4 Leveraging innovation and data use during the COVID-19 crisis

Cities are on the frontline of responses to the COVID-19 crisis. The pandemic exposed an array of urban problems and shed light on inequality affecting people and places, especially in large urban areas. More than ever, city governments need to embrace public sector innovation, and open and digital government to overcome the crisis and rebuild better than before. This chapter explores how city governments and their innovative policy responses have played an indispensable role throughout the COVID-19 crisis, and how innovation and data use will continue to aid cities' recovery through the long term.

The value of innovation and data use in times of crisis

Today, cities are home to almost half of the world population and this share is projected to reach 55% by 2050 (OECD/European Commission, 2020[1]). When COVID-19 ravaged the globe, cities ground to a halt. Municipalities suffered a multi-dimensional crisis that upended residents' lives along health, economic and social lines. As of December 2020, the World Health Organisation reported over 65 million cases and over 1.5 million deaths related to the COVID-19 pandemic (World Health Organization, 2020[2]). The second wave of the virus may lead to a 9.5% decline in GDP among OECD countries, which would be the largest since the Great Depression (OECD, 2020[3]). Lockdowns and social distancing measures greatly reduced in-person interaction and cultural activity, vital both to residents' mental health and cities' economies.

While city residents enjoy better living conditions overall than people living elsewhere (OECD/European Commission, 2020[1]), cities also suffer the economic impacts of the pandemic most acutely. By summer 2020, Paris, France, saw its economic activity decrease by 37% from mid-March, compared to 34% at the national level (OECD, 2020[3]). Between January and September 2020, 38 600 jobs were lost in Paris, representing 40% of job loss for the Ile-de-France region. By the final trimester of 2020, unemployment in Paris increased by 8% among active jobseekers (compared to the same period in 2019). The economic impact was particularly felt among those below 25 years old, with an unemployment increase of 31.8%, almost 23 percentage points more than the national increase (L'Atelier parisien d'urbanisme, 2021[4]). Such unemployment waves can lead to disruptions in the housing market, adversely impact physical health, increase stress and preclude consumer spending that fuels the service, entertainment, fashion and tourism industries, among others.

Unfortunately, urban residents can struggle more than the average to access relief from local governments due to severe drops in cities' fiscal revenue. New York City, NY, United States, anticipates a loss of USD 7.4 billion in tax revenue over the next two fiscal years, while Los Angeles, CA, United States, might lose up to USD 829 million over the same period (OECD, 2020[3]). Florence, Italy, estimates it will lose one-quarter of its EUR 800 million budget due to the decimation of its tourism industry, which represents 15% of the city's GPD (Gautheret, 2020[5]). These losses come at the same time that local governments face large increases in expenditures, mostly due to purchasing protective equipment for workers, implementing lockdown measures and providing emergency support for the most vulnerable. The dual effects of higher expenditures and lower tax revenue threatens the quality of service delivery and safety nets for residents (OECD, 2020[3]).

As with most crises, the COVID-19 pandemic exposed inequality between people and places; the threats are disproportionately felt by the most vulnerable population in large cities, including women, children, the elderly, the disabled, the homeless, low-income households and immigrants. These groups are more likely to suffer from loss of income, decreased access to public services, employment and housing insecurity, isolation associated with social distancing, and increased exposure to the virus.

These challenges, each one difficult enough by itself, converge to present an unprecedented moment for local governments, their staff and their residents. Cities must deliver more and better services to more people at a faster pace under tighter deadlines and tightening budgets in a life-or-death situation. Such a daunting scenario calls for bold ideas to overhaul cities' methods of governance nearly overnight. This chapter explores how innovation and data use serve as crucial tools, supporting cities in the short-term management of the pandemic while moving towards a smarter, greener, more sustainable, inclusive, long-term recovery.

Leveraging innovation and data use to combat crises

Under normal circumstances, local governments recognise the potential of innovation and data use to tackle community challenges and improve residents' well-being under "increasing citizen expectations, decreasing government budgets, and changing demographics" (What Works Cities, 2015[6]). According to responses to the 2018-2020 OECD/Bloomberg Philanthropies Survey, cities leverage public sector innovation to improve their performance most in three areas: public service delivery, internal government operations, and anticipation and management of future challenges (Figure 2.1). Faced with the COVID-19 crisis, local governments resorted to measures that were politically and socially unimaginable just a few months before. Cities both served as vehicles helping national governments implement mitigation measures and pioneered a series of bottom-up innovative responses.

Drawing examples from more than 100 cities worldwide, a stock-taking and analysis of OECD policy responses to COVID-19 (OECD, 2020[3]) shows that local governments swiftly adopted innovative measures to render city operations more efficient and public services more accessible (Box 4.1). In a matter of weeks, local governments "put together testing and contact tracing programmes, built food-delivery services, assembled housing assistance programmes, [and] converted streets for outdoor dining and social distance recreation", among other innovations (Bloomberg.org, 2020[7]).

Local governments worldwide accelerated the adoption and implementation of public sector innovation and data use to guarantee the same or increased levels of internal operations and public service delivery. Fortaleza, Brazil, is convinced that innovation plays a key role in ensuring the provision of services to the population and in fighting COVID-19. In London, United Kingdom, the first emergency response shifted 95% of public service employees to working remotely while ensuring the uninterrupted operation of 500–800 types of public services (OECD, 2020[8])

On top of maintaining service delivery, local governments found innovative ways to tackle practical challenges posed by COVID-19, such as social distancing and lockdowns. Curitiba, Brazil, implemented several solutions, including the creation of online stores for local artisans and entrepreneurs, establishing partnerships with start-ups to offer a virtual marketplace with payments and delivery, deploying artificial intelligence (AI) for the timely identification of COVID-19 symptoms and offering digital consultation to medical patients. Likewise, the municipality of Lisbon, Portugal, launched an open innovation programme, Smart Open Lisboa TOMORROW, to respond to crowdsourced solutions and tackle organisational challenges in the context of the pandemic.

Box 4.1. Cities innovate policy in response to the COVID-19 pandemic

As part of the global effort against the COVID-19 pandemic, the OECD Centre for Entrepreneurship, SMEs, Regions and Cities (CFE), in collaboration with the OECD Working Party for Urban Policy and the OECD Champion Mayors Initiative for Inclusive Growth, developed a note on cities' policy responses. This note provides analysis on issues related to the economic, social and environmental impacts of COVID-19, lessons learned around digitalisation, mobility, density, urban design and collaborative governance, and action-oriented guidance to rebuild cities better.

Short- and medium-term responses provided by cities cluster around six categories: social distancing; workplace and commuting; vulnerable groups; local service delivery; support to business; and communication, awareness-raising and digital tools. The policy note draws ten lessons from the crisis to rebuild cities better.

1. COVID-19 had asymmetrical impacts across territories, but many policy responses were place-blind and uniform, highlighting the need for place-based and people-centred approaches.
2. The health crisis turned into a major economic and social shock, and cities' exposure and recovery depend on industrial composition, labour market breakdown and trade openness.
3. The rediscovery of proximity provides a catalyst to shift from increasing mobility toward enhancing accessibility by revisiting public space, urban design and planning.
4. The crisis exposed inequality between people and places, especially in large cities, where vulnerable groups such as migrants, the poor, women and the elderly were hit hardest.
5. The health problem is less related to urban density than to structural inequalities and the quality of urbanisation – the "urban premium" will likely not turn into an "urban penalty" because the benefits of agglomeration continue to prevail.
6. Digitalisation, a game changer during the crisis, will remain a key to a "new normal", although teleworking ability varies both across and within countries.
7. The "Zoom effect" and "Greta effect" accelerated environmental awareness, making the transition toward clean mobility and circular economy more politically and socially acceptable.
8. COVID-19 bears implications for governance, with citizens' trust in governments increasing in some countries – especially for local politicians – and decreasing in others.
9. The COVID-19 shock calls for a stronger focus on resilience: preparedness for future shocks requires managing "Who" does "What" at "Which scale" and "How" for more resilient cities.
10. Global agendas such as the SDGs, the New Urban Agenda and the Sendai Framework are both timely and relevant to reshape planning, policy, strategy and budget from the ground up.

