



Deprivations and Inequities in Cities Viewed Through a Pandemic Lens

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The COVID-19 pandemic brought a halt to life as we knew it in our cities. It has also put a magnifying glass on existing inequalities and poverty. While everyone has been facing the pandemic's risks, the lived challenges of the lockdowns have been felt most acutely by the poor, the vulnerable, those in the informal sector, and without savings and safety nets. Here, we identify three ways that the COVID-19 pandemic and related containment measures have exacerbated urban inequalities and how subsequent recovery measures and policy responses have tried to redress these. First, lockdowns amplified urban energy poverty, while recovery measures and policies offer an opportunity to address entrenched inequalities in shelter and energy access. Second, preexisting digital divides even within well-connected cities have translated into inequalities in preparedness for living through the lockdown, but digitalization strategies can enhance equity in access to e-services, online work and education for all in the future. Third, slum dwellers in the world's cities have been particularly hard hit by the pandemic and lockdown measures, but the spotlight on them provides further impetus for slum upgradation efforts that through improved access to infrastructure can improve living conditions and provide more secure livelihoods.

Keywords: COVID-19, cities, inequality, urban poor, energy poverty, slums, informal settlements, digital divide

INTRODUCTION

The COVID-19 pandemic is a combination of a global health crisis, an economic recession, and a social crisis. It has held up a magnifying glass to existing inequalities and deprivations. While it is claimed that “the disease does not differentiate between poor and rich,” the immediate and long-term impacts are being felt by vulnerable populations disproportionately. COVID-19 has manifested more visibly in urban areas in terms of vulnerability, pandemic management, and counter-measures (UN, 2020). Higher population density in cities has increased the risk of spread of the disease, especially in cases when distancing and hygiene requirements have been difficult to meet. This has required more stringent measures to be implemented in cities, which in turn have triggered additional social and economic repercussions (Chen and Chen, 2020). A new World Bank report estimates that the new poor are likely to be more urban (World Bank, 2020). The actual vulnerability to COVID-19 and resilience to the related social transformation in cities depends on numerous conditions, including age, gender, socio-economic status, the place, quality and size of dwellings and workplace, access to public services, reliable energy and clean water, access to digital services, and urban governance. Deep-rooted inequalities in cities have influenced how seamless and workable a transition to the new realities of life under the pandemic has been, and how resiliently populations have been able to adapt, in both the global North and South.

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In this work, we highlight three instances of how inequalities in housing infrastructure, access to Information and Communication Technologies (ICT) and digital services, and access to modern energy services have impacted the ability of urban inhabitants to cope with the lockdowns, curfew measures, and subsequent economic and social fallout. With the COVID-19 pandemic still ongoing and entering its second year, data on impacts, response measures, and lessons learnt are still emerging. Information on select shorter-term impacts is increasingly available, while medium- and longer-term effects are deduced from the lessons of comparable past disruptive events or other similar evidence.

For this Perspective, we undertook a literature search of peer-reviewed and other commercial and government documents across multiple disciplines, to identify illustrative examples of issues, impacts, and responses relevant to the intersection of urban energy poverty, the pandemic, and the three thematic focus areas mentioned above. After identifying the immediate impacts of the pandemic and containment measures, we critically synthesized the reported experiences and measures to assess the potential effectiveness of short-term measures and some implications of these for longer-term strategies. We conclude each of the following three sections with a discussion of how a conscious implementation of recovery to a post-pandemic world could alleviate inequalities and poverty based on multiple dividends, embedding this also within the pre-pandemic literature on longer-term sustainable development transformation strategies.

DISPARITIES IN HOUSING CONDITIONS AND ENERGY USE

Time at home has increased considerably during the pandemic with implications for energy use at home, especially in urban areas, where dwellers had been spending more time inside already before COVID-19 than rural communities (Matz et al., 2015). The growth in thermal energy demand in 2020 compared to 2019 has been estimated at around 18 and 6% in the global North and South, respectively (Kikstra et al., 2021). Similar changes were observed in electricity demand due to more use of ICT, cooking, cooling, lighting [e.g., 26% increase in Indian cities, and 6.7% increase in Bhutan compared to 2019 according to Chhetri (2020)].

