Building Resilience through Commercial Relations
The Formalization of Carwash Sites in Medellín

Marcela López

The term resilience has been adopted by different international organizations as a way to guide the future development of cities. The Rockefeller Foundation, for example, has become one of the major promoters of resilience as a concept. Through its 100 Resilient Cities (100RC) Program, the foundation has built a network of cities to exchange experiences, assessment tools and norms to deal with the challenges posed by urbanization, globalization and climate change (Leitner et al. 2018). Medellín, the second largest city in Colombia with a population of 2.5 million people, was one of the Latin American cities invited in 2013 to be part of the 100RC network. The city was selected as a model city of urban resilience for its urban innovation projects to address social inequalities and violence. These projects, largely driven by local elites, introduced conventional infrastructures such as an aerial cable-car lines and an electric escalator in order to improve accessibility and mobility in the most violent and marginalized areas. Additionally, the city invited renowned international and national architects to transform water storage facilities located in economically and spatially marginal areas into public parks. By transforming hydraulic infrastructures that have been historically managed and controlled by the water utility company into public spaces for the enjoyment of the most vulnerable population, these aesthetic and technical works have become main attractions for tourists as well as exemplary models for many cities around the world.

Although infrastructure projects were highlighted as good models of urban resilience, the 100 Resilient Cities Program also cited Medellín residents and their capacity to overcome periods of severe urban violence and high rates of homicides, and to respond and adapt to devastating natural disasters. Resilience in the face of natural disasters is particularly important in the city, where approximately 30.000 houses are located in areas characterized as 'high-risk zones' that are extremely vulnerable to floods and landslides (López 2016; Medellín Como Vamos 2018). According to the Mayor of Medellín (2012-2015) a 'resilient society' has been a key to the transformation of Medellín, from a city known for widespread violence into a global model for resilience and innovative urban planning and design. Simi-

larly, the Chief Resilience Officer for Medellín claimed that the city was selected to be part of the 100RC Network because of the capacity of its citizens to overcome common problems and learn from past tragedies to envision a positive future (Rockefeller Foundation/Alcaldía de Medellín 2016).

These acts of individual and collective heroism portray residents of Medellín as subjects who are able to creatively deal with adversity and cope with environmental threats. By locating social inequalities and violence in the past, though, resilience discourse has also served to obscure the existing political and economic circumstances that are responsible for high rates of criminality. In effect, such discourses have served to maintain the status of Medellín as the most unequal city in Colombia. According to a study conducted by the Antioquia University, Medellín is ranked as the most dangerous city in Colombia, with rates of homicide skyrocketing since 2016, despite substantial economic investments in security (Núñez González/Quintero Herrera 2019). The high levels of criminality and persistent social inequalities have raised critical questions about the impact of Medellín's innovation model and its 'resilient' infrastructures (Brand 2012; González Escobar 2016; Franz 2017; Anguelovski et al. 2018; Garcia-Ferrari et al. 2018).

Indeed, the kinds of questions about urban resilience in Medellín echo critiques of resilience more generally. Critics argue that resilience discourse and practice ignore power relations and injustices (Fainstein 2014; Allen et al. 2017), sociospatial inequalities (Leitner et al. 2018), the political economy of urbanization (Béné et al. 2017) as well as the role of the state (Amin 2013). Meerow, Newell and others stress the importance of asking: resilience for whom, where and why (Watts 2015; Meerow/Newell 2016). To date, much of the discussion concerning resilience tends to represent local communities as key agents responsible for overcoming adversity by building innovative and resilient solutions (Solnit 2009; Kuecker/Hall 2011). The urban poor are often portrayed as resilient subjects who are able to adapt and survive in the absence of state intervention. In this discourse, the urban poor are celebrated for their capacity to withstand natural disasters, cope with economic risks, and endure long periods of violence. This perspective emphasizes the importance of self-organization, flexibility and individual responsibility as corner-stones of urban resilience.

The intention of this chapter is not to dismiss or ignore the existing critical literature on resilience, but rather to explore the diverse ways in which the term is being interpreted and applied beyond mainstream definitions provided by international organizations such as the Rockefeller Foundation. Therefore, this chapter focuses on how resilience is mobilized on the ground to facilitate a particular kind of intervention: the formalization of carwash sites. But, in what way does formalization create resilience? This chapter shows that the political and legal recognition of a precarious economic activity by means of formalization creates opportunities to help the most vulnerable to deal with an uncertain future. By providing a close

reading of the efforts of water utilities to mobilize resources, build new alliances, provide functioning infrastructures and mediate conflicts, this chapter attempts to better understand how informal carwashes can be consolidated as resilient spaces.

In 2010, Medellín's public utility company, *Empresas Públicas de Medellín* (EPM) launched a Carwash Program to reduce commercial losses and recover revenues. As informal carwashes are highly dependent on the water that flows through the already-existing centralized network, they became a primary target for EPM not only because they disturb the management and operation of the hydraulic system (for example, inadequate pressure, intermittent supply, pipe breakdowns), but also contribute to excessive water waste without paying for it. The utility company estimated that in 2018 there were 310 informal carwash sites, which register water losses of approximately 34.400 m^3 per month.