Source: OECD (2020[3]), "Cities policy responses", *OECD Policy Responses to Coronavirus (COVID-19)*, OECD Publishing, Paris, https://doi.org/10.1787/fd1053ff-en..

While innovation and data use might not involve digitally enabled tools and technologies, digitalisation is a constant and crosscutting theme across each of these initiatives. Many cities have leveraged public sector innovation and data use to accelerate a digital transformation that was already underway (Bloomberg.org, 2020[7]). The OECD Observatory for Public Sector Innovation (OPSI) remarked that governments at all levels "have compressed years' worth of technological advancements into a few weeks and months" (OECD et al., 2020[9]). These efforts centre on shifting toward virtual government operations and services, crafting digitally enabled communication with the public, and enabling digital innovation via "dedicated teams, guidance, resources and partnerships" (OECD et al., 2020[9]). According to the OECD/Bloomberg Philanthropies Survey on Innovation Capacity 2020, cities such as Leipzig, Germany, and Stockholm,

Sweden, consider digitalisation and digital solutions as areas that would benefit, either short- or long-term, from investment in innovation. London, United Kingdom, already saw democratic functions moved online, with local committee meetings taking place live via internet with questions and answers in real time. In many cases, these shifts to digitalisation were progressing extremely slowly pre-pandemic, but COVID-19 forced cities to leap forward at a rapid pace.

Box 4.2. Digital innovation and "smart" cities for greater inclusion, sustainability and resilience

Digitalisation took centre stage in recent months to help cities navigate the COVID-19 pandemic. Since the early stage of the outbreak, digital technologies made it possible to relay real-time life-saving information, keep essential public services running (such as healthcare by telemedicine) and bridge social isolation. With countries grappling with repeated lockdowns at different scales, and physical distancing requirements reshaping urban environments, many cities are expanding, accelerating and mainstreaming the use of "smart" city tools. In the longer term, the capacity to leverage the benefits of digital innovation for all will be critical to help cities rebound from the crisis and accelerate the transition to a new urban paradigm for a more sustainable and resilient future.

The concept of smart cities, for instance, changed significantly since the original (and narrow) definition combining ICT, digital usages and citizen participation, to navigating a complex system of governance involving local administrations, public agencies, firms, citizens and communities. While digital innovation remains central to the smart city concept, a key question is whether investment in smart technologies and digital innovations ultimately contributes to improving the well-being of citizens. Therefore, the OECD defines smart cities as "cities that leverage digitalisation and engage stakeholders to improve people's well-being and build more inclusive, sustainable and resilient societies".

This definition underlines that digitalisation and digital innovation are not an end but rather aim to improve people's lives for greater inclusion, sustainability and resilience. Seizing the opportunities offered by the digital transition – including those coming from artificial intelligence, cloud computing and Big Data – smart cities can improve the lives of urban residents by enhancing people's safety, increasing energy efficiency in housing, facilitating access to goods and services, boosting participatory policy making, and more.

Source: OECD (2019[10]), *Smart Cities and Inclusive Growth*, OECD, Paris, https://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf.

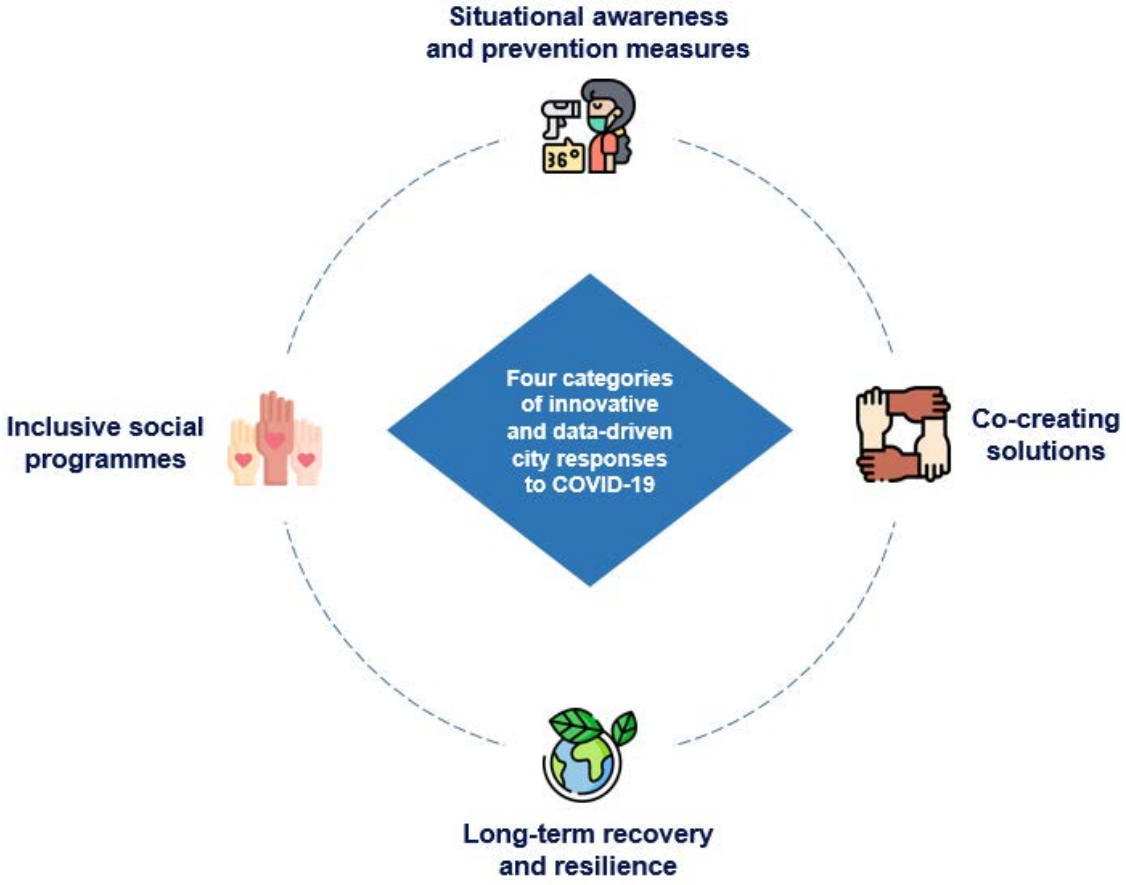
Recognising the role of innovation in response to the pandemic, many local governments committed support and funding for innovation and data use to react to and rebound from the crisis. Before the COVID-19 crisis, almost all cities responding to the OECD/Bloomberg Philanthropies Survey indicated that their municipalities had been planning to either increase (65%) or maintain (24%) future budgets for innovation. After the pandemic hit, the 70 cities that had responded to the 2020 survey version were asked if they intended to increase, decrease, or maintain their innovation budgets in light of rapid changes to priorities. Of the 18 cities that responded, 16 reaffirmed their intention to increase or at least maintain their budget plans for innovation. While this number may not be representative, it serves as an indication that many cities, albeit struggling in the midst of the crisis, are still committed to their investment in innovation.

Several cities' responses emphasised the role innovation played in COVID-19 management and recovery. While Bristol, United Kingdom, public sector managers proclaim their commitment to secure external funding and internal investment for their innovation work, Winnipeg, Canada, seeks to fund their planned increase in innovation activity by phasing in budget contributions from returns on investment generated by their innovation projects. Due to continuing restrictions regarding public safety, Dublin, Ireland, considers the need to upgrade and improve services through innovation more critical now than ever. The city found

greater demand and increased urgency for the provision of digital services, placing importance on data to support and drive these services. Dublin noted that innovation is not exclusively about technology, but also "a new way of doing things". The shift to remote working, the need to maintain public services under tight restrictions and the impact on the well-being of city staff and residents only intensified Dublin's need to innovate around daily operations and service delivery.

