## **Developing Mapatón**

The scale of Peseros had made it a challenge to generate mobility data. The group was of the view that including the users in generating the information required was the only viable option to address this problem of non-availability of data about Peseros. The group decided that the way the data can be generated in an inexpensive and quick manner was through crowdsourcing. For that purpose, they wanted to use an app through which data could be gathered without spending too much money or resources.

The group wanted to first test the existing applications available for collecting the data. In the first pilot study, ‘the Flocktracker’ technology developed at MIT was used. This was a smartphone-based application that was designed to conduct dynamic interactive surveys. It recorded data about trips, ridership, vehicle speed, and other important aspects of transport.

In the first pilot study that ran for five days, 21 representatives from 9 partner organizations mapped 18 routes of 3,000 kilometers. The shortest route was 10 kilometers and took 50 minutes to travel and the longest route was 300 kilometers and took 9 hours to travel. After conducting this study, the group decided Flocktracker was expensive, and to carry out the task with thousands of participants, it needed a cheaper alternative.

The group then decided to create an application. The software experts from the group generated algorithms and mechanisms to turn data collection into a game and use gamification<sup>17</sup> to attract the users to the app. In the case of Mapatón, gamification has used the elements of game design in non-gaming context.

In the second pilot study, a group of volunteers from the National Youth Institute used the custom Mapatón app to collect the data. They charted 56 routes across the city. During the third pilot study, for over a week, 198 students from three universities, studying courses related to urban planning, architecture, and international business, mapped 248 routes running 1,200 kilometers. For the fourth pilot study, drivers of the public transport were trained for three weeks. These drivers then mapped 358 routes running over 8,000 kilometers. After the pilot studies, three prototypes of the app and the digital platform were created.

Simultaneously a communication strategy was developed calling public's attention to Mapatón and seeking their collaboration with the government, as the success of the Mapatón depended heavily on the enthusiastic participation of the citizens.

On January 29, 2016, Mapatón was launched for the public. It was meant for people of the city who travelled on the Peseros. Users could download the game on a smartphone and then sign up for an account. Once the app was ready, the users had to hop into the bus at the starting point and press a button 'Record Route.' Throughout the journey, the GPS on the mobile phone needed to be active. This recorded the complete route on which the bus travelled, and the related data was captured in a database. It was necessary for the users to start the journey from the origin and continue till the last stop.

To encourage people to participate, the commuters who mapped the routes were given points, and those who garnered highest number of points at the end of a specified period were given cash prizes and tabs. The users were also required to post the pictures of the Peseros and those of some of the important landmarks on the route. People who reached certain milestones like

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<sup>17</sup>Gamification, was first used in 2008. By 2010, it became highly popular. It can be defined as a process of enhancing services in order to invoke game-like experiences and further behavioural outcomes.



the number of routes pointed or number of kilometers travelled were given badges as motivational tools.

**Table 4: Mapatón – Timeline**

February 26, 2015	Dialogues for an open city
May 25-29, 2015	Pilot 1
August 25-27, 2015	Pilot 2
October 1 to 7, 2015	Pilot 3
November 30 to December 18, 2015	Pilot 4
January 29 to February 14, 2016	Mapatón
February 24-26, 2016	Mapatón Data Day
March 4, 2016	Open database given to Mancera and to the citizens

Compiled by the authors

These were some routes in the Peseros which were not very popular, and some routes where travelers did not use smart phone much. To encourage the participants to map these particular routes, they were given higher points.

Users could map the routes individually or as a team. The observers said that initially the users started with the game to win the points, but once they were communicated the positive impact the game would have on the city, many of the users identified with the project and committed to the game and its results (*see Table 4 - Timeline of Mapatón*).

### **Capturing Data**

As and when the data were generated by the users travelling on Peseros, it was captured and cleaned. The team used an algorithm that cleaned GPS data in real time. At every point, the team captured and sterilized the data. The team constantly monitored the maps, and the places that were already mapped were allotted less points. The routes that were not getting mapped were allotted more points. This capturing went on for 17 days.

Though pilot studies were conducted, the team was not prepared for the huge amount of data that was generated. Still they quickly managed the data. One of the unforeseen incidents was the attempt by users to hack the system by adding routes and points that did not exist. But the

experts present in the team and in the Lab were quick to react and make amends in the software to block such users.

