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## **Infrastructuring care in digitally mediated cities: Comparative insights from Seoul, Singapore, and Taipei**

### **Abstract**

This paper examines how everyday care is framed and enacted through digital urban infrastructures in times of crisis. Taking the COVID-19 pandemic as a framing, the paper unpacks the ways digital technologies are deployed as care infrastructures to enrol bodies into systems of governance, monitoring, and intervention. We mobilise a thematic and comparative analysis of examples from Seoul, Singapore, and Taipei to address this aim, illuminating the embodied processes through which care practices and relations are shaped by the co-constitution of digital technologies and diverse urban actors under crisis conditions. By casting attention to the digital mediation of bodies and infrastructures in crisis-ridden cities, we develop a nuanced account of care as a constantly emerging and non-teleological phenomenon, manifesting variously as control, solidarity, interdependency, and social connectedness, to name a few, with respect to the use of digital technologies across different urban spaces and temporal contexts. Such an understanding of digitally mediated care helps to foreground the spatiotemporal (re)production and circulation of specific types of bodies and subjectivities in response to urban crises. More practically, thinking comparatively about the digital infrastructuring of care in cities in the context of the global health crisis offers insights into how and why certain cities, such as Seoul, Singapore, and Taipei, have been lauded by popular media as “success stories” in pandemic management and crisis resilience. Our analysis thus addresses critical questions about the infrastructuring of urban populations and the potential reconfiguration of care provision in digitally mediated cities.

### **Keywords**

Infrastructure, care, digital technologies, Seoul, Singapore, Taipei

## Introduction

Digital technologies are increasingly deployed in cities around the world to not only exercise control over the spaces where people live, work, and move but also organise and regulate the kinds of bodies that use and interact within these socio-spatial environments. The drive to digitally transform contemporary urban life and living arguably reached its height during the COVID-19 pandemic, where many cities rushed to mobilise digital infrastructures to monitor and govern the movements of both human and nonhuman inhabitants (Chen et al., 2020; McGuirk et al., 2020). In Singapore and several Australian cities, for instance, Quick Response codes, along with digital apps, CCTV cameras, and facial recognition technologies, were brought together during the pandemic to support automated decision-making in infectious disease surveillance and outbreak control (Goggin and Wilken, 2024). Comparable to other crises around the world, the COVID-19 pandemic gave rise to “a terrain of action and meaning rather than an aberration” (Vigh, 2008: 8), generating both challenges for urban governance and possibilities for social change. Within urban studies, scholars have examined the relationship between digital and ‘smart’ technologies and embodied practices, focusing particularly on the complex and uneven ways in which platforms, apps, quantified data, operating systems, and so on function as infrastructures of everyday urban life (Barns, 2019; Luque-Ayala and Marvin, 2020). This body of work has drawn significant attention to how digital urban infrastructures configure and participate in everyday spatial and embodied processes, from the conduct of citizenship (Cardullo and Kitchin, 2019) to the production of spatialities and cultures of mobilities (Leszczynski, 2016).

This paper seeks to advance existing urban research on the digital infrastructuring of cities by bringing it into conversation with geographical conceptualisations of care. We interrogate the ways digital technologies are framed and deployed as care infrastructures to enrol bodies into systems of governance, monitoring, and intervention. To an extent, this analytical intervention is productive precisely because the implementation of digital infrastructures is frequently justified by urban policymakers through a rhetoric of care and responsibility — especially during the COVID-19 pandemic — as technological “solutions” intended to ensure effective public health measures and to address socioeconomic impacts (Kitchin, 2020; Söderström, 2021). More fundamentally, the lens of care, we argue, enables a nuanced analysis of how socio-technical urban worlds are produced through asymmetrical power relationships while simultaneously offering pathways for conceptualising how “new forms of relationships, institutions, and action that enhance mutuality and well-being” may be fostered and realised (Lawson, 2007: 8). By casting attention on the digital mediation of bodies and infrastructures in crisis-ridden cities, we develop a nuanced account of care as a constantly emerging and non-teleological phenomenon, manifesting variously as control, solidarity, interdependency, and social connectedness, among other forms, across different urban spaces and temporal contexts shaped by digital technologies. Accordingly, such an understanding of digitally mediated care will illuminate the spatiotemporal (re)production, circulation, and governance of particular bodies and subjectivities in response to various, and in some cases prolonged, crises, which may be intensified or attenuated through the growing integration of digital systems into the urban fabric.