The sections below outline how cities leverage data-driven and innovative solutions to the crisis in four broad categorisations: (1) situational awareness and prevention measures (e.g. dashboards, apps), (2) inclusive social programmes (e.g. targeting vulnerable groups), (3) co-creating solutions (e.g. hackathons, partnerships) and (4) long-term recovery and resilience. These categories often overlap. For instance, in Estonia, a government-hosted hackathon led to the installation of SUVE, an AI chatbot, on public websites to improve communication with residents (OECD et al., 2020[9]). In this case, a co-creation event led to providing residents with increased situational awareness to help prevent the spread of COVID-19.

Figure 4.1. Four categories of innovative and data-driven city responses to COVID-19



Source: Author's elaboration.

Situational awareness and prevention

Cities are no strangers to leveraging data-driven innovation to inform, protect and empower residents. From the OECD/Bloomberg Philanthropies Survey, 60% of cities report earmarking innovation funding to invest in digital infrastructure. Indeed, the impact of data-driven innovation was most visible during the immediate outbreak of the crisis, when local governments applied digital tools in several areas to slow the

transmission of COVID-19. Reflecting the urgency of the crisis, cities deployed these tools at a remarkable speed in the form of smartphone apps, online data dashboards, real- or near-time heat maps, updates to open data portals, chat bots and direct engagement with city leadership. This blitz of digital communication from cities kept residents informed of risks and best practices related to COVID-19 despite social distancing restrictions, doing well to mitigate any isolation or information vacuum.

Data-driven tools to keep residents safe

The municipal government of Paris, France, uses a digital application, COVIDOM, to help doctors monitor the health conditions of confirmed or suspected patients quarantined at home. The application, introduced and deployed as part of a national initiative, is crucial to relieving the burden on health centres and better regulating patient flows (AP-HP, 2020[11]). Likewise, the city of Vienna, Austria, developed the "COVID-19 Case and Contact Tracing Tool of the City of Vienna". This tool is used to inform and isolate persons in time, as well as to analyse data generated and to identify if, for example, a major outbreak has occurred in a facility. The data shows how the pandemic is spreading. Starting with one case, the contact tracers and the health department of the City of Vienna can analyse the data to detect how the virus has spread and how many links are associated with it. Each case is also geocoded and reflected on a map, helping to easily identify local clusters. A chatbot was installed, allowing contact tracing staff to answer common questions immediately. (DigitalCity.Vienna, 2020[12])

Municipal governments also engage in efforts to increase resident access to crucial near- and real-time information. Data-driven innovative solutions in the form of near-time dashboards and neighbourhood-level heat maps with local COVID-19 statistics can keep residents informed, convince them to stay at home, or help them decide if and when to take public transport or go grocery shopping. Increasing situational awareness in this way can keep residents aware of what constitutes risky behaviour and deter them from engaging in activities that could accelerate virus transmission. In Cincinnati, OH, United States, City Manager Patrick Duhaney tapped Chief Performance Officer Nicollette Staton and the Office of Performance and Data Analytics (OPDA) to develop tools and processes that help municipal staff and the public navigate the crisis. The OPDA successfully launched dashboards tailored to internal and external stakeholders, allowing residents to be informed of impacted municipal services or daily cases, and help the city's Emergency Operations Centre and Fire Department monitor emergency medical service responses to suspected cases (What Works Cities, 2020[13]). While these innovative and data-driven solutions were rolled out within weeks, they were the fruits of years of investment in strengthening innovation and data use capacity.

Cincinnati is not the only city in the United States stepping up to the task. As the public health crisis progressed, Mayor Eric Garcetti promptly laid out the city's response priorities, focusing on families, small businesses, healthcare workers and homeless people. Mayor Garcetti tasked his Chief Information Officer and the innovation team to collect, analyse and leverage data to inform and justify the city's key responses (Davis, 2020[14]; City of Los Angeles, 2021[15]). Measures in Los Angeles, CA, United States, built on an "existing culture of leveraging data to set goals, make decisions, and communicate with the public", proven effective in accelerating the city's responses to COVID-19 (What Works Cities, 2020[13]). Like examples of cities in the United States, Buenos Aires, Argentina, established a digital platform that provides residents information and recommendations to reduce the risk of contagion (City of Buenos Aires, 2020[16]). In order to avoid congestion and in-person contact during the pandemic, the municipal government of Fukuoka, Japan, displays mobility data (e.g. peak travel time) and provides information about online services (Fukuoka Prefectural Government, 2020[17]). The city also encourages flexible working hours both in the city government and in private companies. Open data portals and chatbots facilitate direct communication between cities and residents.

Like public dashboards, open data portals are used to maximise communication by local governments to residents and the private sector, enhancing local governments' ability to manage the crisis. Tokyo, Japan, created a one-stop COVID-19 database updated in real-time, including the number of infected people, their status, age and gender; the number of inquiries to the city's call centre; and the number of people using the subway. The website also opened its source code so that other municipalities and institutions could replicate similar websites (Tokyo Metropolitan Government, 2020[18]).

As discussed, the implications of open data deployment extend beyond keeping residents informed or crowdsourcing solutions to manage the pandemic. Open data portals are used to ensure the transparency and accountability of government measures. Even before the COVID-19 pandemic, more than 70% of surveyed cities proactively shared data, documents, and information about contracts, procurement, and/or vendor performance to increase bid competitiveness and ensure accountability. The imperative to instil this best practice became more crucial when local governments had to quickly yet strategically dispense public resources for crisis management.

One notable example is Transparencia COVID-19, deployed by the municipal government of Mexico City, Mexico. The dedicated open data portal publishes and explains the use of public resources in response to the pandemic, including vendor contracts awarded to deal with the crisis. Transparencia also shows real-time information at the borough level (alcaldía) on the number of COVID-19 cases, deaths, and hospitals with available capacity. The website also contains data curated based on three areas:

- **Public health:** Data on the patterns of the pandemic, and prevention and treatment measures adopted by the government
- **Social actions:** Data on various government programmes aimed at relieving the social and economic burden related to the pandemic, and guides on how to access them
- **Public spending:** Data and explanations on public spending in response to the pandemic, including contracts awarded to manage the pandemic, social programmes and actions of the local government, and economic support to businesses and individuals (City of Mexico, 2020[19]).

Apart from dashboards and open data portals, AI chatbots help with COVID-19 diagnoses, disseminating hygiene tips and sharing practical information on how to conduct necessary activity while respecting social distancing. Buenos Aires, Argentina, created a chatbot that provides a preliminary diagnostic of COVID-19 symptoms and automatically refers suspected cases to the operators of the Emergency Medical Care System (City of Buenos Aires, 2020[20]). Dusseldorf, Germany, established a 24/7 hotline with a phone bot to answer questions and provide them with updates on COVID-19 (City of Düsseldorf, 2020[21]).

Digital engagement by city leadership

While data-driven and digitally enabled innovations can serve as communication tools, they cannot replace direct and earnest engagement by city leaders. Leadership by the mayor consistently ranks as the most critical factor driving cities' innovation culture and activity: 84% of surveyed cities consider it 'Very important", while the remaining 16% consider it "Important" (Figure 2.5). The urgent needs provoked by the crisis emboldened city leadership to accelerate innovation and data use at an unprecedented pace.

Local governments are ramping up their data collection efforts to improve situational awareness and enhance their ability to protect residents. According to OECD (2020[9]), "the need for governments around the world to make decisions based on good evidence and data has been amplified by the COVID-19 crisis," as bad data can cost lives. Within days of the first lockdown, the government of London, United Kingdom, leveraged data to identify newly vulnerable groups. These efforts allowed city offices to set up vulnerability hubs across all 33 boroughs, co-ordinate volunteers, and provide food, medicine and necessities (OECD, 2020[8]). Dallas, TX, United States, uses data from two surveys to build a picture of residents' needs and deploy resources quickly and efficiently. Dallas's Symptom Tracker Survey collects data from residents in the form of reported symptoms and location, allowing the city to anticipate where healthcare resources

should be focused. The city's Food Access Survey does the same thing to identify areas of the city where people are struggling to find food (Edwards, 2020[22]).

