EXPLORING DIGITAL CO-MANAGEMENT OF FLOOD RISK REDUCTION IN MEXICO CITY, MEXICO: CONDITIONS AND POTENTIALS

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ABSTRACT
Mobile applications to manage disaster risks have been gaining more and more acceptance internationally. Mexico City has not been the exception and in the last five years its production and use by the government has increased. However, the main function of these applications has been merely informative and the role of inhabitants basically passive. This has been the case of communication and information technologies in the case of floods. Therefore, the objective of this work was to identify the potential and the conditions for the development and use of mobile applications to manage flood risk in Mexico City in a co-management context, as a result of a long-term research project. From two case studies, the most important functions in the voice of the population were identified from interviews and focus groups and later these functions were systematized and intended to be technified in a mobile application. The process allowed us to see the potential of digital co-management of flood risk supported by technology, and at the same time, to identify the different conditioning factors. On the one hand, among the most important potentials are the optimization of resources and the possible reduction of losses during floods. Similarly, it was observed that a co-production process with the population at risk increases the probability of acceptance of the technology. But on the other hand, various spatial, administrative, legislative and technical factors were identified that condition the use of this type of technology at the local level, such as the difficulties imposed by the territorial scale, and the administrative interlinks within the several dependencies responsible for both, risk management and for the production of mobile applications, for which recommendations are proposed.
Keywords: climate change, institutional map, disaster risk management.

1 INTRODUCTION

Information and communication technologies (ICTs) applied to disaster risk reduction have become a very important resource in recent years. An example is early warning systems, if these systems are centered on people, based on social technologies developed through a participatory process and based on the use of simple and low-cost early warning equipment and facilities [1]. In turn, to understand the issue of the population's participation in the operation of digital technologies, classifications have been made to distinguish the degree of participation of the inhabitants in the production of information. In the field of technologies applied to geography, for example, according to Haklay [2], at least five categories can be identified: crowdsourcing (where people may be unaware of this role as a provider of information); distributed intelligence (where only some inhabitants are trained to provide information); participatory science (where the inhabitants participate in the definition of the problem and in the data collection); and extreme citizen science (where inhabitants and scientists define the problem and methods for data collection).

However, when it comes to collaborative approaches that go beyond collaborative data collection and permanent management is required, as is the case with flood risk management, a rapid review of the "co-paradigm" is fundamental.

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The original concept called "co-production" has its origins in development debates in the mid-1990s but has recently gained attention again [3]. In its origins, the concept of co-production has been used to refer to actions that allow a community organization to intensify its existing relationships, develop new relationships, and legitimize its own role in a broader framework of actors, so that their needs and interests are best served [3]. Thus, the concept of co-production has recently reached the field of disaster risk reduction to understand the formulation of new concepts associated to resilience and climate change [4]–[6] or risk management of floods in a co-production context [7]. On the other hand, the concept of co-management has also been a base to understand the usefulness of allocation of tasks, exchange of resources, linking different types and levels of organization, the reduction of transaction costs, risk sharing, conflict resolution mechanisms and power sharing [8].

While the classification of co-produced technologies has been developed to a certain extent, what has been scarcely investigated are the respective conditions and limitations that these processes of technological co-production entail. Even more scarce are the works that analyze the process of government actors in said technological co-creation and co-management. A reason for that is maybe because the co-production concept has not been part of the literature in Mexico (an in Latin America, in general), in contrast to the European literature, where the development and discussions of the concept are not unknown. Consequently, collaborative approaches for the development of technology for disaster risk reduction and monitoring have been only promoted in the last years by international organizations and each local context and each type of risk face different circumstances and challenges to reach this goal.