To address this aim, we draw upon selected examples from Seoul, Singapore, and Taipei to examine the embodied processes through which care practices and relations are shaped by the co-constitution of digital technologies and diverse urban actors under crisis conditions. Specifically, this paper focuses on how different modes of care are infrastructured with and

through the digital during the COVID-19 pandemic, namely, digitally mediated borders in Taipei, everyday mobile and video-mediated communication in Seoul, and state-managed digital information infrastructure in Singapore. Not only were these digital infrastructures particularly salient in their respective contexts during the pandemic, functioning as key sites through which institutional care was delivered, but they were also chosen for their capacity to illustrate distinct registers at which digital care infrastructures operate, from border control and state information management to everyday communication. We suggest that the combination of these examples illustrates critical sites that broadly constitute ‘the urban’ in which institutional care is enacted through digital technologies in response to the COVID-19 pandemic. Moreover, by analysing institution-led digital interventions for care in Taipei and Singapore, as well as people’s responses to care gaps unfulfilled by state-implemented initiatives in Seoul, we engage with dominant readings of ‘smart’ urban governance in geographical research, which are largely grounded in Euro-American conceptions of power that frame digital interventions primarily as instruments for asserting top-down control. It is with this angle that we focus on three Asian cities that were, at various points during the pandemic, lauded by popular media as exemplars of institution-led pandemic management and crisis resilience, offering a germane comparative foil for unpacking what might constitute digitally mediated urban governance of care in the twenty-first century (Mora et al., 2025; Ward et al., 2025). Although focusing on Taipei, Seoul, and Singapore, the analysis that this paper thus offers has broader implications for understanding the infrastructuring of care for inhabitants in digitally mediated cities, by attending to both the challenges and potential of more technocratic and/or technocentric modes of governance engendered by digital urban infrastructures.

Following this introduction, we briefly review the emerging literature on digitally mediated care and introduce an approach for examining our empirical examples. We then draw on news, policy documents, and a documentary film to evaluate examples from Seoul, Singapore, and Taipei. This disparate set of materials — in Chinese, English, and Korean — is mostly publicly accessible via governmental webpages, archives, city planning repositories, critical scholarship, and media outlets, and was gathered and qualitatively compared by the researchers for how care is framed and articulated in relation to digitalisation programmes in each city. Each empirical section thus spotlights a contextually specific enactment of digital urban interventions and their implications for care, but together, they reveal the embodied processes through which care practices and relations are shaped by the entanglement of digital technologies and urban actors in moments of crisis. In the concluding section, we offer a comparison of the three cases to gesture towards the conceptual and practical implications for studying the infrastructuring of urban populations and the potential reconfiguration of care provision in digitally mediated cities.

### **Care in/and the smart city**

Within digital geographies, there has been a rise in interest in the concept of care, which is often defined as “everything that we do to maintain, continue, and repair our ‘world’ so that we can live in it as well as possible” (Fisher and Tronto, 1990: 40). Broadly positioned as a corrective to the currently dominant preoccupation in geographical research with the more harmful effects of digital technologies, this scholarship calls attention to their generative possibilities — of which care is one — while recognising that these digitally mediated