The team faced challenges in terms of the quality of data received. According to Christian Guerrero, programmer for Mapatón, “A problem in crowdsourcing is that you never know what’s on the other end. You don’t know what type of or what quality phone the person has.”<sup>18</sup> This was addressed by algorithms that took care of giving correct location names, and detecting strange behaviours. For example, if a player kept the app on even while going home, such behaviours were recorded and eliminated.

The routes that Peseros travelled on were not always fixed. The drivers changed the routes according to the crowd and according to the traffic. This problem was fixed by taking the route that was mapped by most of the people. For example, if five people mapped the same route, and one mapping showed a diversion, the route that was recorded by the maximum number of people was retained.

Another challenge was marking the stops. These buses did not have designated stops and stopped as per their convenience, and as and where the passengers requested. Or they had stops which had generic names like school, college, or a hospital, which was difficult to comprehend. To overcome this challenge, citizens mapping the routes were asked take pictures of the stops and post.

The routes were validated by 10 volunteers who worked on them for three days. The name of the origin and destination were then validated and the names that were officially used were retained.

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<sup>18</sup> Zoe Mendelson, In Pursuit of Big Data, Mexico City Mapathon Gamifies Crowdsourcing, <https://nextcity.org>, February 25, 2016

## The Results

The game ran for two weeks during January 29 through February 14, 2016. Nearly 4,000 people participated in the game and mapped more than 4,000 routes. The distance travelled by them was equivalent to 1.4 times the circumference of earth. The task which would have needed 400 mapping days to complete was done in just two weeks. Some of the observers said that had the same task been done by the government in a traditional format, it would have cost millions of dollars. Mapatón was the first to use a game to create such a large data pool (see Table 5 - *Achievements of Mapatón*).

**Table 5: Mapatón – Achievements**

<b>13</b> organizations involved in the development of Mapatón
<b>12,538</b> work hours invested in the project.
<b>3,996</b> users
<b>736</b> teams
<b>4,125</b> routes mapped
<b>2,765</b> routes validated
<b>1,762</b> routes entered into the final database
<b>51,308</b> kilometers mapped - equal to 475 days of activity mapping
<b>165,000</b> Pesos in Prizes
<b>7,498</b> hours of teamwork (equal to 2,999,200 pesos in human resources)

Compiled from various sources

Smooth collaboration among three structures facilitated Mapatón. These were the Lab, the coordination group of Mapatón and the people who participated in the event. This was an instance where government and citizens worked together to find a solution to one of the main challenges that the people of the city faced. The people participated enthusiastically, as they felt that they were playing a role in creating something that would benefit them. According to Gabriella, “the projects that we carry out would not be possible without trust in the collaborative

working groups – it’s the most important point of our work: being able to find those points of common ground.”<sup>19</sup>

All the data received was reviewed to create the final data that was compatible to GTFS<sup>20</sup> data format. This called for removing duplicate entries and verifying the origin and destination with the photograph attached. The end result was a map of all the routes that these buses travelled on, along with their timing, stops, duration of the trip, and cost of tickets. Once all the routes were mapped, it resembled a complex network, reflecting the sheer number of buses present and the routes they plied on. The data was put into use for coming up with data-driven policy and research. The data was also opened for public use. This led to development of smartphone apps for transport modes and routes, taking the city a step closer to seamless mobility (*see Exhibit 3 - Some Interesting Facts about the Peseros as derived from Mapatón*).

The data was made available for all the citizens and the government. Citizens could now check the details of the routes, destinations, and the bus to reach specific destination.

To get ideas about putting the data into use, a hackathon was hosted by PIDES. The best ideas during the hackathon were given prizes. The first prize was to an idea where the data can be of help to those who did not own a smartphone. People using a feature phone could send an SMS to a particular number providing the details of their origin and destination, and receive a reply with information about the buses, routes, timing, and so on.

After Mapatón Mexico City got a general overview of the existing system of Peseros. One of the offshoots of this was extensive data about the crime spots in these routes. These were specified by some of the people who took up the exercise. Police immediately took action to address this problem.

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<sup>19</sup>Mexico City: Mapatón CDMX & Humanizing government,” Big Bold Cities, April 29, 2018.

<sup>20</sup>The General Transit Feed Specification defines a common format for public transportation schedules and associated geographic information

The Lab was able to address the problems of bureaucracy and was designed to be agile and experiment to address the civic issues. It was able to bring together diverse people and made government accessible to all. The citizens volunteered to participate in the events conducted by the Lab and showed growing sense of engagement.