In the case of Mexico, risk management as a field has been the main focus of legal and operative frameworks, where participative actions are mentioned and promoted. Therefore, the objective of this article is to show and discuss the process of technological co-creation to reduce flood risks in Mexico City with the aforementioned actors, and to explore the potential of a possible co-management of flood risk. based on said technology. To do this, first the overview of technologies applied to disasters in Mexico City will be shown and later the opinions and suggestions of government actors will be analyzed regarding said process of technological co-creation, which in turn is based on a process of co-production with the population vulnerable to hydrometeorological hazards.

2 THE CONTEXT OF THE PRODUCTION OF GOVERNMENT MOBILE APPLICATIONS IN MEXICO CITY AND THE RISKS OF DISASTER

The relationship between technology and population begins in Mexico with the introduction in this country of the Seismic Alert System (SAS), which began operations in 1991 in response to the great earthquake of 19 Sep. 1985, which according to official figures claimed the lives of 4,541 people and the estimated collapse of 412 buildings in Mexico City [9].

The Seismic Alert System is based (to date) on a system of sensors in the Pacific Ocean that, in case of detecting telluric movement, emit the signal to Mexico City and the warning is communicated through speakers throughout the city, giving approximately 50 seconds of opportunity to evacuate buildings before the seismic wave reaches the city.

Regarding the use of technology by civil society during a disaster, a historical pinpoint was the earthquake of 19 Sep. 2017 in Mexico City, curiously, an event that occurred exactly 32 years after the first earthquake. During this event, civil society used various technologies to communicate and organize in the emergency stage. Among these technologies were social networks, digital platforms, mobile applications and collaborative mapping to support search and rescue efforts [10] (see Table 1).

Table 1: Technological applications used by civil society during the earthquake of 19 Sep. 2017 in Mexico City [10].

Technological applications	Description
#revisamigrieta	Architects and civil engineers analyzed the severity of the cracks through the photos that users sent
Facebook	Activated the Safety Check, a tool with which users could report that they were well after the earthquake
WhatsApp	It was used to communicate and share the location of users, even under rubble
Google	Activated Safety Check and Crisis Map, a tool to map and visualize damaged and collapsed buildings in real time, as well as collection centers and shelters
Seismos México	CICM and SMIE, in collaboration with academic institutions and civil society, launched the Seismos México website, with collaborative maps of risk and damage, publications and news that reported on the situation
Verificado 19S	Digital platform to verify data on needs and collapses in the emergency stage

But it wouldn't be until January 2019 when the "Digital Agency for Public Innovation of Mexico City" was created by the Government of that city, when a systematic and centralized production of platforms starts: mobile applications and other digital technologies for the administration of the city of Mexico, including the field of risk reduction with the mission of "Design, coordinate, supervise and evaluate policies related to data management, open government, digital government, technological governance, connectivity governance, citizen attention, infrastructure management and government regulatory improvement of Mexico City" [11].

According to the website of this agency, between 2018 and 2021 a total of 121 projects have been carried out, from which 85% have been web platforms, 21% websites, 2% mobile applications and the remaining 13% has been a combination of technologies (platforms and applications) (see Table 2). Half of these technology-based projects have been created to support the digital administration of the city and serve as information media, while a significant 41% and 9% have been intended to serve as instruments for public consultation and citizen participation respectively (see Table 3). In detail, in terms of collaboration in the production of each technology, it is observed that the majority of these projects (88%) have a non-collaborative basis with the citizenry in their production, while collaborative projects with other actors (research centers and companies, for example), represent almost a third of all projects (26%) (see Table 4).