While much attention has been given to how water is extended, distributed and contested in informal settlements (Graham/Dessai/McFarlane 2013; Meehan 2013; Ranganathan 2014; Anand 2017), little is known about how water is secured and negotiated in informal carwash sites. In particular, the ways that utility companies adjust and adapt their structures to engage with informal carwashes and their associated technologies, practices and dynamics remains relatively unexplored. This chapter contributes to addressing this gap by drawing attention to the manner in which utility companies attempt at formalizing carwash sites by incorporating them into the existing centralized water network. I argue that what makes carwash workers resilient is not just their day-to-day survival strategies, but their capacity to make political claims on the state, which is granted by their formal recognition as consumers.

Carwashes are commonly represented as sites that consume high amounts of water (Al-Odwani/Ahmed/Bou-hamad 2007; Zaneti/Etchepare/Rubio 2012), as places of labor exploitation (Clark and Colling 2016, 2017) or as sites of conflict over public space (Carcedo 2017). However, the way in which different spatial practices, modes of using and valuing water, alternative infrastructures and possibilities for collaboration emerge in these underprivileged sites has received less scholarly attention. The aim of this chapter is to show how carwashes offer a critical opportunity to explore how they "reclaim the urban space, develop their own specific form of urbanism and infuse the city with their own praxis, values, moralities and temporal dynamics" (De Boeck 2011: 267) as well as provide possibilities to generate alternative forms of water supply provision that are more equitable, safe and affordable. Given that commercial water consumption is mediated by different power relations, market structures, ethical concerns and socio-material practices in relation to domestic water consumption, scrutinizing carwashes may shed new light on urban water studies.

By drawing upon science and technology studies (STS) and debates on urban informality, this chapter examines how resilience is being facilitated through a col-

laborative process between human and non-human actors to support the formalization of carwash sites. From this perspective, I view the resilience of carwashes as a practice mediated by complex and dynamic assemblages of human actors including the staff of the utility company, municipal authorities and carwash workers; and non-human entities such as water, meters, bills and laws. By incorporating non-humans, not as background but as active entities (Winner 1980; Bennett2005; Braun/Whatmore 2010;Meehan 2013; Anand/Gupta/Appel 2018) into the study of resilience, this chapter draws attention to two key points. First, to the ways in which complex interactions between notions of water scarcity and socio-technical systems that combine physical, commercial and juridical interventions come together to facilitate the formalization of carwash sites. Second, to the political capacity of ordinary objects to challenge conventional distinctions between legal/illegal, formal/informal and authorized/unauthorized (Roy 2011; McFarlane 2012; Cheng 2014; Acuto et al. 2019; Banks et al. 2020).

This study draws on fieldwork conducted in 2014, 2017 and 2018. The data used in this chapter emerges from visits to 30 carwash sites located in different neighborhoods in Medellín. In-depth interviews were conducted with both workers and owners of carwash sites as well as staff of the utility company, police officers, municipal employees and members of local NGOs. This information was complemented with participation in events organized by the Car Wash Roundtable as well as official documentation produced by EPM, municipal meetings' minutes, and review of local newspaper articles.

(S)car-City?

Many international institutions and governments around the world tend to assume that techno-managerial solutions are necessary to prevent a potential water crisis. Recent work in Cape Town (Scheba/Millington 2018), for example, demonstrates that city authorities responded to actual water scarcity by proposing the implementation of technologies based on desalination projects and water-saving devices. As Scheba and Millington argue, however, these technocratic solutions, which include incremental water tariff increases, could aggravate existing economic inequalities and produce new forms of water scarcity. Other scholars have shown how the construction of large-scale hydraulic infrastructures (for example, dam projects) and the increase in water prices amidst periods of extreme water shortages have become a major source of political struggles (Kaika 2003; Giglioli/Swyngedouw 2008).

Another strategy commonly used to address water crises is the control and elimination of informal connections to the city's centralized water system. In mainstream discourses, there is the tendency to perceive informal water practices as something criminal, chaotic, wasteful and inefficient, and therefore, punitive acts

are justified to prevent a potential water crisis and to avoid the collapse of the water infrastructure. In their study of the water wars in Mumbai, Graham/Dessai/McFarlane (2013) examined how police officers strategically mobilize water scarcity debates for the purpose of persecuting inhabitants of informal settlements and penalizing illegal water connections. In Mumbai, as in other cities around the world, water scarcity has become a common discursive tool to penalize and marginalize informal settlements and their associated water practices.

In Medellín, the proliferation of informal connections has also become increasingly associated with future water shortages. In 2013, for example, a campaign was launched by EPM in local newspapers, radio and television not only to portray water scarcity as an imminent threat, but also to criminalize informal water practices. At the center of the campaign was an image of a dried-up reservoir that is losing around 18 million m^3 of water every year as a consequence of illegal water connections. Ironically, the image of an empty reservoir stands in sharp contrast to the 300 million m^3 of water that the city draws from three distant reservoirs to supply its estimated 1 million consumers with a 24 hours service through a centralized network (EPM 2019). In absolute terms, this total volume is easily enough to guarantee water supply services to all urban residents. However, the prospective of catastrophic water shortages has been socially manufactured by the utility company to criminalize informal connections. As a response to a perceived environmental catastrophe, EPM is granted the power under Colombian Criminal Code (Article 256) to send people that connect illegally to the formal water network to prison for up to six years.