## **Looking Ahead**

The makers termed the initiative revolutionary, as never before did the city's government partner with NGOs and the private sector to crowdsource a database that called for participation from the citizens. Mapatón proved that to promote open government in Mexico it was necessary to design and document projects that solve specific urban problems through active participation, people-centered design, collaborative ecosystems, and open knowledge. According to Rodrigo Téllez from the Lab, "it (Mapatón) stands out as a model of how governmental processes can be made more legible to citizens by involving them in the resolution of complex problems that affect their everyday lives."<sup>21</sup>

Mapatón also showed the changing relationship between government and the civil society. Observers said that it proved that government cannot deal with all the social problems itself and needs active participation of the civil society organizations for the ideas, insights, and strategies they provide. It is time governments encourage strong civil society organizations to solve public problems alongside government agencies. Mapatón was successful in bringing together diverse organizations and citizens to collaborate to come with solutions for complex problems in an economical manner.

The success of Mapatón ignited discussions across different sectors in the city. NGOs, government agencies, and research centers entered into a dialogue about crowdsourcing as a tool for solving public issues.

The Lab itself took up several such initiatives. In a span of five years 400 civil servants were trained. It created 20 new databases that were used by 13 ministries. To address the needs of

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<sup>21</sup> Rodrigo Téllez, "A Case from Mexico City: Laboratorio Para La Ciudad's Mapatón CDMX,"

citizens and take government closer to the citizens 52 app prototypes were put in place. The Lab developed 5 digital platforms that were used widely not only in Mexico City, but also in several other cities across the world. The concept of urban labs found several takers, and labs addressing the civic issues of interest to them. The Lab also started working with other cities that were interested in replicating the initiative.

The use of technology was one of the distinctive features of Mapatón. The App that can be used not only in Mexico City, but also in other cities which need such data. These included Xalapa, where four people came together and inspired 400 citizens to carry out the exercise. The beneficiaries of this were 400,000 people. The observers said that the use in Xalapa showed that Mapatón could be scaled up or down and was suitable for any city that intended to map its public transport.

Many cities across the world borrowed the technology used in Mapatón to chart their public transport systems. Eight cities in Mexico, Latin America, and Africa showed their interest in implementing a similar strategy and reached out to the Mapatón team to help them.

As of 2018, more than 54% of the world’s population lived in urban areas. This was expected to increase to 70% by 2075. Thus, the initiatives like Mapatón had a wide range of applications in urban areas across the world. The experiment of harnessing the power of citizens could be put into use in many ways all across the world. Mapatón resulted in an iterative process, which can be used to develop new ideas using technology and collective intelligence of citizens. Thus, the opportunities for further innovations are unlimited.

**Exhibit 1: Collaboration – Areas of Priority**

**Open City**  
Open City is about open data. The Lab was of the view that open data was very important for mass participation of citizens in the government-led activities. To accomplish the Lab came out with an open data portal. It also facilitated passing of a law bill called Open City Law, that provided citizens right of open data, open platforms, and right for citizens to take part in creating public policies. Thus, the participation of citizens in the public policies was not limited to voting in the elections. According to Bernardo Rivera Muñozcano, Open City Strategy Coordinator of the Lab, “What we wanted was to get a sense of what the people that live in

the city want, what they imagine their city can be, and what they value most about living in the Mexico City. We wanted to appeal to many levels of interest.”<sup>22</sup>

### **Creative City**

The Lab wanted to foster the potential of creativity in all levels across the city. It wanted the citizens to design their own public spaces through civic technology. The idea was to connect untapped creative energies of the citizens and gather their creative ideas, and implement those in the city’s system. Gabriella said, “Urban creativity is about how we invent spaces for ingenuity beyond the usual places like museums and art schools.”<sup>23</sup>

As a part of the creative city, the Lab established a Ventanilla Única (One-Stop Window) through which citizens could give ideas about creating their own public spaces using civic technology. The Lab also conducted several sessions with active participation and generated dialogues to expand the use of design for the betterment of the city. Children were also encouraged to design their own play environment.

### **Playful City**

The Playful city strategy of the Lab focused on understanding how playfulness can encourage citizens to participate in enhancing the city. The goal of Playful city was to embed playful learning experiences across Mexico City that are creative and collaborative by leveraging existing public spaces throughout neighborhoods and micro-communities.