City leadership also prioritises finding ways to engage and inform residents about the changing situation. Daily communication from mayors and city leaders played a key role in fostering transparency and inspiring confidence in the government's ability to manage the crisis. During the peak period, the Governor of the Tokyo Metropolitan Government in Japan, Yuriko Koike broadcast almost daily live to updates on the city's situation (Tokyo Metropolitan Government, 2020[23]). Meanwhile, the former Mayor of Dusseldorf in Germany, Thomas Geisel hosted a weekly talk show with guest speakers to discuss the local impact of the pandemic and answer questions from citizens on how Düsseldorf had been fighting the COVID-19 crisis (EUROCITIES, 2020[24]). Mayor Marvin Rees of Bristol, United Kingdom, kept residents up to date through a variety of communications platforms including newsletters, local media, Facebook Live, the council website, and the Mayor's Blog. During social distancing, Bristol's council meetings that require democratic input were streamed online, allowing residents to participate remotely and submit questions (Bristol City Council, 2020[25]). Soon after the outbreak in the United States, Mayor Garcetti of Los Angeles, CA, held daily updates to inform residents about the latest situation and measures in the city such as pausing parking rules enforcement and opening more temporary shelter beds (Office of Los Angeles Mayor Eric Garcetti, 2020[26]).

The COVID-19 crisis jolted cities forward in their capacity to provide residents with useful information, collect data to improve service delivery, and communicate quickly and effectively over digital mediums. Such innovations aimed to enhancing cities' situational awareness, help track the virus, identify residents' gravest needs and perform rapid response. While the development of these capacities proved effective in mitigating the crisis short-term, they could benefit cities in their long-term recovery efforts.

However, city officials must ensure the continuation and institutionalisation of these innovations, and not allow them to be cut once cities transition from crisis to recovery. Budget and resource constraints could threaten the long-term nature of such programmes. It is important that cities solicit feedback from residents and make data-driven decisions about what COVID-19-era innovations help them govern and support citizens most effectively.

Inclusive social programmes to support the most vulnerable

As with many crises, COVID-19 impacted the most vulnerable populations and minorities disproportionately (OECD, 2020[3]). Studies show that an individual's risk may be significantly higher if they belong to one or more vulnerable groups such as migrants, the homeless, the elderly, children or women. The multidimensional risks related to the COVID-19 crisis extend beyond health implications and loss of income to broader psychological effects resulting from social distancing and long-term confinement.

Many cities are on the frontline of crisis management to protect these groups, with emphasis on combatting structural inequalities and mitigating its immediate effects on vulnerable communities (OECD, 2020[3]). City governments are in the unique position to respond effectively to the crisis thanks to their intimate understanding of local conditions and concerns. Nevertheless, as mentioned in the previous chapter, the tremendous potential for cities to manage future risks and tackle pressing community challenges can only be unlocked with effective use of data. While the volume and variety of data generated make cities an ideal environment for data-driven innovation, data availability across key policy sectors remains unbalanced.

According to the OECD/Bloomberg Philanthropies Survey, only 55% of cities possess available data on housing and homelessness (Figure 3.2). Even fewer cities possess sufficient data for other key areas such as social welfare and social services (42%) or education (42%). This dearth of data in key sectors could prevent local governments from implementing targeted interventions in a timely and effective manner.

The pandemic changed the perceptions of city leaders and spurred programmes in domains such as housing and homelessness, domestic violence, access to education, and necessities including technology,

public services and facilities. However, local governments have not sought to re-invent the wheel with these actions. These programmes are characterised as "innovative" because they effectively extended, adopted or pivoted existing government measures to the new context of COVID-19. While these initiatives occur regardless of whether cities exploit data to inform innovation in response to COVID-19, data use could enhance cities' responses to the crisis, allowing them to plan and prevent in addition to react.

Housing and homelessness

The COVID-19 crisis highlighted the link between homelessness, the lack of affordable housing and the increased risks of infection in deprived communities. In the wake of the pandemic, cities took a series of responses to mitigate short-term impacts.

During the lockdown, Bristol, United Kingdom, worked closely with local hotels to set up a clean and secure environment for homeless people and those without access to public funds. The city also secured two temporary van sites to allow people who live in their vehicles to practise social distancing and access health and sanitation facilities (Bristol City Council, 2020[25]). By April 2020, Paris, France, partnered with the Ile-de-France regional government, Parisian Public Hospitals (AP-HP), ACCOR hotel group and other actors to launch the COVISAN project to quarantine suspected and confirmed patients who did not require hospitalisation. Hotel rooms were converted to quarantine facilities with priority access given to residents from working-class neighbourhoods disproportionately impacted by the virus (AP-HP, 2020[27]).

Lima, Peru, opened Casa de la Mujer (Women's Home) shelters for female victims of domestic violence during the lockdown period. In opening the second shelter in June 2020, the Mayor of Lima stressed that, apart from protection and necessities, affected women and minors would receive psychological, legal and social counselling, and workshops on empowerment and stress management. (Agencia Peruana de Noticias ANDINA, 2020[28]).

Besides these immediate solutions to secure safe and sanitary living conditions for those hardest hit by the crisis, cities also ramped up their long-term efforts to address the housing crisis. For instance, in response to mass unemployment from COVID-19, San Antonio, TX, United States, bolstered an existing housing assistance programme with USD 76 million, staffing pulled from dormant city agencies and by moving the paper application process online (Bloomberg.org, 2020[29]). Whereas the programme previously received 50 applications a week, it received about 20 000 in the first several weeks of the pandemic. Low-income residents in the programme are also eligible to have two months' rent and utilities paid for, and USD 300 in cash to help with vital expenses. Yokohama, Japan, increased housing subsidies for residents whose livelihoods were severely affected during the pandemic (City of Yokohama, 2020[30]).

Volunteer efforts

Local governments are at the forefront of volunteer and solidarity efforts, coming up with ideas to connect and co-ordinate the community response. Efforts to co-ordinate volunteers can help cities augment their emergency response, including in service of vulnerable populations, especially when staff and resources are stretched thin.

Through their platforms, cities such as Ghent (Belgium), Bristol (United Kingdom), and Paris and Toulouse (France) matched volunteers with requests for support from organisations and healthcare institutions during the COVID-19 crisis. From March to August 2020, Ghent bundled and co-ordinated all requests under the heading "Ghent Helpt", which received applications from a record 450 candidate volunteers (City of Ghent, 2020[31]). Likewise, the citywide volunteering platform Can-Do Bristol connected volunteers with 23 community and volunteer organisations to help respond to more than 3 000 requests for support (Can Do Bristol, 2020[32]). In less than a week, the "Fabrique de la Solidarité" received help from 1 000 Parisians in social patrolling, preparing and distributing food to the homeless (City of Paris, 2020[33]).

In the city of Chicago, IL, United States, a Racial Equity Rapid Response Team was created by Mayor Lori Lightfoot to mitigate the disproportionate impact the virus had on communities of colour (Bloomberg.org, 2020[34]). Targeting the specific needs of this population, the team distributed more than 8 000 boxes of food, 300 000 bottles of hand sanitizer, and 1 million face masks (Bloomberg.org, 2020[29]). Such socially oriented programmes can both hamper inequalities from increasing and serve as a blueprint for addressing socio-economic issues in the future.

Education and youth engagement

When it comes to ensuring the continuity of educational programmes and activities for children, digitalisation is crucial to facilitate the transition and possibly long-lasting transformation. Lima, Peru, created a virtual platform, Aprende con Lima Educación, offering educational materials for city residents (City of Lima, 2020[35]). Through La Escuela de Lima (Lima's School), the city launched an educational space where both adults and children can access free, quality digital educational content such as virtual conferences and workshops (City of Lima, 2020[36]). Buenos Aires, Argentina, implemented a school help desk called the Connected Educational Community through which parents can connect, present ideas, make inquiries and see the learning materials to accompany their children in the process. The help desk is accessible through a toll-free telephone number or online chat (City of Buenos Aires, 2020[37]).