Table 2: Number of projects developed by the Digital Agency for Public Innovation of Mexico City (ADIP) according to the type of technology, 2018–2021. *(Source: Own elaboration based on the web site of ADIP.)*

Number of projects developed by ADIP according to the year and type of technology					
Year of creation	Number of platforms created	Number of mobile applications (apps) created	Number of web sites created	Number of mixed technologies created (plat+app)	Total
2018	4	0	1	0	5
2019	49	0	6	5	60
2020	32	2	11	7	52
2021	0	0	3	1	4
Total	85 (70%)	2 (2%)	21 (17%)	13 (11%)	121 (100%)

Table 3: Number of projects developed by the Digital Agency for Public Innovation of Mexico City (ADIP) according to the purpose of the technology, 2018–2021. *(Source: Own elaboration based on the web site of ADIP.)*

Number of projects developed by ADIP according to the year and purpose of technology					
Year of creation	Informative	Public consulting	Participation	Digital administration	Total
2018	2	1	1	1	5
2019	14	23	9	14	60
2020	13	24	1	14	52
2021	1	2	0	1	4
Total	30 (25%)	50 (41%)	11 (9%)	30 (25%)	121 (100%)

Table 4: Number of projects developed by the Digital Agency for Public Innovation of Mexico City (ADIP) according to year and type of collaboration, 2018–2021. *(Source: Own elaboration based on web site of ADIP.)*

Number of projects developed by ADIP according to year and type of collaboration						
Year of creation	With citizens			With other actors (i.e. research centers)		
	Collaborative	Non-collaborative	Total	Collaborative	Non-collaborative	Total
2018	2	3	5	3	2	5
2019	10	50	60	14	46	60
2020	2	50	52	12	40	52
2021	0	4	4	2	2	4
Total	14 (12%)	107 (88%)	121 (100%)	31 (26%)	90 (74%)	121 (100%)

On the other hand, some events have been factors of great influence regarding the subject of the projects produced by this agency. Among the projects produced between 2018 and 2021, almost a third have been produced to give support to the actions against COVID-19 (28%), that reached a peak crisis in 2020 in Mexico, while the projects focused on disaster risk management are relatively few (see Fig. 1). Of the 121 projects, only four projects associated to this topic were identified: two in 2018 and two in 2019 (see Table 5) (the latter are actually updates of the former). Although they represent a small number, these two projects have been very important in relation to the 2017 disaster, since one of these projects was the "Portal for Reconstruction", where the government officials responsible for the reconstruction of housing affected by said earthquake are shown, as well as reconstruction works advances, statistics and digital modules for assistance to victims [12].

The second project associated to risk reduction corresponds to the mobile application "Sentika" (which means "together" in the Nahuatl language). This mobile application promotes the direct and voluntary participation of the population by registering personal data on a digital platform (name, professional profile, telephone, among others), in order to have a database per neighborhood, of people who could according to their profile, support search and rescue tasks in an emergency phase due to any disaster within the radius of action of the corresponding neighborhood [13]. As of April 2022, this application shows a total of 2,830 registered volunteers [13]. This application also includes a digital needs manager in public spaces and shelters, and would show what would be required in the event of a disaster in each place, such as tools, water, food, stairs, doctors, architects and translators, among others. This application does not exist in isolation, but is part of an official action procedure called Seismic Emergency Protocol or PES [14].

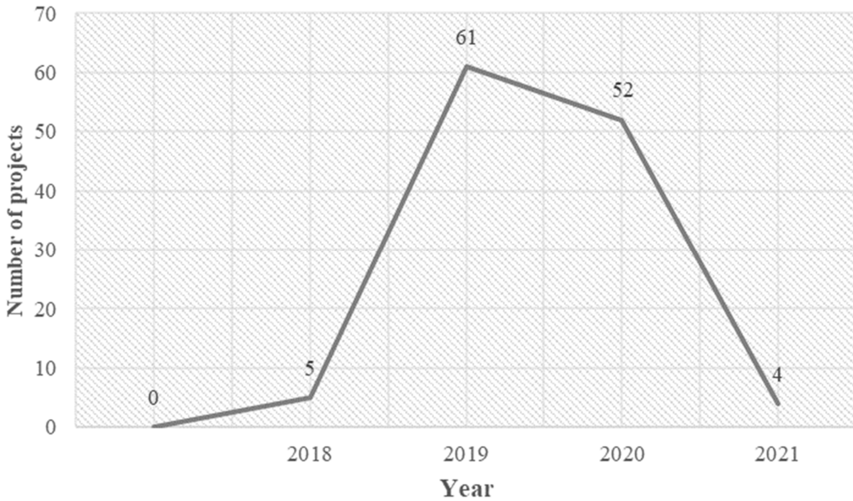

Figure 1: Number of projects developed by the Digital Agency for Public Innovation of Mexico City (ADIP) according to year and topic, 2018–2021. *(Source: Own elaboration based on web site of ADIP.)*