Higher energy use means increased energy costs, that generate a serious burden particularly on poor households, especially in buildings with low energy standards. Low energy quality buildings are often inhabited by lower socio-economic groups (Weinsziehr et al., 2017), whose heating costs in Europe can be €2,000 higher per year than the best performing buildings even in normal circumstances (Government of the UK, 2019). Spending more time inside and in poor housing conditions also affect the lives of disadvantaged populations in a number of other ways (Patel et al., 2020). Low quality buildings perform poorly on temperature and humidity control, which can result in a room climate that is either too cold and damp, or too hot, associated

with higher incidence of respiratory problems (Awada et al., 2021).

In parallel, the pandemic has led to contracting markets and closure of industries and services that have resulted in high rates of unemployment, reduced working hours (and thus, incomes) with enormous differences within and across countries. On average, there has been a 10.7% loss of labor income during 2020 compared to 2019 (ILO, 2020) and as high as over 50% in some countries, like Peru. Urban populations have been hit harder, with low quality job-holders, younger workers, and women more likely to lose jobs (Cueva et al., 2020; ILO, 2020).

As a result, energy poverty has been aggravated in many countries, with residents finding it difficult to pay energy bills, e.g., households in European cities spending an additional €18–25 per month for energy. Unaffordable energy bills have also had an impact on mental health (Goyens, 2020).

Shortly after introducing containment and stay-at-home orders, many countries announced measures to mitigate the impact on households and businesses (Mastropietro et al., 2020b). The immediate value of emergency policies has been to enable marginalized families and individuals to continue to earn a salary while staying at home. Traditional poverty measures in electricity provision, such as purchasing prepayment meters have been supported in a number of EU countries (Goyens, 2020). After the pandemic, many countries prohibited disconnection from energy supply in case of non-payments (Mastropietro et al., 2020b). To make this measure specific for vulnerable citizens, some countries applied limitations, such as registration (Government of the UK, 2019), and providing support for first homes only (Goyens, 2020). These bans have been linked to deferral plans, payment extension solutions, and or zero-interest rate loan solutions (Mastropietro et al., 2020b). Sri Lanka set up a special fund for containment, mitigation and social welfare spending, and special energy tariffs were created for vulnerable households in Mali and Togo (IMF, 2020). The validity and eligibility of social tariffs has even been extended in some nations (Spain, Italy and Ukraine) (IMF, 2020; Mastropietro et al., 2020a).

In the longer term, placing buildings in the center of recovery measures and efforts could bring several social, health and economic benefits (Zangheri et al., 2020). Experiencing the hardships of low-quality buildings and energy poverty even more acutely during 2020 can increase the popularity of deep energy renovations. Drastically increasing the energy performance and quality of buildings can provide co-benefits for the resilience and living conditions of vulnerable groups, the environment, and the labor market. Several countries (for example, the UK, Germany) have added building refurbishments to their recovery and stimulus packages, hoping to improve also local employment and economic activity.

Municipalities are among the largest landlords for social housing in many cities (e.g., Vienna), and are responsible for retrofitting housing for vulnerable groups, while providing impetus for the renovation industry and leading into an energy transition (IEA, 2020). Today it is possible to build or retrofit almost any building to produce more energy than what is consumed inside (Ürge-Vorsatz et al., 2020), ensuring almost zero costs for occupants even in lockdown conditions.

DIGITAL DIVIDES AND DIGITAL PREPAREDNESS

The digital divide is not only a global North-South, urban-rural, generational or gender divide (ITU, 2020). It also exists within well-connected cities, megacities, and regional centers across socio-economic strata. Through the COVID-19 pandemic and responses, the divide in digital preparedness to deal with the impacts on everyday life has become visible at multiple levels: for information, schooling, work, social connection, daily chores, entertainment, religious, health and government services.