Yet if portraying a catastrophic scenario has served to penalize informal connections, it has also enabled EPM to tolerate and legitimize certain informal water practices. Since 2010, for example, the utility company has used the prospect of a future water crisis to justify the implementation of a program to reduce water losses in informal carwash sites. Informal carwash sites obtain water by connecting informally to the city's network or by manipulating the valves that regulate pressure. However, attempts at controlling and eliminating informal connections in carwashes have become an increasingly difficult and time-consuming task. Efforts to intervene and repair these complex socio-technical configurations are constantly subverted as devices installed by EPM to reduce or obstruct the flows of water are easily altered or modified. In this case, the inability to fully control the flows of water creates an opportunity for the utility company to reform water supply provision by legitimizing carwash sites, while at the same time intervening in their informal logics and practices (see also Furlong/Carré/Guerrero 2017). This kind of flexibility is only possible because EPM is able to effectively claim that working with the informal carwash sector is the best way both to protect an allegedly scarce natural resource, and partially recapture revenue lost through informal connections.

Informal Carwash Sites, a Waste of Water

The growing number of vehicles in many cities around the world has created a continually increasing demand for carwash facilities, but many cities are unable to provide adequate urban infrastructure to fill the increased demand. The explosion of informal carwash activities in Medellín and other fast-growing cities is filling this high demand in the market. Carwash activities constitute an important part of the informal urban economy, which contributes to 44 per cent of Medellín's economy (DANE 2019). According to EPM, as many as 70 per cent of automobiles in the city are washed in unauthorized facilities. The proliferation of unauthorized carwashes has been facilitated not only by the abundance of water in the city, and the integrated water network (Graham/Marvin 2001), but also by the high standards of cleanliness and hygiene around the car culture. Here, the convergence between water, technology and cultural habits helps to explain the proliferation of carwash sites around the city, particularly in poor and disadvantaged neighborhoods. Additionally, because informal carwashes are able to obtain water free of charge, they can provide low-costs relative to their formalized competitors – something which has contributed to constant demand for their services.

In the last couple of years, informal car washing activities have become highly controversial not only because of the unsanctioned use of public space, noise pollution and discharge of dangerous substances, but also for the constant waste of potable water. The main local newspapers commonly argue that informal carwash sites expose large parts of the population to water insecurity because of their wasteful use of a scarce natural resource (El Colombiano 2016). Historically, the informal work of car washing has been socially stigmatized due to its association with poverty, drugs and aesthetic impropriety. In some cases, this informal activity has been criminalized, as is the case with the Colombian Criminal Code, article 256 mentioned above. Carwash workers, commonly referred to as *alistadores*, are usually young men who, for a variety of reasons, are marginalized in the formal market sector. For many of these young men, work in carwash sites is seen not only as an economic survival strategy, but also as a way to stay away from criminal activities. It is estimated that some 10.000 people in Medellín derive their income from the volatile economy of washing cars.

In recent months, this economy has become an alternative source of employment for refugees from Venezuela (Álvarez Correa 2019). As is true in other sectors of the informal economy across the world, though, the unsanctioned, unregulated nature of such activity makes them subject to constant conflicts with public authorities. The police commonly enforce legal actions to confiscate car washing equipment, to close down carwash facilities or to issue fines to car owners. Such measures are justified on the grounds that informal carwashes violate a number

of city ordinances, threaten public interests, and disturb the social order and the aesthetics of the city.

The utility company has also increasingly targeted informal water connections in an effort to reduce the levels of unaccounted-for-water, which amounts to 30.51 per cent of the water supplied (EPM 2019). For EPM, informal connections are hard to ignore as they are seen as a major threat not only to the water availability per se, but also to the company's revenues. Despite techno-managerial efforts to secure the efficient functioning of the hydraulic system, though, the company is constantly being challenged by the 'unruly' nature of water. Water is a fluid and mobile resource that is difficult to control and regulate. As water is distributed in the city through kilometers of pipes, it leaks and disappears (Anand 2015). Water also means different things to different actors. While for carwash workers water is part of a larger economic survival strategy and a way to secure a viable place in the city, for EPM it is a scarce commodity in need of protection, and consumers have the moral responsibility to pay for it.

Because informal connections are difficult to regulate, discourses of water scarcity provide an opportunity to extend and reinforce control over water consumption in carwash sites and to mobilize state support. The discursive construction of water scarcity has been supported by the figure that nearly 34.400 m^3 of water is lost every month by informal carwash activities. The need to control this water loss plays an important role in calling for formalization. Rather than blame carwashes for future crises, the notion of water scarcity provides new possibilities for (re)organizing carwashes and (re)imaging carwash workers as consumers who are able to pay bills on time and to adapt to a water saving culture.

Building Resilience Through Commercial Relations

Engineers of EPM tend to promote techno-managerial approaches as the main strategy to control informal connections and to secure the proper functioning of the water infrastructure system. Implementing sanctions, inserting valves to restrict the flows of water, removing improvised pipes and confiscating equipment are common mechanisms to eliminate, punish, ban and blame carwashes for the illegal and unsustainable use of water. However, neither technical nor managerial solutions have been able to fully control water losses and recover revenues. Acknowledging that informal connections are deeply embedded in complex socio-economic and material conditions, the Commercial Department of EPM introduced the Carwash Program in 2010 to facilitate the establishment of a culture of legality and the habit of saving water. What has been interesting is that the logics of economic efficiency of EPM have pressed the company to create alternative arran-

gements to cooperate with carwashes in order to prevent commercial losses. There are 250 carwash sites that are currently part of the program aimed at formalization.