The Playful City aimed at reactivating underused spaces, establish children’s perspective as a central factor in urban planning, and public policy design. Children accounted for 25% of the city’s population but their needs were not met by the urban planners. The Playful City looked at the existing laws about the spaces for children and found that they were more of adults’ view about facilities that children would require, and that the spaces available for children were inadequate and were not conducive for cognitive and physical development of children. This made the Lab come up with several proposals, including Peatoníños, which looked at making the streets safe for children to play by opening the roads and green spaces in marginalized localities for the benefit of children. Thus, on weekends some of the roads were closed for vehicular traffic, and children in the neighboring localities could use the space to play.

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<sup>22</sup>“Crowdsourcing a Constitution,” <https://citiesofservice.org>

<sup>23</sup> City whisperer, <https://www.c2montreal.com>

**Participatory City**

The Participatory City envisaged finding talent from within the people of the city and enable seamless knowledge flow. The Lab was of the view that the city had lot of resources and it needed to bring them together and work towards a common vision. The Lab wanted to encourage participatory processes in making decisions about the future of the city. This was possible by new technology and methodologies that enabled citizens to take active part in shaping the public policy.

**Pedestrian City**

The Pedestrian City called for looking at the city through the lens of pedestrians and redesigning the streets to accommodate pedestrians, cyclists, and users of public space. As a part of this policy, Paseo de la Reforma, an avenue that runs across the Mexico City was closed for traffic on Sundays to encourage cycling.

**Global City**

This was aimed at rethinking how Mexico City would relate to the other cities in the world, and foster city-to-city relationships.

Compiled from various sources



**Exhibit 2: Agencies involved in Mapatón**

<b>Organization</b>	<b>Description</b>	<b>Role</b>
Laboratorio para la Ciudad	Created and communicated the project	Leader and Coordinator
PIDES Social Innovation	Mexico-city based NGO working towards fostering citizen collaboration in government projects	Logistics, Team advisor and coordinator
Transportation and Mobility Ministry	A government agency in charge of all transportation in Mexico City. Helped in the administration of data.	Coordinator
Transfer Mobility Center (CETRAM)	In charge of regulating the transportation hubs. helped to create the communication with the concessioned bus owners	Coordinator
Institute of Policies on Transportation and Development	An international institute that promotes sustainable and equitable transportation globally, with offices in Mexico, Brazil, Argentina, China, Europe, and Indonesia	Advisor
M + Urbano	A Mexican company that builds public facilities and infrastructure	Advisor
CTSEmbarq (WRI Mexico)	Mexico based NGO	Collaborator
Transconsult	Mexican consulting company specializing in Transportation and roads	Advisor
Planeación y Desarrollo	Mexico-based NGO	Logistic Advisor
UrbanLaunchPad	A social venture dedicated to building open urban Information structures across the world	Collaborator
Ally	Technology firm involved in developing B2C and B2B solutions for transport companies. Provides digital products and mobility solutions	Advisor
Krieger Electronics	Software consulting firm involved in the product engineering, design, strategy, development and maintenance of the technology behind Mapatón	Leading Partner
British Embassy in Mexico	Embassy of the UK in Mexico	Finance Partner
Hewlett Foundation	Nonpartisan, private charitable foundation that Advances ideas and supports institutions to Promote a better world	Finance Partner

Compiled from various sources

### Exhibit 3: Interesting Facts about Mapatón

#### Route Length

Maximum 245 km

Minimum 0.5 km

Average 11 km

Route Length	% of the routes
1-5 km	16.1
6 – 10 km	40.6
11-15 km	22.9
16-20 km	10.8
21-25 km	3.7
>25 km	5.9

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#### Stops Per Route

Maximum – 87 stops

Minimum – 2 stops

Average – 15 stops

#### Travel Duration

Minimum Travel Time – 2 minutes 10 seconds

Maximum Travel time – 6 hours 17 minutes

Average Travel Time – 50 minutes

Duration in minutes	% of Trips
< 10	1.4
11 – 15	5.3
16-20	5.9
21-30	20.1
31-45	25.7
46-50	7.7
51-60	10.1
61-90	14.5
91-120	4.6
121-150	2.5
>150	2.2

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<b>Price per Trip</b>	
Maximum 800 Pesos	
Minimum 200 Pesos	
Average 43 Pesos	
<b>Cost per trip (in Pesos)</b>	<b>% of trips</b>
2-5	31.5
6-10	51.7
11-15	12.4
16-20	0.8
>20	3.6

Adapted from <http://datos.mapatoncd.mx/>

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