practices of care are non-innocent (Power et al., 2022), often ambivalent (Kong and Woods, 2018a), contextual (Raghuram et al., 2009) and performed as an unevenly embodied and ethically situated activity (Puig de la Bellacasa, 2017). Significantly, digital technologies are increasingly functioning as institutional care infrastructures that operate across multiple space-times, extending governance mechanisms while simultaneously mediating everyday caring relations (see Milligan, 2000; Power and Hall, 2018). This shift reflects broader transformations in institutional care practices over recent decades (Milligan and Wiles, 2010), in which, unlike the centralised institutions of mid-20th century care provision, digital technologies are generating fragmented, multi-sited arrangements that blur boundaries between public services, private contractors, and individual responsibilities, thereby reconfiguring who cares, where care occurs, and how caring relationships are enacted. At the heart of this shift is the enrolment of bodies into digitally mediated care systems through interfaces, apps, and tracking technologies that both enable and constrain caring practices, transforming homes, workplaces, and public spaces into sites where institutional care is performed and negotiated.

To illustrate, Reid (2021: 86) highlights the ways ‘smart’ devices are “implicated in care and caring practices” by facilitating ageing in place and enabling older people to maintain their independence and self-determination through a cost-effective and generally preferred alternative to institutionalised care. Concurrently, these technologies of care transform the home into a relational space, one that is neither entirely public nor private, and is inhabited by residents, family members, caregivers, and a range of more-than-human actors (Reid, 2022; see also Schwiter and Steiner, 2020). Whereas Reid’s contribution illuminates how caring practices and relations between humans are (re)shaped by digital technologies, other scholars foreground the entanglements of care between humans and non-human entities. Maalsen (2023: 202), for example, argues that focusing on care enables a deeper appreciation of the relationships between humans and algorithms — that we care for and with other things — revealing the care practices, politics, and ethics that are “bound up with our encounters with algorithmic technologies and which have implications beyond ourselves”. Conceptualising algorithms with and through care, as Maalsen stresses, invites reflection about people’s responsibilities in relation to digital technologies, as well as how individuals care through the digital and the reciprocity of care digital technologies themselves demand. Across these examples, care crystallises as a useful concept for digital geographers to reimagine “human-nonhuman relations, subjectivities, and potentialities that come to be possible” in digitally mediated worlds (Del Casino et al., 2020: 606), particularly because thinking with care necessitates an orientation towards “knowledge construction without negating dissent” and an acknowledgement of the “unavoidable thorny relations that foster rich, collective, interdependent, albeit not seamless, thinking-with” (Puig de la Bellacasa, 2012: 205).

Some digital geographic engagements with care have furthermore examined how digital technologies mediate the practice of care in everyday urban contexts. A significant thread in this literature has been about the fostering of safety and security through digital urban infrastructures. Nicolosi and colleagues (2020) demonstrate how the collection and sharing of data on incidents of harm through volunteered geographic information systems and applications allows individuals to access support and identify unsafe urban spaces, and by extension, can be seen as an expression of care work, albeit one with inherent limitations such as the accuracy of crowdsourced data. However, as Datta (2020b) warns, the techno-

solutionism of smartphone safety apps serves to naturalise their surveillance functions, and these apps are moreover prone to unreliability because of slow download times, app crashes, and a general lack of supporting infrastructure. Nevertheless, the point here is that approaching digital technologies as things that we care with and through, rather than defaulting to assumptions about their more harmful effects, can broaden discussions about the work that digital infrastructures do in the urban solely from threatening and violent presences to their potential contributions to supporting and enhancing urban life.

In this context, our paper foregrounds the generative analytical potentialities of care in exploring the patchy entanglements of bodies, digital technologies, and socio-institutional practices, afforded by the notion of care operating in and across different domains of the city — an emergent process that is inherently relational and situational, simultaneously caring, careful, and careless. The COVID-19 pandemic has amplified how such digitally mediated caring relations unfold in context-specific and uneven manners, yet most literatures have hitherto discussed the crisis only in relation to the (re)arrangement of urban governance and (bio)politics through the implementation of digital infrastructures (Chen et al., 2020; Enright and Ward, 2021). Although acknowledging the harmful effects that an increased, almost ubiquitous surveillance over the public might bring about, our focus here is to think through how care enables the entanglement of bodies and digital technologies in different urban environments and allows for “differences in the infrastructural architecture of care” to be performed “in a globalizing world of care” (Raghuram, 2012: 155). This approach underlines how the notion of care provides a productive angle to look at different cities comparatively, especially given the recent groundswell of academic and public concern over the “global polycrisis” (Lawrence et al., 2024).