Informal carwash facilities have been operating in public space for more than 20 years and are frequently either family businesses or cooperatives ranging in size between 2 and 20 members. Services are provided to a wide variety of vehicles, including buses, taxis, private cars and motorbikes, with hand washing being the most common method (figure 1). Informal carwashes offer a range of different services, including exterior washing, waxing and interior cleaning. Workers are regularly exposed to hazardous chemicals and dangerously uncomfortable working conditions, and in most cases, they lack basic technical equipment or protective uniforms.

Figure 1: Carwash site specialized in washing buses (Marcela López 2017).

The formal integration into the centralized water network has had the effect of legitimizing informal carwashes, and this has a number of attendant advantages, including the improvement of their working conditions, stability in terms of income, providing educational training, adequate working spaces, health insurance, uniforms, basic equipment as well as all required licenses. This is why carwash workers see their official recognition as consumers as a key strategy to guarantee

their permanence in the long-term. While conducting fieldwork, workers reported that the main reason for joining the Carwash Program is to facilitate their formalization. Here, the formal recognition by EPM that the carwashes – and by extension, their workers – are a legal, tariff-paying consumer becomes a powerful tool to demand better access to different goods and services. Formalization as a consumer has an immediate effect on the social and economic resilience of carwash workers. The following section explores how resilience in carwash sites is increasingly exercised through a socio-technical system made of complex physical, commercial and juridical interventions facilitated by the utility company.

Physical Infrastructures

Informal carwash sites are typically places that lack the most basic infrastructure in terms of water, sewage, electricity and solid waste collection. To facilitate the formalization process, the utility company has physically intervened in carwash sites with a wide range of simple technologies and minimal investments. One of the main technical devices installed by EPM is a water meter. In carwash sites, a meter basically operates as a device that assigns economic value to water by measuring consumption in cubic meters. However, meters not only operate as mundane objects that control and measure the quantity of water being consumed, but also have political capacities that shift according to specific geographical and socio-political contexts. In some places, meters can become objects of political struggle while in others they are perceived as tools of possible collaboration. For example, Antina von Schnitzler (2016) shows how prepaid meters in South Africa became objects of massive resistance during the apartheid struggle because of their association with racial differentiation and discrimination. In a similar vein, Rohracher and Köhler (2019) discuss how the installation of new metering devices for hot water in a Swedish city became a political terrain in which issues such as high costs, uneven distribution and segregation were contested.

Meter also have the potential to create new opportunities for cooperation and recognition, while reflecting aspirations of modernity, progress, development and proper behavior (Harvey/Knox 2012; Larkin 2013; Anand/Gupta/Appel 2017). In Maputo, Mozambique, Baptista (2016) has drawn attention to the growing demand for prepaid systems as a way to secure access to electricity in a city that never achieved universal service provision. She shows how prepaid meters became surprisingly popular because customers could save money, avoid debts, control electricity consumption and reduce bureaucratic procedures associated with inaccurate bills. In Medellín, water meters have been deployed in carwash sites to produce particular environmental, ethical and commercial effects. A meter, for instance, has facilitated the active engagement of carwashes in resource management (for example, avoi-

ding water-waste); preventing disruptions (for example, performing regular repair and maintenance); and social responsibility (for example, paying bills on time).

For the utility company, therefore, water meters have been instrumental in encouraging carwashes to use less water, while also controlling leakages and damages in the infrastructure network. Thanks to these material devices, EPM delegates additional tasks to carwashes, including basic repair and maintenance functions that facilitate the functioning of the centralized water network (Graham 2010; Schwenkel 2015; Baptista 2019). Itineraries that were traditionally part of EPM's responsibility – e.g., leak detection, maintenance of equipment, checking faulty meters and cleaning of oil and grease traps – are now integrated in the daily routines of carwash workers in order to prevent water supply interruptions, high bills and environmental problems. Rather than reducing carwashes to passive consumers, meter technologies recognize them as ethical and political subjects involved in practices of repair and maintenance.

Figure 2: Technical interventions in carwash sites implemented by EPM: Installment of water meters, construction of drainage systems and provision of hoses. (Marcela López 2017).

Water meters are only part of a more comprehensive set of socio-technical interventions deployed by EPM and municipal authorities to manage and reorder carwashes. The utility company has also installed, free of charge, basic hydraulic infrastructure such as drainage systems, sewage connections as well as oil and grease traps to avoid the direct discharge of wastewater and hazardous chemicals into the storm drain system. These small-scale technical interventions introduced new norms for urban aesthetics in which carwashes become active in controlling wastewater disposal in order to prevent problems of pollution, smells and disorder. Additionally, the company has equipped facilities with water saving devices (for example, pressure washers and hosepipes) to avoid the constant waste of water (figure 2). According to EPM, the introduction of new equipment has contributed to a steady decrease of water consumption from 400-500 m3 per month to 80-100 m3 per month.

EPM has also pushed for interventions by the municipality, focusing on investing in and upgrading streets and public spaces around carwash facilities by greening parks, setting up benches and tables, and installing containers for the disposal of rubbish and chemical waste. Additionally, the utility company has supported the work of carwash workers who, together with local artists, have painted murals portraying their work on the facades of houses and local business (figure 3). All these small-scale interventions aim at creating a new social order and urban 'aesthetic' in carwash sites by transforming them into places that comply with minimum planning standards to avoid potential conflicts with public authorities, residents and consumers.