The pandemic is exposing the lingering inequalities underpinning the digital divide, adding a new dimension of urgency. Multiple barriers exist that hamper digital inclusion: access to digital technologies due to high costs (for devices, Internet, and electricity connections) and unreliable services (again both for electricity and Internet), low digital literacy and support (Beaunoyer et al., 2020). In deprived urban areas, households, schools, and businesses suffer from unaffordable, weak, or non-existent Internet connection (Wamuyu, 2017), leading to falling behind further during lockdowns, missing out on education and income. Improved Internet access in poor urban neighborhoods increases telecommuting and home education opportunities during lockdowns. The poor, young and women are least likely to have jobs that are fit for teleworking (Brussevich et al., 2020), doing the essential work that maintains and sustains urban life: public transport, healthcare, refuse collection, deliveries, or food service and supply. Those with the lowest incomes have also found it hard or impossible to isolate at home, leading to higher risk of COVID19 exposure (McFarlane, 2020).

In such circumstances digital services become a privilege. Sir Tim Berners-Lee, inventor of the World Wide Web, called for access to the Internet to be considered a human right (Web Foundation, 2014). This notion is being supported by the initiative “Cities for Digital Rights” that promotes and defends digital rights in urban settings. Digitalization offers great opportunities to improve access to services, accelerated through COVID-19 related measures (e.g., e-governance, e-health services) (TWI2050, 2020) and to provide opportunities for home schooling and telework. This requires cities to embrace digital solutions and innovation in their planning and management processes, while being cognizant of the digital divide. Many digital public health technologies previously deemed unacceptable are now being tested in cities worldwide to reduce the spread of COVID-19 (Bragazzi et al., 2020). Increasing digitalization of urban life could perpetuate or break the cycle of health inequalities (Hoernke, 2020).

The longer-term impacts of the pandemic and digitalization on cities and their infrastructure remain to be seen. Peak-urbanization (at least for large cities) and the comeback of the country-side or regional centers has emerged as a new demand. With the amenities of city-life, such as entertainment and culture, having come to a halt, affordability of housing and closeness to nature speak for the countryside, if telework is possible. The demand for office buildings and certain types of housing

and related services and jobs could shift. First impacts on the housing markets have already been witnessed. This could impact the future of city composition (migration and segregation), urban planning (e.g., sprawl), municipal budgets and sustainable development objectives. To achieve digital inclusion, cities first need to understand and identify where digital divides persists (geographically and demographically).

Digitalization is an autonomous trend that is impacting nearly every aspect of our lives. It offers many opportunities to improve our lives through better service quality, harnessing of efficiency potentials, facilitating communication and information exchange, and creating new opportunities. At the same time, it comes with challenges for sustainable development for which strong governance at all levels is needed (TWI2050, 2019).

Inequalities in access to technology and services could be addressed by providing reliable, ubiquitous Internet, raising digital literacy rates (Ahmed et al., 2020) and facilitating access by providing electronic devices to those in need, e.g., for educational access for home schooling (Quaintance, 2020). Else digital technologies risk excluding and further disadvantaging those already left behind (Seah, 2020). This requires time, resources, and capacities that not all cities have readily available. Mobile Wi-Fi hotspots (e.g., on buses) for underserved areas or public spots for dense areas are a quick short-term solution (Samms, 2020). The focus should be on what is there already: Bogotá, for example, uses a multi-channel approach including TV and radio to provide education to children during home-schooling (UCLG, 2020).

In the long-run, city-development strategies should build around improved digitalization that ensures inequality aspects, also in partnership with other actors such as the private sector. Cooperation with the private sector needs strong governance (e.g., in procurement strategies) to deliver social value beyond business value alone (Wray, 2020). Municipality owned affordable and reliable Internet (and electricity) is an option that allows connectivity at home in addition to the traditional public places (e.g., libraries, community centers) (Samms, 2020). Lastly, training and empowering users to take advantage of digital technologies is key (What Works Cities, 2020). Given that reducing the digital divide will take time, cities need to continue providing complementary offline services.

SLUM AND INFORMAL SETTLEMENT VULNERABILITIES

Slums, peri-urban, and informal settlements have been disproportionately impacted by the COVID-19 pandemic and its aftermath and have had to face distinctive risks. This is because these are characterized by precarious and overcrowded housing conditions, lack of basic infrastructure and amenities, and a high concentration of the socioeconomically disadvantaged (Buckley, 2020; Corburn et al., 2020; Tampe, 2020). Lockdown measures that were the first response in many countries to deal with the pandemic were difficult to implement and unsuited for such settlements because overcrowding made social distancing

physically impossible, and these measures undermined survival opportunities of slum dwellers (Chirisa et al., 2020; Wasdani and Prasad, 2020). A lack of access to adequate energy and ICT services, a critical issue for most slums even prior to the pandemic, exacerbated the multiple vulnerabilities of populations living in these areas.