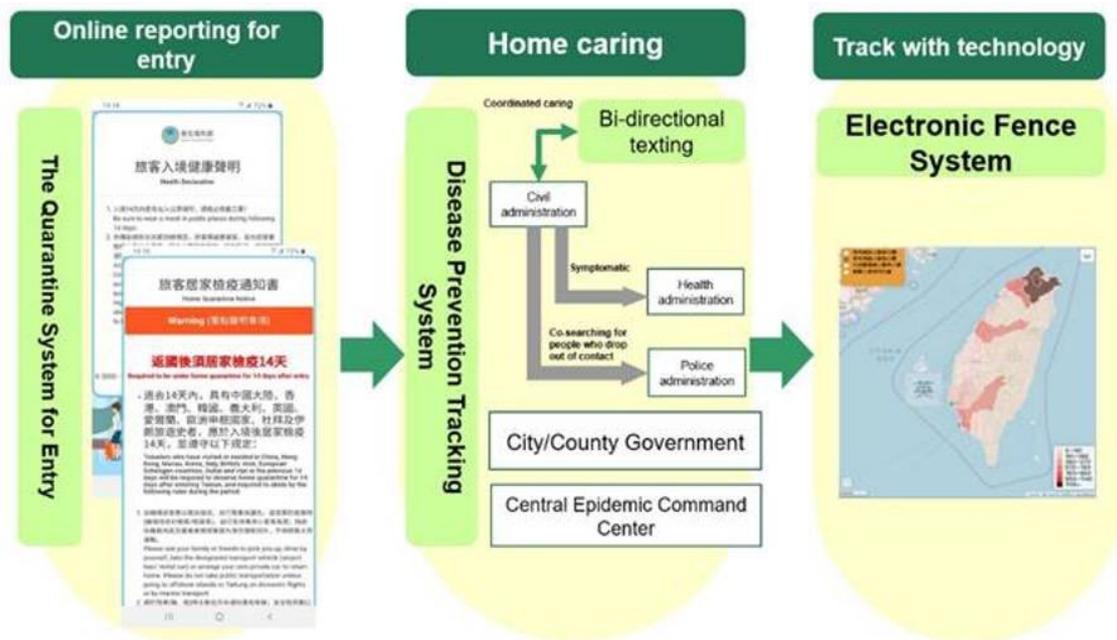
Central to our interest is the enrolment of bodies into digital infrastructures of care in times of multiple, interconnected, and recurrent crises in cities. Our analytical focus thus lies in the ‘embodied geographies of infrastructure’ (Lesutis and Kaika, 2024), mediated by digital urban technologies that people care with and through. The life-sustaining effects of care — or the lack thereof — need to be performed through bodies, which involves, in the context of digitally mediated cities, the (re)production of new entities and beings in and through various interfacing of bodies and digital technologies, be they QR code scanners, healthcare apps, or devices (Rose, 2017). Since “[c]are is a relation of co-activity, constantly being remade by those who participate in it” (Seo, 2020: 6), and if we position digital urban infrastructures as part of that relationship, what animates this form of digitally mediated caring relation, we contend, is the subjectivities and potentialities that are generated through digital technologies. By paying attention to moments when such relations come into being, we can better account for the role that digital infrastructures play in co-constituting different subjects of care and, by extension, materialising more caring urban environments, however “morally ambiguous and relationally unstable” (Cook and Trundle, 2020: 178) they might be. In the following sections, we bring such an understanding of care to bear on our three case studies.