The utility company has also brought the work of carwashes into the city discourse by sponsoring exhibitions at the Antioquia Museum, one of the most important cultural institutions in Medellín. Exhibitions displaying the everyday labor of carwash workers and the importance of this activity for the economic development of the city has served to bring political recognition and mobilize state support. Additionally, these cultural events became important not only to create awareness among a general public, but also to educate the staff of EPM and the municipality about the daily practices and collective expectations of this informal economy. The shaping of public discourse around carwashes has given more power to the EPM Commercial Department to justify lower water tariffs, greater investments in technical infrastructures. It has also facilitated negotiations with municipal authorities and other EPM departments.

The Water Bill

As part of the formalization process, EPM issues carwashes a monthly bill. Rather than resisting the payment for water, carwash workers agreed to pay because a

Figure 3: Artistic interventions in houses and local business to visibilize the work of carwash workers. (Deúniti 2018)

bill enables them to actively negotiate their citizenship and to demand basic rights from the state. More specifically, a water bill acts as an object that allows workers to negotiate and strengthen their political claims to certain rights: the right to work, to legally occupy public space and to build new relations with the water company and other municipal authorities. The proof of payment of a water bill confers on workers legitimacy and improves their ability to consolidate carwashes as legitimate spaces of economic activity.

To facilitate the payment of monthly bills and prevent a "culture of non-payment", EPM has established a financial incentive in the form of a "transitional tariff". Over the course of six months, EPM charges only 30 per cent of the total consumption costs, and afterwards carwashes experience incremental increases of 2.5 per cent per month until reaching the full cost of a regular commercial tariff. Paying a bill not only grants carwash sites with certain rights (for example, safe and reliable water service, technical support, receiving a bill every month), but also assigns responsibilities and obligations (for example, sustainable use of water, avoidance of informal connections, leak detection and timely payment). Despite EPM's efforts to integrate carwashes as consumers, the material properties of water continue to pose significant challenges to the formalization process. One of the major issues of disagreements between EPM departments is the introduction of

a lower water tariff for carwash sites. As water and solid waste collection services are included in the same bill, negotiations to set up a lower tariff has put pressure on both water and solid waste collection departments to reach an agreement. In a meeting I had with different public authorities involved in the formalization of carwash sites, ENVARIAS (a company acquired by EPM in 2014) refused to implement a social tariff because carwash activities produce hazardous materials that need to be transported and disposed in designated sites thereby incurring higher costs. The staff of the water department reminded ENVARIAS personnel that their company was now part of EPM, and that their operating assumptions needed to be synchronized with the larger corporate social responsibility strategy of the company. This meant supporting the carwash program by offering a lower tariff for solid waste collection.

The project leader of the Carwash Program initiative at EPM insisted on the need to adjust the formula that calculates the prices to guarantee access to affordable tariffs and avoid the accumulation of debts. He claimed: "*Compañeros*, the formalization of carwashes is a social program and we should not forget to adapt our structures to provide affordable water and solid waste tariffs as part of our corporate social responsibility program." In Medellín, affordability concerns are particularly important: as the city reported in 2014, 36.560 households disconnected from water services for non-payment of bills (López 2016). Because of precarious and volatile economic conditions, carwashes constitute a group that is particularly likely to be disconnected for non-payment, which may pose significant challenges to the sustainability of formalization as a resilience practice over time. The issue of disconnection for non-payment could explain the reasons why some carwashes remain reluctant to be formalized, with incremental tariff increases rendering their activities economically unviable.

With the introduction of a water bill, EPM aims at providing opportunities to consolidate carwashes as sites of economic, ethical and environmental value. Receiving a monthly bill has been an important incentive not only to actively monitor and reduce water consumption, but also to make carwashes a commercially efficient activity. A bill, which carwash owners calculate as part of their monthly operating costs, helps the utility company to determine whether or not a particular carwash site can become economically and environmentally sustainable. In one of my visits in February 2017 to the Carwash Trinidad, one of the first carwashes impacted by the EPM initiative, the manager explained the broad motivation to participate in the program in the following way:

> Being part of the carwash program has helped us to be more organized, to save water and to better manage our finances. Now, we are able to offer our workers better working conditions by providing them with appropriate uniforms and health insurances. Also, the program has helped us to professionalize, as we are able to

deliver better quality services, build reputation and save money to invest in car care products and maintenance of shared spaces.

A water bill has also empowered carwash workers to initiate negotiations with different municipal authorities. For example, a police officer mentioned that carwash sites are using the EPM bill to avoid any kind of confrontation and punishment. He also complained that it had become more difficult to penalize these sites because workers often mobilize the bill as a way to prove that their activities are legally authorized. In this way, the water bill becomes a quasi-legal instrument that workers use to avoid having their equipment decommissioned and activities penalized with fines. A water bill has been used to disrupt the clear boundaries between informal and formal as it proves that carwashes have authorized access to water, even though they do not have a license to appropriate public space.

As McFarlane (2012) argues, the relations between informal and formal are never fixed, but instead are constantly negotiated and changeable over time. For carwashes, crossing formal-informal boundaries provides diverse opportunities to (re)negotiate their rights, and for this reason, confronts police officers with a dilemma: on the one hand, they have a duty to respond to citizen complaints about disturbances generated by carwash activities in residential areas. On the other, they cannot intervene in these sites because they are formally serviced by a public institution. When police officers organize inspections at carwashes, workers immediately get in contact with the staff of EPM, who feels obliged to mediate conflicts in order to protect the formalization process. By paying a water bill, carwash sites increase their ability to frustrate police actions and actively mobilize the utility company to validate their claims of citizenship. An examination of the way in which a water bill challenges the artificial division between formal and informal can provide new perspectives to think about informality.