Beyond the scope of formal education, cities work to ensure access to a range of social and leisure activities crucial to the development of youth and children. Founded by the City of Ljubljana, Slovenia, in 2009, the Young Dragons public institute provides development programmes that enable young people to enjoy quality leisure time. Since the pandemic, Young Dragons launched a digital youth centre, DigiMC, where young people, volunteers, students and youth workers of the Young Dragons can participate in virtual activities according to their interests (OECD, 2020[3]). Through the #gazteklubaetxean programme, the Bilbao City Council in Spain offers young people a chance to enjoy online leisure activities from home. People aged 12 to 17 can participate in a series of recreational and educational challenges aimed at instilling values and promoting a healthy lifestyle (City of Bilbao, 2020[38]).

Co-creating solutions

Co-creation, both through resident engagement and partnerships with outside organisations, presents an opportunity for city governments to foster bottom-up recovery. In general, involving residents in the creation process can ensure that innovations serve user needs and reduce the risk of failure (Arundel and Es-Sadki, 2019[39]), and soliciting resident feedback can provide a more accurate reflection of resident priorities in cities' budget and policy decisions (Goldsmith and Kleiman, 2017[40]). Likewise, organisational partnerships can allow cities to "enhance approaches and tools, share risk, and harness available information and resources for innovation" (OECD, 2015[41]).

The value of such partnerships is greater in moments of crisis, when residents' needs are urgent, public resources are strained and non-public-sector organisations are more willing to lend assistance. Even before the crisis, cities reported engaging in strategic partnerships for innovation with other levels of government (86%), NGOs, the academic and philanthropic sector (83%), the private sector (77%) and city residents (80%) (Partnerships section, Chapter 2).

Only 13% of participating cites reported that partnerships to enhance data capacity play no major role (Partnerships can help cities fill in gaps around data capacity section, Chapter 2). Such partnerships enable local governments to compensate for resource- or skill-related shortcomings that might impede innovation and data use. The diversity of high-skilled labour, creative minds, advanced industry and academic institutions that exists in cities allows them to act "as laboratories for bottom-up and innovative recovery strategies" (OECD, 2020[3]).

During the COVID-19 crisis, these partnerships proved to be a creative and useful method for co-creating innovative solutions across domains. Governments at all levels are "recognising that they do not have all the answers," leading many to empower residents and businesses to contribute ideas and solutions through mediums such as hackathons, issue calls to action for start-ups and fast-track useful products such as personal protective equipment (PPE) (OECD et al., 2020[9]).

Through these and other forms of co-operation, local governments are "seeking bottom-up insights and stories in order to better understand the challenges and needs of their people" (OECD et al., 2020[9]). At both the national and local level, competitions, challenges and hackathons are jointly organised by the government, civil society and private sector.

Hackathons and crowdsourcing

Bogota, Colombia, organised a #MOVID19 Hackathon (COVID Mobility Works, 2020[42]) by partnering with DataSketch, NUMO and other supporting public and private institutions. The competition relied on mobility data from open local and national sources and supporting organisations to improve the quality of transport in Bogota and reduce the risks of COVID-19 infection. Participants developed mobility solutions that adhere to the principles of sustainable transport and can be executed by the government. Their effectiveness must also be easily monitored and evaluated by the authority. One of the proposed solutions was to provide healthcare professionals with bicycles.

Tallinn, Estonia, encouraged its start-up community to take part in a national hackathon called Hack the Crisis to generate solutions to the pandemic fallout (City of Tallinn, 2020[43]). The hackathon produced tools such as MASC, a "digital solution for monitoring PPE stock and demand in hospitals," now used in hospitals across the country (OECD et al., 2020[9]). Valmiera, Latvia, organised the Valmiera Tourism Innovation Hackathon to crowdsource ideas for attracting tourists back to the city with the opening of the Baltic borders (City of Valmiera, 2020[44]). Other cities, such as Antwerp (Belgium), Cologne (Germany) and Madrid (Spain) also called for start-ups to find innovative ways to overcome COVID-19 related challenges (OECD, 2020[3]).

Such approaches empower cities to crowdsource solutions from their residents and businesses while ensuring that community concerns are embedded in their responses. Cities can also leverage innovation hubs and living labs, both important pieces of innovation infrastructure, to stay in touch with residents and solicit bottom-up solutions to local challenges related to COVID-19.

Partnerships

Besides bottom-up solutions, many city governments view the pandemic as an opportunity to strengthen existing partnerships and accelerate new ones. For instance, Mexico City, Mexico, entered a partnership with private companies like Google Maps and Waze to monitor mobility trends during the crisis. Proposed to users on a voluntary basis, the application will gather data to help contact tracing (Saliba, 2020[45]).

In New York City, NY, United States, the NYC Recovery Data Partnership is a collaboration between city government, community non-profits and private organisations to support COVID-19 response and recovery (City of New York, 2020[46]). Partner organisations share their data free-of-charge on how the pandemic affects the city, services, industries and the daily life of New Yorkers. Data partners must ensure that their data is responsibly collected, standardised, frequently updated and applicable to the city's analysis of COVID-19 efforts (e.g. allowing comparable analysis of the situation pre-COVID-19). The initiative currently counts 13 data partners. Examples of current partners and the types of data being shared include:

- LinkedIn: LinkedIn Hiring Rate, a real-time measure of hiring activity (extracted from site activity).
- Metropolitan Museum of Art: statistics on museum attendance and membership activities.

- Upsolve: Demographic information about New Yorkers signing up for personal bankruptcy services and their reasons filing for bankruptcy.
- Urban Systems Lab: Survey results about access to parks and open space during the pandemic.

This data is accessible to all city agencies upon request, pending review from the Partnership staff to ensure that their intended use complies with the principles of privacy, equity, fairness, transparency and accountability. The initiative is co-chaired by the Mayor's Office of Policy and Planning, the Mayor's Office of Data Analytics, and the Mayor's Office of Operations, with counsel from the City's Chief Privacy Officer.

Long-term recovery and resilience

The COVID-19 crisis is likely to leave its mark on cities long after the virus is under control. Things will not go back to normal as "the pandemic and its aftermath are prompting cities to rethink how they deliver services, how they plan their space and how they can resume economic growth" (OECD, 2020[3]). Thus, while many innovative responses undertaken by cities tend to be short-term measures aimed at mitigating the effects of lockdown, local governments are also putting in place long-term strategies to aid the recovery and rebuild better than before.

Strategic recovery plans

Cities can turn COVID-19 into an opportunity to design a recovery plan that is inclusive, smart, green and innovative, leading to a more equitable and liveable city post-pandemic. While the pandemic is devastating in many ways, it also prompts cities to overhaul antiquated systems and strategies. In many cases, this trial-by-fire forced them to throw out old playbooks and take courageous decisions on issues long ignored, such as climate change, inequality, homelessness, pollution, public and sustainable transport, food security, digital services and e-government, and more.

Several cities adopted wide-ranging strategies for long-term recovery and resilience. Milan, Italy, developed an Adaptation Strategy that tackles challenges through both short- and long-term actions. The proposal promotes flexibility among the workforce by encouraging smart/remote work and staggered work hours to minimise rush hour traffic. It also aims to improve and diversify mobility options using real-time traffic data to adjust car use rules, expanding cycling infrastructure, encouraging the use of shared vehicles and reclaiming public and green space for residents. Milan's strategy also aims to support social innovation and start-ups to integrate business and social objectives, while creating community cohesion. It plans to leverage existing digital services and develop new tools to ensure the expansion and accessibility of a range of public services. Immediate actions include integrating data sources to enhance analytics and implement targeted interventions, and creating the Citizens' App where residents can access public services through smartphones (City of Milan, 2020[47]).