Slum dwellers make a significant contribution to urban economies in many developing countries. However, most slum dwellers face asymmetries in access to labor market opportunities, livelihood advancement, and occupational mobility, with a vast majority predominantly employed by the informal sector (Ghosh et al., 2020). While the nature of the informal sector varies from country to country, unregulated working conditions and wages, insecurity of jobs, and lack of social safety nets or protection and low to no savings characterize urban informality more broadly. The pandemic and lockdowns left many informal workers either without jobs and income or compelled to work in precarious and unsafe conditions to survive. The loss of income also had knock on effects, making the payment of regular expenditures for rent, water, electricity, and other utility services difficult and forcing many to continue to work, since a lack of access to adequate energy services and ICT amenities precluded these populations from remote education or teleworking. In some instances, evictions increased, as a vast majority of urban homes are rented rather than owned and lost incomes made regular rental payments difficult.

Women within these settlements have been disproportionately impacted by the pandemic, being overrepresented in the informal economy, and more likely to be engaged in invisible work, such as home-based or domestic and care work (WIEGO, 2020). Already overcrowded homes with additional anxious family members confined indoors have also resulted in increased rates of gender-based violence under lockdowns [Gender in Humanitarian Action Working Group (GiHA WG), 2020; Mittal and Singh, 2020]. A lack of street lighting and unreliable electric supply in urban slums, in addition to the cramped living conditions, has increased the vulnerability of women to domestic violence (de Duren and Ruth, 2020), and put abusers in closer proximity to their victims making it harder for women to seek help too.

A growing concern has also been the potential health associations of cooking with biomass in cramped indoor quarters and COVID-19. Many slum dwellers already depend on biomass or charcoal for cooking, and women and children are more exposed to the smoke from these kitchens. The pandemic increased exposure to indoor smoke through several channels. For some, who were able to afford cleaner fuels before the pandemic, economic insecurity and income losses forced a move down the energy ladder to the use of cheaper and more easily available solid fuels or kerosene (Shupler et al., 2020). In other evidence, slum and unorganized floating residents were found to use more biomass and other solid fuels not only to offset the financial burden but because cooking activity increased significantly due to the shutdown of hotels, restaurants, and street vendors (Beig et al., 2020). Efforts to increase access to clean cooking services have included either extending pay for

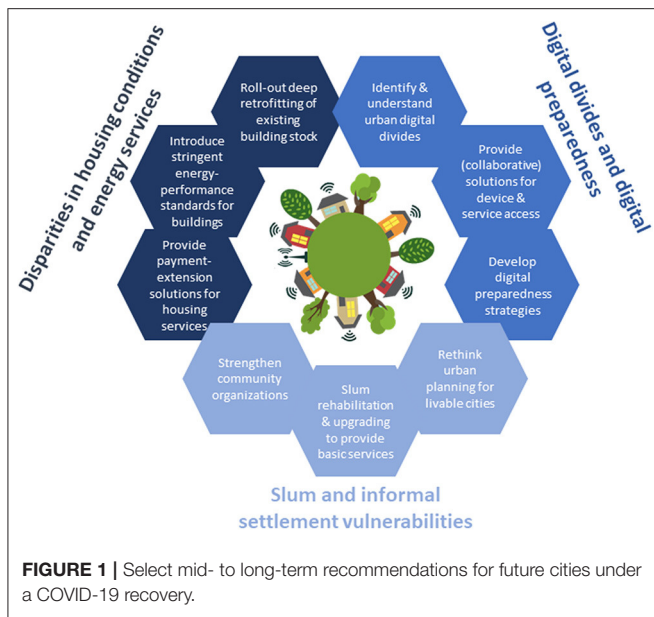
service financing options or potentially discussing the extension of government schemes like India's Ujjwala targeted to rural areas to also include poor urban households (Hindustan Times, 2020).