The Law

Besides the investments in technical infrastructures and the implementation of commercial mechanisms, legal instruments have also become strategic tools to guarantee the resilience of carwash sites. Since 2010, the utility company has mediated and facilitated the establishment of a Car Wash Roundtable (*Mesa Interinstitucional de Lavadores de Autos*) to represent the interests of carwashes and to discuss concrete solutions to the problem of informal car washing. This roundtable operates as a platform that brings together different municipal authorities, including representatives from the offices of public space, mobility, police, human rights, security, environment, economic development, and urban planning. This alliance, whose members meet on a regular basis, provides opportunities to form

new solidarities, articulate programs, assign responsibilities and manage common budgets. Challenges can arise, though, when it comes to synchronizing the many objectives of the representative agencies.

In November 2018, for example, I participated in a series of meetings organized by the roundtable to identify potential conflicts arising from the construction of a bike lane adjacent to the airport and parallel to a street where multiple carwashes have been consolidated. The EDU (Urban Development Cooperation), the Department of Public Space and ENVARIAS (which is responsible for solid waste collection) came together to discuss possible ways to address multiple challenges - reducing traffic congestion, improving access to public space, and increasing the supply of rubbish containers - without adversely impacting the daily operations of the carwash sites.

EPM has also been working together with the Municipality of Medellín and carwash workers to adapt existing legal mechanisms to support the formalization process by changing water policies, redefining the use of public space and improving labor conditions. One of the main outcomes of this coalition was the issuing of the Municipal Accord 85/2013, which is currently actively debated in the City Council. This accord is the result of three-years of collective bargaining agreement, in which carwash workers agreed to comply with the following set of rules to facilitate their own legal status:

- Forbid the parking of cars that are not using carwash services.
- Restrict the hours of operation: From 6:00 am to 6:00 pm
- Avoid traffic congestions
- Forbid the parking of commercial trucks
- Use adequate carwash equipment
- Avoid obstructing pedestrian zones
- Keep equipment in good condition (for example, control of leakages)
- Maintain correct behavior (for example, use of adequate vocabulary)
- Forbid the sale and consumption of drugs and alcohol
- Forbid child labor
- Avoid high levels of noise
- Carry personal identification

By failing to comply with any or all of these guidelines, municipal authorities are granted with the right to intervene at carwash facilities and issue fines. The creation of this accord demonstrates the willingness of carwash workers to adopt certain rules and regulations that would substantially restructure their social and economic behaviors. In exchange for these commitments, though, carwash workers will be officially recognized as consumers, which will enable them to claim the right to work, and to legitimize their position in further negotiations with public authori-

ties. As such, the municipal accord becomes the first legal attempt to organize the carwash sector, to address their needs and to protect their interests. The ultimate goal is to transform this legal mechanism into a public policy that can be integrated in future Municipal Development Plans, so that the assignation of public resources can be allocated to secure the further development, consolidation and protection of carwashes as a resilient activity.

Conclusion

This chapter provided a detailed empirical study of how resilience is operationalized on the ground by examining the attempts to formalize carwashes in a city in Latin America. I have demonstrated how EPM's strong commercial logic - aimed at reducing water losses and consolidating revenues - played a critical role in its engagement with informal carwash activities. I have also shown that, because of difficulties in controlling and regulating informal connections, a utility company opted for finding alternative solutions that allowed carwashes to be formally inserted into the centralized infrastructure network. Instead of disrupting or restricting the flows of water by removing tubes and pipes, issuing fines and decommissioning equipment, EPM recognized the necessity to cooperate with carwashes by formally integrating them as consumers in the already-existing centralized network.

Drawing on STS and debates on urban informality, this chapter explored how resilience is produced out of and mediated by discursive and material strategies based on complex assemblages between human actors (staff of the utility company, municipal authorities, carwash workers) and non-human entities (water, meters, bills, laws). Firstly, EPM discursively constructed water as a scarce resource to justify the formalization of carwash sites as consumers. Rather than blaming carwash facilities for the constant waste of water, notions of water scarcity opened up new opportunities to position carwashes as political and ethical subjects actively involved in practices such as water-saving, payment of bills, the repair of leaks and maintenance of the infrastructure network.

Secondly, the Carwash Program implemented by EPM has largely relied on a set of socio-technical arrangements to make water formally accessible to carwash facilities. The program centered on providing carwash sites with basic physical technologies such as water meters to facilitate the measurement of water consumption, as well as drainage systems and oil and grease traps to reduce the environmental impacts and improve the aesthetic appearance. Additionally, the issuing of a water bill and the establishment of a legal mechanism (Accord 85/2013) increase the ability of carwashes to access better water services from EPM and to demand from the state recognition of their right to work and to access public space. The program has so far received broad support from carwash workers, with 250 out of 310 informal

carwash sites taking part in the program. A critical understanding of how carwashes are motivated to be part of the program and their aspirations to be officially recognized as consumers demands a greater appreciation of the political effects of mundane objects and the possibilities they offer to build new solidarities and forms of cooperation with the utility company and municipal authorities.