Other cities created special offices and task forces, like Toronto's (Canada) Office of Recovery and Rebuild designed to develop its long-term recovery strategy. The city proactively engages residents, businesses and communities to gather inputs from a range of stakeholders to guide its actions around rebuilding (City of Toronto, 2020[48]). San Francisco, CA, United States, created a COVID-19 Economic Recovery Task Force to develop its long-term strategy, organised around four topics: jobs and business support (namely for SMEs); vulnerable populations; economic development; and arts, culture, hospitality and entertainment. In formulating its final recommendations, Task Force members reached out to thousands of residents through surveys, interviews, focus groups and town hall meetings (The Office of Resilience and Capital Planning of San Francisco, 2020[49]). In response to the pandemic, Bogota, Colombia, modified its Development Plan to create green jobs, maintain its employment rate and support SMEs, with particular focus on women entrepreneurship and employability (City of Bogota, 2020[50]).

Green recovery: Re-imagining public space

A radical reimagining of public space during COVID-19 serves several functions including adding bike lanes and expanding sidewalks to facilitate socially distanced transport and permitting restaurants to stay open via outdoor seating. While these emergency changes helped keep the economy alive and provided residents with a safe way to get out of the house, they also have longer-term implications.

By reclaiming urban space occupied by cars for bike lanes, sidewalks and outdoor seating, pollution levels dropped while cycling increased. Fewer cars and less traffic mean more bicycle and pedestrian safety, helping make cities more liveable. Milan, Italy, was among the first cities to "reallocate street space from cars to walking and bikes, giving 35 km of roads to pedestrians and cyclists to keep air pollution down and provide more space" to allow for social distancing (OECD, 2020[3]; Laker, 2020[51]). Paris, France, did the same for 50 km of roads. While the change is temporary, Mayor Anne Hidalgo is considering making some of these changes permanent to reduce levels of car usage and pollution (OECD, 2020[3])

Cities around the world are reclaiming street space for outdoor dining to help businesses survive the pandemic and keep workers employed. This means fast tracking or overhauling permitting processes, including in cities dominated by private cars such as Lima (Peru), New York, NY (United States), and Toronto (Canada) (Lindeman, 2020[52]). New York quickly moved to "formalise outdoor dining, launching its Open Restaurants and Open Streets programmes" early in the pandemic (Lindeman, 2020[52]). More than 9 000 businesses registered for Open Restaurants during summer 2020 – such a success that the Mayor agreed to extend the programme to 2021. Besides offering a lifeline to local business and protecting jobs during the pandemic, reclaiming street space can diminish car use. In Toronto, lane and parking spot closures are seen as "big wins in a city that allocates an incredible amount of space to cars, even with mounting pedestrian and cyclist deaths" (Lindeman, 2020[52]).

Medellin, Colombia, took the opportunity for green recovery even further, accelerating efforts to build an eco-city. With a focus on transport, Medellin's COVID-19 recovery plan aims to cut carbon emissions by 20% by 2030. The city plans to offer 50 000 electric bikes for rent at low cost, expand bike lanes by 50% in three years and electrify public transport by 2030 (Anastasia, 2020[53]). In May 2020, Madrid, Spain, piloted a car park for shared vehicles, located next to a metro station to promote sustainable intermodal transport in the central business district. Madrid is also increasing its bus lanes by 30% (OECD, 2020[3]).

Smart recovery: Leveraging digitalisation to fight the pandemic

Smart recovery and digitalisation play "a pivotal role in cities' emergency responses to the pandemic," with cities "solidifying and expanding the use of smart city tools to facilitate and make new rhythms and habits permanent" in the face of social distancing (OECD, 2020[3]). Cities accelerated digitalisation efforts that were not priorities before the pandemic but became indispensable to public services, educational and cultural material, and general connectivity necessary to survive lockdowns. Cities like Riga (Latvia), Bamberg (Germany), Istanbul (Turkey) and Tirana (Albania) developed digital learning platforms for children (EUROCITIES, 2020[54]). Tirana broadcasts classes on national television, while Riga designates one day a week as a remote workday.

Tokyo, Japan, seized the opportunity to digitalise public services including online learning, telemedicine, telecommuting and others (OECD, 2020[3]). Florence, Italy, committed to full digitalisation of municipal services, aiming to go from 85% of digitalised citizen services to 100%. This includes digitalisation of building and landscaping practices, which aims to simplify the authorisation process. Florence is also mapping the provision and quality of fibre optic connections across the city to identify areas with poor connection and ensure universal access to the internet for teleworking (City of Florence, 2020[55]).

Inclusive recovery: Targeted investments to protect the vulnerable

Inclusive recovery entails investment in several sectors, perhaps most notably housing, construction and innovation. Mexico City, Mexico, plans to invest USD 1 billion in the construction sector to create a million new jobs and public infrastructure and social housing (SinEmbargo MX, 2020[56]; Infobae, 2020[57]). Other cities use cash infusions to house the homeless to protect this vulnerable population from increased exposure to COVID-19. In Houston, TX, United States, the city worked with community partners focused on homeless services to move 2 700 people into secure housing and prevent another 2 000 struggling with rent from becoming homeless in the midst of the pandemic (Bloomberg.org, 2020[29]). Rotterdam, Netherlands, invested EUR 20 million in upgrading homeless services, including offering counselling and improved living conditions. This came after the addition of 150 homeless shelters that had been adapted to social distancing requirements (OECD, 2020[3]). Meanwhile, Paris, France, launched a EUR 6 million investment package for small and independent businesses, artisans, cultural enterprises and innovative start-ups, and EUR 4 million for members "of the social and solidarity-based economy" (City of Paris, 2020[58]; City of Paris, 2020[59]). Though each of these investments was made to provide a short-term solution to the crisis, they also provide a roadmap for a new approach to persistent problems that can be scaled up and made permanent.

Innovation and data capacity beyond COVID-19

Cities were always laboratories of creativity and innovation, and their responses to the COVID-19 crisis demonstrate that this remains the case. The unfortunate yet unavoidable demands related to the crisis propelled cities to innovate more in the past few months than they did in years. COVID-19 provided city governments with the impetus to "take bold, courageous decisions that can be politically costly but are more socially acceptable than they were a few months ago." (OECD, 2020[3])

Most importantly, the pandemic showed city governments to be agile and adaptive. A range of measures demonstrate the ability of cities to embrace technology-enabled and data-driven solutions, overhaul traditional working modes and facilitate collaboration across silos. From uncomplicated ad-hoc measures such as pop-up bike lanes and extension of outdoor seating in restaurants, to more sophisticated acts such as digitalising administrative services, cities showed they can think on their feet and leverage innovative ideas to respond to sudden crises.

Cities' responses to COVID-19 show that not every innovative measure requires a formal plan. Many measures were speedily conceived and deployed without an institutional framework or formal strategy. The crisis brought out the survival instinct in many cities, and demonstrated that innovation does not have to be resource-intensive or scrupulously planned.

However, while encouraging, cities' short-term stopgaps and advances should not be construed as substitutes for longer-term, structured approaches to innovation and data use. Though many emergency innovations are effective, there is a risk that this innovation capacity will atrophy as the pandemic abates and cities exit crisis mode. In the post-crisis era, cities might not be able to sustain and disseminate the culture of innovation, or leverage the skills acquired during the crisis. By systematically enhancing their innovation and data use capacity, cities can increase the chances that successful innovations forged in response to COVID-19 can be sustainably funded, staffed and incorporated into the bigger picture of government work rather and scaled up for impact. The infrastructure formed through innovation capacity can ensure that cities' breakthroughs in the COVID-19 era do not disappear once the virus does.

In fact, innovations achieved under the pressure of COVID-19 despite the lack of formal innovation strategy speak to the importance of institutionalising formal mechanisms such as long-term strategy and vision, dedicated funding and staff, data use and evaluation of innovation outcomes. With a solid foundation for a resilient and inclusive city where residents' well-being is at the centre of policy making, governments with

strong public sector innovation capacity might also be better positioned to anticipate future challenges, minimise imminent risks and avoid shocks from crises. They are less likely to be caught off-guard, forced to scramble to maintain levels of internal operations and public service delivery for residents. Instead, by bolstering innovation and data use capacity now, cities can be ready when the next crisis comes, putting themselves in a position to protect the most vulnerable groups of society without being thrown from their longer-term plans. In short, cities can use innovation and data use capacity to act, rather than react.