Recent trends indicate that in many developing and emerging economies urbanization has to a large extent proceeded unplanned, with many of the urban poor ghettoed in slums and informal settlements. The pandemic provides an opportunity to rethink how we develop and plan cities. Strengthening community organizations within slums can be an important means of enabling local action. Partnerships between such community groups and local governments and municipalities, private sector, non-governmental agencies, and social organizations can help in designing locally developed strategies to protect slum inhabitants from the immediate impacts of the pandemic. Several examples of such initiatives have been documented in many countries. One such is the case of the city of Bengaluru, India, where Swiggy, a food delivery platform partnered with commercial kitchens, NGOs and the state government to provide daily meals to thousands of underprivileged, daily wagers and stranded migrant labor during the lockdown (Deccan Herald, 2020).

In the longer term, for cities to remain places of opportunity, a broader structural transformation of slum and informal settlements to provide decent housing and shelter as well as access to basic amenities, secure employment, and safe public green and open spaces is necessary (Patel and Shah, 2020). Future slum rehabilitation programs need to consider integrating concerns regarding effective urban governance and formalization of informal spaces (Van Belle et al., 2020). This also means cities need to take a more dynamic and inclusive approach to planning to enhance equity and resilience (Bhide, 2020). Universal access to basic services including health, education, water, energy, digital services, sanitation, and waste collection, with targeted interventions for vulnerable groups also needs to be ensured (UN, 2020). Many cities have realized that resilience, equity, and access to basic public services and green public spaces are essential for their citizens well-being (C40 Cities, 2020). Broader strategies for more just relationships between employers and workers, educators and students are needed to address preexisting inequalities and ensure long-term security of jobs and livelihoods.

CONCLUSIONS

The COVID-19 pandemic has transformed some short and long-term dynamics in our cities (Sikder, 2020), but the impacts are unevenly spread across populations, often aggravating previously existent inequalities. Therefore, recovery measures need to ensure immediate relief, but also point toward long-term solutions that contribute to the redistribution of wealth, and new urban development through tapping the benefits of improved housing, more



inclusive infrastructure, and better access to basic amenities and services.

In this perspective, we sketch out key focus areas for governments to work on to improve living conditions and preparedness of the urban poor (Figure 1).

Local policymakers are called upon to address the three issues that are underlined in this paper: disparities in housing conditions and energy services, digital divides and digital preparedness, and slum and informal settlement vulnerabilities. Urban green recovery plans that include large-scale home renovation programs could ensure warm, healthy homes and affordable energy bills for all. In the shorter-term, alleviation of payment defaults on rents and utility bills of the energy poor should continue. In parallel, urban digital preparedness, more equal access to virtual delivery of essential services,

provision of opportunities for virtual working and education for all in the future need attention. COVID-19 can be a wakeup call to increase efforts to close the digital divide and push for structural change. The crisis has increased the urgency to redesign and improve informal settlements and for providing adequate and efficient services that address the diverse needs of poor urban residents. This requires partnerships between urban municipalities and planners and stakeholders, as well as strengthening local communities for inclusive planning strategies (PSUP University Politecnico di Torino, 2020). More immediately, direct support to slum and informal settlement populations for income support, adequate nutrition, energy, water and other basic infrastructure and services is necessary.

All in all, the COVID-19 pandemic has been a “test of societies, of governments, of communities and of individuals” (Bachelet, 2020). Solidarity and cooperation are our tools to tackle the virus, to mitigate the effects of the pandemic, and to develop more sustainable, resilient, and livable cities. In this context, we treat digital technologies, home renovation, and slum rehabilitation as means, not the end (UCLG, 2020) to improve conditions for all, and the specific needs of the most deprived, in particular. We need more egalitarian policies to enhance access to modern infrastructures and decent living services for all and to ensure reliance to future shocks for the most vulnerable.

DATA AVAILABILITY STATEMENT

The data that support the analysis and findings of this study are publicly available from sources that are referenced in the article, further inquiries can be directed to the corresponding author.

AUTHOR CONTRIBUTIONS

SP conceived the research. BB-K, SP, and CZ analyzed and wrote parts of the perspective and conclusions. All authors contributed to the article and approved the submitted version.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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