Table 5: Number of projects developed by the Digital Agency for Public Innovation of Mexico City (ADIP) according to year and topic, 2018–2021. *(Source: Own elaboration based on web site of ADIP.)*

Number of projects developed by ADIP according to year and topic				
Year	COVID-19	Risk disaster-related	Other	Total
2018	0	2	3	5
2019	1	2	57	60
2020	31	0	21	52
2021	2	0	2	4
Total	34 (28%)	4 (3%)	83 (69%)	121 (100%)

In the case of floods, there is a corresponding protocol called the "Interinstitutional Protocol for the Attention of Rains and Floods" (PILLI) [15], which describes the activities that government agencies have to do before, during and after floods, based on a five-color alert ranging from green to purple, depending on the probability of damage caused by the hydrometeorological hazard. Within the communication technologies that support this protocol there is a set of information platforms, government social networks to alert, and *SMS* messages sent to the population in case of probable heavy rains, although there is not an application similar to "Sentika", which could alert certain citizens with capacities and/or particular training to deal with floods, such as special brigades integrated by citizens trained by the government itself. The question is whether an application of this type, with the participation of the population and authorities, could be generated not for a high-impact and infrequent disaster, such as an earthquake, but for a middle-impact but regular disaster, as the case of floods. And it is this question that gave rise to the project that is described below, emphasizing in this article, the potential and limits to make real the functions expressed by the population in a potential digital co-management against floods.

3 METHODOLOGY

Both the availability for co-management and the technological needs of the population were documented from two case studies subject to flood risks in the eastern zone of Mexico City in the La Colmena and Ermita-Zaragoza neighborhoods. The main technique of joint work with the population was two face-to-face focus groups held in February 2020 (with around eight and seven participants each). These focus groups allowed the researchers to identify the specific impacts of hydro-meteorological risk in this area and document potential smart solutions to be implemented, e.g. monitoring rainfall system and water capture and reuse mechanisms at the household level, as well as online communication systems operating before, during and after the events take place. Two subsequent virtual focus groups were conducted in August 2020 with community members (around five participants each), and served to refine the design of the pilot projects to be undertaken in such case studies. Other two online focus groups were conducted in October 2021 (with around five participants each) because of the pandemic. With these focus groups it was also identified the need to undertake participatory appraisals to identify in detail the conditions of the neighborhood and the areas at higher risk within it.

Once the technological needs were documented with the population, they were ordered according to the moment of the flood and the level of participation required not only among residents but also between residents and authorities. When this progress was made, a series of interviews were conducted with municipal and state government officials to confirm the technical and administrative feasibility of each of the functions reported by the population. This way, a series of interviews were carried out with different authorities at various levels, involved in dealing with rains and floods in Mexico City, to find out their opinion and observations regarding said needed technological functions. These interviews were conducted between June 2021 and March 2022 and a total of 7 collective interviews were conducted with the participation of around 30 officials in total. Some of the questions were the following.

Would the authority be willing to:

- Incorporate the use of an app in the maintenance operations?
- Take responsibility for having a channel of communication between residents and competent authorities?
- Design a local joint collection and prevention campaign?
- Have a plan for collective action and mutual support between residents if the pumps fail?
- Have a plan for collective action and mutual support between residents if the regulatory vessel threatens to overflow?
- Promote a website and the app and be responsible for updates (on the website) and alerts through the app?
- Train residents and form mutual aid groups?
- Consult the interactive map when preparing institutional risk maps?