No matter the context, cities worldwide should strive to maintain the momentum built around innovation and data use during the pandemic. Without the foundation of robust capacity in both areas, successful programmes such as those launched in response to COVID-19 might not be maintained or scaled up. For instance, while cities may have re-routed staff and funding toward innovative activities at the height of the crisis, without dedicated staff or funding for innovation, both resources might be returned to their pre-COVID-19 applications. Exacerbating this risk is that abstract changes such as innovation and data use require long-term investment, and results are not immediate.

However, with a focus on building innovation and data use capacity now, cities can increase the likelihood that spontaneous leaps in deployment that occur during the next crisis may be sustained and scaled, ultimately benefiting residents.

References

Agencia Peruana de Noticias ANDINA (2020), *Municipio de Lima inauguró segunda Casa de la Mujer para víctimas de violencia*, https://andina.pe/agencia/noticia-municipio-lima-inauguro-segunda-casa-de-mujer-para-victimas-violencia-802086.aspx (accessed on 5 December 2020). [28]

Anastasia, M. (2020), *Colombian city uses COVID-19 recovery to become 'eco-city'*, World Economic Forum, https://www.weforum.org/agenda/2020/06/colombias-medellin-eco-city-coronavirus-covid19-recovery (accessed on 5 December 2020). [53]

AP-HP (2020), *Covidom : une solution de télésuivi à domicile pour les patients porteurs ou suspectés Covid-19 co-construite par l'AP-HP et Nouveal e-santé*, Assistance publique - Hôpitaux de Paris, https://www.aphp.fr/actualite/covidom-une-solution-de-telesuivi-domicile-pour-les-patients-porteurs-ou-suspectes-covid (accessed on 4 December 2020). [11]

AP-HP (2020), *COVISAN : Après le démarrage des premiers pilotes, les partenaires ont tenu une première réunion pour faire le point et organiser la montée en puissance*, Assistance publique - Hôpitaux de Paris, https://www.aphp.fr/contenu/covisan-apres-le-demarrage-des-premiers-pilotes-les-partenaires-ont-tenu-une-premiere (accessed on 5 December 2020). [27]

Arundel, A. and N. Es-Sadki (2019), *D2.7 Preliminary survey results report: Understanding value co-creation in public services for transforming European public administrations*, https://www.co-val.eu/blog/2020/01/31/preliminary-survey-results-on-innovation-and-the-use-of-co-creation-methods/ (accessed on 11 February 2021). [39]

Bloomberg.org (2020), *10 innovators who are raising the bar in the fight against COVID-19*, https://bloombergcities.medium.com/10-innovators-who-are-raising-the-bar-in-the-fight-against-covid-19-c6d977dd7396 (accessed on 5 December 2020). [29]

Bloomberg.org (2020), *It's time for civic innovators to document their COVID work*, https://bloombergcities.medium.com/its-time-for-civic-innovators-to-document-their-covid-work-9d62de69376b (accessed on 5 December 2020). [7]

Bloomberg.org (2020), *Lessons from Chicago's COVID-19: Racial Equity Rapid Response Team*, https://bloombergcities.medium.com/lessons-from-chicagos-covid-19-racial-equity-rapid-response-team-6d47414567bd (accessed on 5 December 2020). [34]

Bristol City Council (2020), *Bristol's response to coronavirus (COVID-19)*, https://www.bristol.gov.uk/council-and-mayor/bristols-response-to-coronavirus-covid-19 (accessed on 5 December 2020). [25]

Can Do Bristol (2020), *Can Do Bristol Covid-19*, https://candobristol.co.uk/activity/coronavirus--covid-19-%5bofficial-volunteering---register-interest-w-bristol-city-council%5d (accessed on 5 December 2020). [32]

City of Bilbao (2020), *El Ayuntamiento de Bilbao Pone En Marcha El Programa #Gaztekluba Etxean, Que Ofrece A Las Y Los Jóvenes Alternativas De Ocio Online*, https://www.bilbao.eus/cs/Satellite?c=BIO_Noticia_FA&cid=1279197396455&language=es&pageid=3000075248&pagename=Bilbaonet%2FBIO_Noticia_FA%2FBIO_Noticia (accessed on 5 December 2020). [38]

City of Bogota (2020), *Así cambió el Plan de Desarrollo de Bogotá por el coronavirus*, https://bogota.gov.co/mi-ciudad/administracion-distrital/asi-cambio-el-plan-de-desarrollo-de-bogota-por-el-coronavirus (accessed on 5 December 2020). [50]

City of Buenos Aires (2020), *Contención familiar: cómo abordar los problemas más frecuentes en los hogares*, https://www.buenosaires.gob.ar/vicejefatura/noticias/cuarentena-la-ciudad-lanzo-una-linea-especial-de-atencion-y-asesoramiento (accessed on 4 December 2020). [20]

City of Buenos Aires (2020), *Coronavirus (Covid-19)*, https://www.buenosaires.gob.ar/coronavirus (accessed on 4 December 2020). [16]

City of Buenos Aires (2020), *Nuevas medidas educativas: una mesa de ayuda y apoyo escolar y una canasta alimentaria quincenal*, https://www.buenosaires.gob.ar/jefaturadegabinete/noticias/nuevas-medidas-educativas-del-gobierno-porteno-una-mesa-de-ayuda-y-apoyo (accessed on 4 December 2020). [37]

City of Düsseldorf (2020), *Stadt Düsseldorf schaltet Info-Telefon zum Coronavirus*, https://www.duesseldorf.de/index.php?id=700021325&tx_pld_frontpage%5Bnews%5D=31720 (accessed on 5 December 2020). [21]

City of Florence (2020), *Rinasce Firenze*, https://www.comune.fi.it/system/files/2020-05/rinascefirenze_DOC_6.pdf (accessed on 5 December 2020). [55]

City of Ghent (2020), *Gent Helpt*, https://stad.gent/nl/over-gent-en-het-stadsbestuur/nieuws-evenementen/gent-helpt (accessed on 5 December 2020). [31]

City of Lima (2020), *Aprende con Lima Educación*, https://www.descubrelima.pe/lima-en-casa/educacion/aprende-con-lima-educacion/ (accessed on 5 December 2020). [35]

City of Lima (2020), *Mml Presenta Proyecto Educativo La Escuela de Lima*, http://www.munlima.gob.pe/noticias/item/39958-mml-presenta-proyecto-educativo-la-escuela-de-lima (accessed on 5 December 2020). [36]

City of Los Angeles (2021), *Data on COVID-19: Keeping Los Angeles Safe*, https://corona-virus.la/data (accessed on 22 April 2021). [15]

City of Mexico (2020), *Transparencia Covid-19*, https://datos.cdmx.gob.mx/pages/covid19/ (accessed on 5 December 2020). [19]

City of Milan (2020), *Milan 2020 Adaptation strategy*, https://www.comune.milano.it/documents/20126/7117896/Milano+2020.+Adaptation+strategy.pdf/d11a0983-6ce5-5385-d173-efcc28b45413?t=1589366192908 (accessed on 5 December 2020). [47]

City of New York (2020), *NYC Recovery Data Partnership*, https://www1.nyc.gov/site/analytics/initiatives/recovery-data-partnership.page (accessed on 5 December 2020). [46]

City of Paris (2020), *Coronavirus : soutien aux entreprises parisiennes*, https://www.paris.fr/pages/coronavirus-soutien-aux-entreprises-parisiennes-7678 (accessed on 6 December 2020). [58]

City of Paris (2020), *La Fabrique de la Solidarité : agir avec les acteurs de la solidarité*, https://www.paris.fr/pages/la-fabrique-de-la-solidarite-6389 (accessed on 5 December 2020). [33]

City of Paris (2020), *Un plan de soutien à destination des entreprises et des associations*, https://www.paris.fr/pages/un-plan-de-soutien-pour-les-secteurs-economique-associatif-et-culturel-7808 (accessed on 6 December 2020). [59]