If the purpose of resilience is to help vulnerable population to adapt to and survive socio-natural disruption, it is important to go beyond the alleged innovation and creativity of low-income population and demand the intervention of the state and utility companies. As I have shown, socio-technical configurations that combine diverse physical, commercial and juridical interventions have been actively implicated in reducing the exposure of carwashes to conditions of precarity and uncertainty. Although these socio-technical configurations have created new capacities for building resilience, if the aim is to prevent more exclusion and marginalization, they need to be adjusted according to the heterogeneity of carwashes. The contribution of this chapter therefore lies in its attempt to situate carwashes, whether in Latin America or elsewhere, not only as spaces that report high water losses, but also as critical sites for understanding how resilient solutionscan be mobilized and implemented.

References

Acuto, Michele/ Dinardi, Cecilia/ Marx, Colin (2018): "Transcending (in)formal Urbanism." In: Urban Studies 56/3, pp. 475-487.

Allen, Adriana/ Griffin, Liza/ Johnson, Cassidy, eds. (2017): Environmental Justice and the Urban Resilience in the Global South, New York: Palgrave MacMillan.

Al-Odwani Ali/ Ahmed, Mansour I./ Bou-Hamad Sammer (2007): "Water Reclamation in Kuwait." In: Desalination 206/1–3, pp.17–28.

Álvarez Correa, Melissa (2019): "Lavautos Piden Ser Reubicados. En el Concejo se Evalúa el Acuerdo 85, Aprobado en el 2013." In: ADN, pp. 2.

Amin, Ash (2013): "Surviving the Turbulent Future." In: Environment and Planning D: Society and Space, 31, pp. 140-156.

Anand, Nikhil/ Gupta, Akhil/ Appel, Hannah (2018): The Promises of Infrastructures, Durham: Duke University Press.

Anand, Nikhil (2015): "Leaky States: Water Audits, Ignorance, and the Politics of Infrastructure." In: Public Culture 27/2, pp. 305-330.

Anand, Nikhil (2017): Hydraulic City: Water and the Infrastructures of Citizenship in Mumbai, Durham, NC: Duke University Press.

Anguelovski, Isabelle/ Irazábal-Zurita, Clara/ Connolly/ James J.T. (2018): "Grabbed Urban Landscapes: Socio-spatial Tensions in Green Infrastructure Planning in

Medellín." In: International Journal of Urban and Regional Research 43/1, pp. 133-156.

Banks, Nicola/ Lombard, Melanie/ Mitlin, Diana (2020): "Urban Informality as a Site of Critical Analysis." In: The Journal of Development Studies 56/2, pp. 223-238.

Baptista, Idalina (2016): "'We Live on Estimates': Everyday Practices of Prepaid Electricity and the Urban Condition in Maputo, Mozambique." In: International Journal of Urban and Regional Research 39/5, pp. 1004-1019.

Baptista, Idalina (2019): "Electricity Services Always in the Making: Informality and the Work of Infrastructure Maintenance and Repair in an African City." In: Urban Studies 56/3, pp. 510-525.

Béné, Christophe/ Mehta, Lyla/ McGranahan, Gordon/ Cannon, Terry/ Gupte, Jaideep/ Tanner, Thomas (2017): "Resilience as a Policy Narrative: Potentials and Limits in the Context of Urban Planning." In: Climate and Development 10/2, pp. 116-133.

Bennett, Jane (2005): "The Agency of Assemblages and the North America Blackout." In: Public Culture 17/3, pp. 445-466.

Brand, Peter (2013): "Governing Inequality in the South through the Barcelona Model: 'Social Urbanism' in Medellín, Colombia." June 11, 2019 (https://www.dmu.ac.uk/documents/business-and-law-documents/research/lgru/peterbrand.pdf).

Braun, Bruce/ Whatmore, Sarah J (2010): Political Matter: Technoscience, Democracy, and Public Life, Minneapolis: University of Minnesota Press.

Carcedo, Franco (2017): "Trabajo Informal y Control Policial en Espacios Públicos: El Caso de los Lavacoches de la Ciudad de Santa Rosa." In: Revista Huellas 21/1, pp. 31-48.

Cheng, Deborah (2014): "The Persistence of Informality: Small-Scale Water Providers in Manila's Post-privatisation Era." In: Water Alternatives 7/1, pp. 54-71.

Clark, Ian/ Colling, Trevor (2016): "New Insights into Informal Migrant Employment: Hand Car Washes in a Mid-sized English City." In: Economic and Industrial Democracy, pp. 1-21.

Clark, Ian/ Colling, Trevor (2017): "Work in Britain's Informal Economy: Learning from Road-Side Hand Car Washes." In: An International Journal of Employment Relations 56/2, pp. 320-341.

(DANE) Departamento Administrativo Nacional de Estadística (2019): Medición de Empleo Informal y Seguridad Social. Trimestre Móvil. Diciembre 2018 - Febrero 2019 (https://www.dane.gov.co/files/investigaciones/boletines/ech/ech_informalidad/bol_ech_informalidad_dic18_feb19.pdf).

De Boeck, Filip (2011): "Inhabiting Ocular Ground: Kinshasa's Future in the Light of Congo's Spectral Urban Politics." In: Cultural Anthropology 26/2, pp. 265-286.

(EPM) Empresas Públicas de Medellín (2019): Informe de Sostenibilidad 2018, Medellín: Grupo EPM.

El Colombiano (2016): "Lavaderos de Carros, con el Agua al Cuello." 23 January, 2016 (*https://www.elcolombiano.com/antioquia/lavaderos-de-carros-con-el-agua-al-cuello-JC3477209*).