4 RESULTS

The needs reported by the population were analyzed to see their overlap or repetition, reaching a total of 20 functions (see Table 6). Almost half of the needs require direct communication between residents (column “b”) and between residents and authorities (column “c”). Only two needs refer to informative issues (column “a”). Within the most important needs before the flood are: the need of a weather forecast, the need of sharing emergency contacts, the establishment of agreements before the flood and information about measures and strategies on what can be done before the flood.

Table 6: Types of functions expressed by the inhabitants classified according to the moment of flood and degree of collaboration.

No.	Technological needs reported by the population at risk	*a*	*b*	*c*
	Before the flood			
1	Information about weather and probability of rain	O		
2	To share the contacts of authorities			O
3	To share Emergency Contacts			O
4	The capacity of sending reports from the side of the population			O
5	Communications between population and the corresponding offices			O
6	Interactive maps of flood risk		O	
7	Capacity to edit the technology the population themselves			
8	Communication between neighbors		O	
9	Registration of commitments to tackle risk			O
10	Recommendations for actions before a flood	O		
	During the flood			
11	A channel of communication to receive information from the authorities			O
12	To identify possible Administrators of the app to post messages		O	
13	To have a plan of activities that can be done at the time of the flood			O
14	To produce flooded street reports		O	
15	Sending power supply reports		O	
16	Identify saturated drains		O	
	After the flood			
17	Sending damage reports		O	
18	Request cleaning help			O
19	Request repair help			O
20	Historical memory of floods expressed by the population.		O	

Legend: (*a*) Informative functions; (*b*) Function that requires an interaction between residents; (*c*) Function that requires an interaction between residents and authorities.

For the stage during the flood, the population reported as a need the permanent communication between residents and authorities, knowledge on flooded streets, collapsed energy sources and saturated drainage sites as essential, and finally, it was highly relevant in the stage after of the flood, to keep track of the reports of damage to the houses and requesting support for cleaning them, due to the risk of illnesses due to the introduction of sewage into the house. In this last stage, the memory of the flood was also important to record the recurrence and location of floods in future events.

These experiences and needs were shared with the authorities. In this interaction, four aspects of special importance for the authorities were identified, whose conditions and potentials are described in the following and summarized in Table 7.

4.1 Aspects associated with the production, use and quality of information

A condition found was that all ICTs involved in disaster risk reduction must be produced and managed by the Digital Agency for Public Innovation of Mexico City. Therefore, an academic instance cannot simply produce a technology that involves government actions.

Table 7: Potentials and constraints for a digital co-management of flood risk reduction in Mexico City.

Topic of discussion	Conditions	Potentials
Aspects associated with the production, use and quality of information		
Production of technology	An academic institution cannot produce an application that involves government responsibilities.	Once the technology has been tested, a collaboration with the government could be reached for the production of the technology.
Delivery of information	The information currently produced by the government is of high quality and there are several communication channels, but it is not disseminated at the local level.	Co-produced technology could ensure that government information is disseminated.
Dialogue with the population	The population requests dialogue with authorities through technology.	The current regulatory framework seeks this interaction with the population.
Storage of information	The city government seeks to constitute a single digital repository on disaster events.	The co-produced technology could be linked to the institutional repository.
Aspects of comprehensive flood risk management		
Collaboration between authorities	According to existing protocols to act against floods, the participation of more than ten departments is required.	A technological application could centralize this need for inter-institutional contact.
Prevention and adaptation	Existing flood protocols focus more on reaction.	The co-produced technology can integrate prevention and adaptation actions.
Co-responsibility	In the existing protocols there is no room to establish agreements with the population.	The proposed technology could serve as a resource to establish mutual population–government agreements.
Territorial aspects		
Neighborhood scale	Organized social capital against floods could be different in each neighborhood and have an effect on the required functions.	The proposed technology could be individualized and developed as "cells" that jointly and synergistically could allow risk management.
Size of the city	The institutional complexity of a city of nearly 9 million inhabitants could limit a technology designed on a neighborhood scale.	The application should be tested in smaller cities to assess whether the efficiency is a function of the size of the city.
Life cycle of the app		
Sostenibility of the app in the long run	The periods of public administration can represent a limitation in the life of the technology.	The academic institution could act as technology manager at times of government transition.
Connectivity	A mobile application would depend entirely on an uninterrupted Wi-Fi service	Arrangements are being made to put *Cell Broadcast technology* into operation in Mexico, which does not depend on Wi-Fi for communicating alert messages.