City of Tallinn (2020), *Hack the Crisis Global Community*, https://www.tallinn.ee/eng/Uudis-Hack-the-Crisis-Global-Community (accessed on 5 December 2020). [43]

City of Toronto (2020), *COVID-19: Impacts & Opportunities Report from Toronto's Office of Recovery & Rebuild – City of Toronto*, https://www.toronto.ca/home/covid-19/covid-19-reopening-recovery-rebuild/covid-19-about-reopening-recovery-rebuild/ (accessed on 5 December 2020). [48]

City of Valmiera (2020), *Valmiera Tourism Innovation Hackathon*, https://www.valmiera.lv/lv/jaunumi/turisma_zinas/23294_27_un_28junijs__valmieras_turisma_inovaciju_hakatons (accessed on 5 December 2020). [44]

City of Yokohama (2020), *Moving into a safety net house with rent subsidy*, https://www.city.yokohama.lg.jp/kurashi/sumai-kurashi/jutaku/joho/safety-kakuju.html (accessed on 5 December 2020). [30]

COVID Mobility Works (2020), *#MOVID19 Hackathon*, https://www.covidmobilityworks.org/responses/movid19-hackathon-f1a693b104 (accessed on 5 December 2020). [42]

Davis, E. (2020), *How Data Is Shaping the Way Cities Respond to COVID-19*, https://www.usnews.com/news/cities/articles/2020-04-28/how-statistics-are-shaping-the-way-mayors-respond-to-coronavirus (accessed on 22 April 2021). [14]

DigitalCity.Vienna (2020), *CoVid-19 - Case and Contact Tracing Tool of the City of Vienna*. [12]

Edwards, A. (2020), *City of Dallas Innovation Team Launches COVID-19 Tracker, Food Access Surveys to Crowdsource Data*, https://dallasinnovates.com/city-of-dallas-launches-a-series-of-data-driven-initiatives-in-response-to-covid-19/ (accessed on 5 December 2020). [22]

EUROCITIES (2020), *Dusseldorf – Live TV talk with the mayor*, https://covidnews.eurocities.eu/2020/05/15/dusseldorf-live-tv-talk-with-the-mayor/ (accessed on 5 December 2020). [24]

EUROCITIES (2020), *Overview of social measures in cities to respond to COVID-19 crisis: Policy note*, https://eurocities.eu/wp-content/uploads/2020/08/Policy-note-Overview-of-social-measures-in-cities-to-respond-to-COVID-19-crisis.pdf (accessed on 5 December 2020). [54]

Fukuoka Prefectural Government (2020), *New Coronavirus Infectious Diseases Portal*, https://www.pref.fukuoka.lg.jp/contents/covid-19-portal.html (accessed on 5 December 2020). [17]

Gautheret, J. (2020), *Dario Nardella, maire de Florence : "Au fond, je suis optimiste, nous nous relèverons'"*, https://www.lemonde.fr/smart-cities/article/2020/06/17/dario-nardella-maire-de-florence-au-fond-je-suis-optimiste-nous-nous-releverons_6043109_4811534.html (accessed on 7 December 2020). [5]

Goldsmith, S. and N. Kleiman (2017), *A New City O/S: The Power of Open, Collaborative, and Distributed Governance*, Brookings Institution Press, http://www.jstor.org/stable/10.7864/j.ctt1vjqnwd. [40]

Infobae (2020), *Coronavirus en la Ciudad de México: gobierno planea generar 987,183 empleos tras crisis por COVID-19*, https://www.infobae.com/america/mexico/2020/06/24/coronavirus-en-la-ciudad-de-mexico-gobierno-planea-generar-987183-empleos-tras-crisis-por-covid-19/ (accessed on 5 December 2020). [57]

L'Atelier parisien d'urbanisme (2021), *Observatoire de l'économie parisienne*, https://www.apur.org/fr/nos-travaux/observatoire-economie-parisienne. [4]

Laker, L. (2020), *Milan announces ambitious scheme to reduce car use after lockdown*, https://www.theguardian.com/world/2020/apr/21/milan-seeks-to-prevent-post-crisis-return-of-traffic-pollution (accessed on 8 December 2020). [51]

Lindeman, T. (2020), *Outdoor dining is a lifeline for restaurants, but cities don't always make it easy - City Monitor*, City Monitor, https://citymonitor.ai/fabric/streateries-restaurants-outdoor-seating-rules-coronavirus-5229 (accessed on 5 December 2020). [52]

OECD (2020), "Cities Policy Responses", *OECD Policy Responses to Coronavirus (COVID-19)*, OECD Publishing, Paris, https://doi.org/10.1787/fd1053ff-en. [3]

OECD (2020), *OECD Government After Shock Global Dialogue and High-level Forum: Leveraging the crisis to build better cities*, OECD, Paris, https://oecd-events.org/government-after-shock/session/264cedc5-6a1e-eb11-9fb4-0003ff1d3cc2 (accessed on 16 February 2021). [8]

OECD (2019), *Smart Cities and Inclusive Growth*, OECD, Paris, https://www.oecd.org/cfe/cities/OECD_Policy_Paper_Smart_Cities_and_Inclusive_Growth.pdf (accessed on 22 March 2021). [10]

OECD (2015), *The Innovation Imperative: Contributing to Productivity, Growth and Well-Being*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264239814-en. [41]

OECD/European Commission (2020), *Cities in the World: A New Perspective on Urbanisation*, OECD Urban Studies, OECD Publishing, Paris, https://dx.doi.org/10.1787/d0efcbda-en. [1]

OECD et al. (2020), *Embracing Innovation in Government: Global Trend 2020*, ECD/Observatory of Public Sector Innovation/Mohammed Bin Rashid Centre for Government Innovation/World Government Summit, https://trends.oecd-opsi.org/wp-content/uploads/2020/11/OECD-Innovative-Responses-to-Covid-19.pdf (accessed on 5 December 2020). [9]

Office of Los Angeles Mayor Eric Garcetti (2020), *Mayor Garcetti: L.A. will open thousands of temporary shelter beds for homeless Angelenos as part of COVID-19 response*, https://www.lamayor.org/mayor-garcetti-la-will-open-thousands-temporary-shelter-beds-homeless-angelenos-part-covid-19 (accessed on 22 April 2021). [26]

Saliba, F. (2020), *Claudia Sheinbaum, maire de Mexico : "La mégalopole de demain sera plus participative"*, https://www.lemonde.fr/smart-cities/article/2020/06/21/claudia-sheinbaum-maire-de-mexico-la-megalopole-de-demain-sera-plus-participative_6043603_4811534.html (accessed on 5 December 2020). [45]

SinEmbargo MX (2020), *CdMx invertirá 76 mil 267 mdp en plan de recuperación económica para crear más de 900 mil empleos*, https://www.sinembargo.mx/24-06-2020/3811072 (accessed on 5 December 2020). [56]

The Office of Resilience and Capital Planning of San Francisco (2020), *Economic Recovery Task Force*, https://www.onesanfrancisco.org/covid-19-recovery (accessed on 5 December 2020). [49]

Tokyo Metropolitan Government (2020), *Latest Information about COVID-19*, https://tokyodouga.jp/foreign/daily-eng (accessed on 15 March 2021). [23]

Tokyo Metropolitan Government (2020), *Updates on COVID-19 in Tokyo*, https://stopcovid19.metro.tokyo.lg.jp/en/ (accessed on 5 December 2020). [18]

What Works Cities (2020), *How Data-Driven Cities Respond Swiftly and Effectively to COVID-19*, https://whatworkscities.medium.com/how-data-driven-cities-respond-swiftly-and-effectively-to-covid-19-4de7a96d53e3 (accessed on 22 April 2021). [13]

What Works Cities (2015), *What Works Cities Brief: The City Hall Data Gap*. [6]

World Health Organization (2020), *WHO Coronavirus Disease (COVID-19) Dashboard*, https://covid19.who.int/ (accessed on 7 December 2020). [2]

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