Fainstein, Susan (2014): "Resilience and Justice." In: International Journal of Urban and Regional Research 39/1, pp. 157-167.

Franz, Tobias (2017): "Urban Governance and Economic Development in Medellín: An 'Urban Miracle'?." In: Latin American Perspectives 44/2, pp. 52-70.

Furlong, Kathryn/ Carré, Marie Noelle/ Acevedo Guerrero, Tatiana (2017): "Urban Service Provision: Insights from Pragmatism and Ethics." In: Environment and Planning A 0/0, pp. 1-13.

Giglioli, Ilaria/ Swyngedouw, Erik (2008): "Let's Drink to the Great Thirst! Water and the Politics of Fractured Techno-natures in Sicily." In: International Journal of Urban and Regional Research 32/2, pp. 392-414.

González Escobar, Luis Fernando (2016): "¡Un 'Premio Nobel' Para Medellín!" In: Revista Universidad de Antioquia 326, pp. 105-111.

Graham, Stephen/ Marvin, Simon (2001): Splintering Urbanism: Networked Infrastructures, Technological Mobilities and the Urban Condition, New York: Routledge.

Graham, Stephen/ Desai, Renu/ McFarlane, Collin (2013): "Water Wars in Mumbai." In: Public Culture 25, pp. 115-141.

Graham, Stephen (2010): "When Infrastructures Fail." In: Stephen Graham (eds.), Disrupted Cities: When Infrastructure Fails, New York: Routledge, pp. 1-26.

Harvey, Penny/ Knox, Hannah (2012): "The Enchantments of Infrastructure." In: Mobilities 7/4, pp. 521-536.

Kaika, Maria (2003): "Constructing Scarcity and Sensationalising Water Politics: 170 Days That Shook Athens." In: Antipode 35/5, pp. 919-954.

Kuecker, Glen D/ Thomas D. Hall (2011): "Resilience and Community in the Age of World-System Collapse." In: Nature and Culture 6/1, pp. 18–40.

Larkin, Brian (2013): "The Politics and Poetics of Infrastructure." In: Annual Review of Anthropology 42, pp. 327-43.

Leitner, Helga/ Sheppard, Eric/ Webber, Sophie/ Colven, Emma (2018): "Globalizing Urban Resilience." In: Urban Geography 39/8, pp. 1276-1284.

López, Marcela (2016): "Struggling for Public, Reclaiming Citizenship: Everyday Practices of Access to Water in Medellín. Colombia." In: McDonald, D.A. (Eds). Making Public in a Privatized World: The Struggle for Essential Services, pp. 165-178. London: Zed Books.

Medellín Como Vamos (2018): "Informe de Calidad de Vida Medellín 2018." June 24, 2019 (https://www.medellincomovamos.org/).

Meerow, Sara/ Newell, Joshua P. (2016): "Urban Resilience for Whom, What, When, Where, and Why?" In: Urban Geography 40/3, pp. 309-329.

Meehan, Katie M. (2013): "Tool-power: Water Infrastructure as Wellsprings of State Power." In: Geoforum 57/1, pp. 215-224.

Núñez González, Amaury/ Quintero Herrera, Edgar (2019): "Medellín: Aumentan los Asesinatos Pese a la Inversión." May 24, 2019 (https://territoriodeplomo.blog/2019/05/05/aumentan-los-homicidios-en-medellin-a-pesar-de-la-inversion/).

Ranganathan, Malini (2014): "'Mafias' in the Waterscape: Urban Informality and Everyday Public Authority in Bangalore." In: Water Alternatives 7/1, pp. 89-105.

Rockefeller Foundation/ Alcaldía de Medellín (2016): "Resilient Medellín. A Strategy for Our Future." June 15, 2019 (https://www.100resilientcities.org/wpcontent/uploads/2017/07/Medellin-English-PDF.pdf)

Rohracher, Harald/ Köhler, Helena (2019): "Households as Infrastructure Junctions in Urban Sustainability Transitions: The Case of Hot Water Metering." In: Urban Studies 56/11, pp.2372-2386.

Roy, Ananya (2011): "Slumdog Cities: Rethinking Subaltern Urbanism." In: International Journal of Urban and Regional Research 35/2, pp. 223-238.

Scheba, Suraya/ Millington, Nate (2018): "Crisis Temporalities: Intersections between Infrastructure and Inequality in Cape Town Water Crises." International Journal of Urban and Regional Research Online. June 18, 2019 (http://www.ijurr.org/spotlight- on/parched-cities-parched-citizens/water-crisis/).

Schwenkel, Christina (2015): "Spectacular Infrastructure and its Breakdown in Socialist Vietnam." In: American Ethnologist 42/3, pp. 520-534.

Solnit, Rebecca (2009): A Paradise Built in Hell, New York: Viking.

Von Schnitzler, Antina (2016): Democracy's Infrastructure: Techno-Politics and Protest after Apartheid, Princeton, NJ: Princeton University Press.

Watts, Michael (2015): "Adapting to the Anthropocene: Some Reflections on Development and Climate in the West African Sahel." In: Geographical Research 53/3, pp. 288-297.

Winner, Langdon (1980): "Do Artifacts have Politics?." In: Daedalus 109/1, pp. 121-136.

Zaneti, Rafael/ Etchepare, Ramiro/ Rubio, Jorge (2012): "More Environmentally Friendly Vehicle Washes: Water Reclamation." In: Journal of Cleaner Production 37, pp. 115-124.