Nevertheless, the management and functioning of the technology (i.e. a mobile app) is being promoted by an academic institution, which could look for a collaboration with the government for a formal production of the app, and use other existing collaborations for this purpose. On the other side, risk maps are produced by the authorities and published. With the application, risk maps could be made and confirmed with the population.

Regarding the delivery of information, currently the information on early warning is communicated through a meteorological early warning network. This way, the information currently produced by the government is of high quality and there are several communication channels that are nevertheless not known at the local level. Hence, a mobile application could facilitate the access and dissemination of such information.

With regard to dialogue with the population, there is a regulatory framework that is currently being generated by the local government that advocates participation and communication with the population. This framework is relatively young and factors such as the pandemic have stopped these actions. Nevertheless, a mobile app could be a communication platform between the population and the authorities since the population and the authorities communicate already each other though in an informal way. This is perhaps one of the most important functions, since it is worth mentioning that as a result of the focus groups, it was repeatedly documented that the population is willing to participate and use the application as long as the authorities also take part, which means not only technical aspects but also a political dimension of communication between authorities and residents.

As for the complexity and training of the app, the existing mobile applications are very simple and do not require training, besides they are mostly focused on reaction and in the moment after the disaster. If what is needed is to act in risk management and especially at the moment before the flood, people would need to be trained. An important question would be the quantity of personnel required to train the inhabitants, but an option proposed by the research team would be to train "trainers of trainers" between the residents.

Finally, the information produced through reports is now concentrated by the city government in a single digital deposit. That is to say, the city government concentrates reports from the entire city in a single digital repository, seeking to constitute a single database. In that sense, the application could be an intermediate repository of message and photos information and it could be linked to an official repository.

4.2 Aspects of comprehensive flood risk management

A basic condition for the operation of the application is the degree of collaboration between authorities. Collaborative work between several institutions is required to deal with floods for both, vertical and horizontal coordination. According to the current Protocol for Rains, the work of more than ten institutions is required from the State and Municipal level, an issue that such an application could facilitate. About the different moments of the disaster, this application could cover not only the moment of the flood emergency but also the moment before the flood. The population would be willing to organize themselves in activities to manage the risk before the flood and the application could support these prevention activities. Said integrality would require certain co-responsibility. The establishment of agreements between government and population is not considered in the current protocols, so that an application of this type could serve as a tool to facilitate this communication.

4.3 Territorial aspects

The application is designed to work on a neighborhood scale and this could mean a limitation in a territory like Mexico City, made up of 16 interconnected and functionally interdependent municipalities. Being an application that works by neighborhoods would mean a greater challenge in data management and each neighborhood would have to be part of a digital menu after accessing the corresponding municipality. To this regard, most technological applications created by the city government are used at a city level. Although in the field of disaster relief, as shown by the "Sentika" application described above, it is important to manage an emergency on a neighborhood scale and the same local territorial action is necessary in the case of flood risk management. That could be in the form of "cells", since each neighborhood is different both in its history, social and economic composition, and in its organization facing common problems. This territorial characteristic could mean that the application could be used to support community flood risk management at the neighborhood level and being differentiated between neighborhoods. Another suggestion proposed was to test the application in a smaller city as the institutional complexity could be reduced.

4.4 Aspects associated to a technological application (app) life cycle

The long-term sustainability of an application was a matter of concern for the authorities, since any mobile application requires constant updating, not only of the functions but also of the versions of its operating systems on a regular basis. At the state municipal level, the change of government is every six years, while at the municipal level it occurs every three years. This represents a concern, not only because of administrative changes, but also because of the possible disappearance of departments in charge of this type of information. A possible solution is that at the end of an administration, a university could manage the application and monitor it as part of an academic program, for example within the activities of a Risk Analysis Laboratory supported by Technology.

Finally, signal connectivity was also a factor that was mentioned as important in ensuring communication. This is perhaps one of the biggest limitations, since a mobile application would depend entirely on an uninterrupted WIFI service. However, in recent weeks it has been announced by the Mexican Seismic Alert System (SASMEX), that the corresponding arrangements are being made so that the seismic alert no longer depends on the Wi-Fi signal for its transmission and instead can use cell broadcast technology, used by conventional cellular telephony [16]. This opens the possibilities to seek greater autonomy for this type of technology in the near future, including the technology that is being developed in this project.

5 DISCUSSION

In Mexico City there is a regulatory framework that supports both the creation of technology against disasters, as well as the participation of the population in its performance through citizen committees organized against risks. Consequently, at a general level, it is observed that there is a significant number of volunteers willing to participate and support risk management actions (something that is evidenced by the existing app Sentika). However, it would be necessary to promote and make these laws and regulations familiar to the population. In this regard an efficient flood risk management requires the active and co-responsible participation of the population and government, and eventually of a third party that facilitates communication between these first two actors. This third stakeholder could be eventually the academia or a non-governmental institution. On the other hand, the relationships that a neighborhood maintains among the residents and between the residents and the authorities or with other groups, or what could be called social capital, is highly variable from one neighborhood to another. This requires a constant updating and a differentiated and a very fine adjustment level in the territory for its performance. Hence, it would be necessary to make modifications in the law to regulates the use of personal data.

On the side of maintenance, technological appropriation by the population in turn requires constant updating, which would have several limitations that were commented on in the point of long-term sustainability of the application. This would require, in the short term, the modification of the administrative manuals of this type of applications to consider the changing and dynamic needs of a population and create the corresponding updating channels based on the voice of the population, since these channels currently exist only to accommodate the updating needs of the government departments themselves, but do not have the spaces to receive citizen suggestions regarding technological updates. Another limit could be the periodicity or rains itself as in Mexico City the rainy season and the flood season, is regularly from May to September. Therefore, a strong limitation regarding the interest and use of a mobile application in the face of floods could be the season when there are no rains. Therefore, a permanent campaign or program would be required throughout the year to keep prevention actions active and promote a permanent culture of disaster prevention.

Finally, like any public instrument, it would be necessary to see the impact that this application has and design the corresponding instruments to monitor and measure this impact, as well as to make the information transparent and reliable both from the part of the authorities and from the part of the residents.

6 CONCLUSIONS

Co-production only represents the beginning or the prime generation of a technology, but a technology in the case of flood risk management requires a collaborative and permanent work. This process is required to be not just a bottom-up process, but a top-down process at the same time, otherwise there is a risk of not meeting the needs of one or another group of stakeholders. On the other hand, throughout this analysis it was seen that technology is important to manage risk, but technology it is not everything. More important is trust and collaboration between residents and authorities, that will make possible not only the co-creation of technology but also the co-management supported by that technology. In this sense, the agencies responsible for technological production and management must pay attention not only to production itself but also to its consistency at the policy level, with a smart city not only focused on the use of technology, but also based on the inclusion of its inhabitants therein. Therefore, if it is possible to create a technology that not only serves the interests of the population and government but also supports a better quality of life by facilitating inclusion and solving daily needs, perhaps technology can play a more socially and cultural accepted role in the coming times.

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