### **The digital care fortress from the border to the home in Taipei**

The Severe Acute Respiratory Syndrome (SARS) outbreak of 2003 left Taiwan with one of the world’s highest fatality rates (WHO, 2015). Yet, this devastating chapter and the lessons from SARS would become the foundation for Taiwan’s rapid and decisive response when COVID-

19 emerged nearly two decades later (Ministry of Health and Welfare, 2020a). At the onset of the 2020 outbreak in Taiwan, authorities swiftly established the COVID-19 Central Epidemic Command Centre (CECC) to address the ‘affective atmosphere of death’ and ‘emotions of harm’ (Yu, 2024) through the implementation of stringent containment measures. In particular, strict border control and mandatory health management/home quarantine were identified by the CECC as central strategies to contain the spread of COVID-19. As Taiwan’s most densely populated city, Taipei became both a focal point for these interventions and a testing ground for their effectiveness.

To streamline immigration procedures and facilitate real-time health tracking, authorities introduced the Quarantine System for Entry. Travellers were required to scan a QR code and complete a health declaration online either before boarding their flight or upon arrival. This information was then automatically integrated into a disease prevention tracking system, enabling authorities to enforce a mandatory 14-day quarantine on visitors. In parallel, regulatory bodies deployed the Digital Fencing Tracking System, developed in collaboration with telecommunications operators, to monitor the locations of individuals in home isolation or quarantine. Entry into Taiwan became highly regulated, being limited primarily to residents of Taiwan and those holding valid residency permits or special entry authorisation. Those permitted entry were then placed under constant surveillance, with their movements monitored through an extensive network of digital infrastructures (see Figure 1).



**Figure 1:** Digital infrastructures developed for border control during the COVID-19 pandemic. *Source: Ministry of Health and Welfare (2020b)*

The newly digitally formulated caring relationship, initially designed for border control, was rapidly extended into the domestic sphere as the coronavirus spread and Taipei — with its dense population and status as Taiwan’s transportation hub — became a major hotspot particularly vulnerable to rapid transmission. A key development in this process was the Taiwan Social Distancing App, co-created by the Centers for Disease Control (CDC) and Taiwan AI Labs. This app utilised Bluetooth technology to detect whether a user had come within two meters of a confirmed COVID-19 case for more than two minutes within the past

14 days. By enabling real-time data sharing, the app and associated digital devices coordinated individual mobilities and travel behaviours, aligning people's actions with broader public health objectives. This digital system effectively embedded individual bodies within a broader 'community' of care, reinforcing civic duty and self-governance in managing health risks.

Through these digital infrastructures, the prevailing 'parental' caring relationship between authorities and the public was reconfigured. People were strongly encouraged to download the app, with officials framing it as an essential tool to expand public care protections, particularly in dense urban environments like Taipei where the virus could spread rapidly. In remarks particularly relevant to dense metropolitan areas like Taipei, the then-President Tsai Ing-Wen declared:

*"In facing the pandemic, we should not panic. To create a more resilient 'New Taiwan Model,' I encourage everyone to download the app, with younger people helping elders at home. In this way, we can cultivate a new sense of caring solidarity (團結防疫)<sup>1</sup> to fight against the pandemic." (Radio Taiwan International, 2022)*

This system positioned a range of actors — including government agencies, city authorities, the police, healthcare providers, and family members — as enforcers of care. By deploying an extensive network of QR codes, healthcare apps, and geolocation tracking, government officials engineered a layered system of care extending from the borders into private homes. As Tsai emphasised, this system embodied the ethos of "benefiting both others and oneself" (Ministry of Health and Welfare, 2022), a concept deeply embedded in Taiwan's approach to pandemic governance.

Through the lens of care, the Taiwanese case highlights how digital infrastructures have reconfigured the caring relations between authorities and members of the public under the conditions of the COVID-19 pandemic. These technologies not only reinforced 'affective nationalism' (Yu, 2024) but also legitimised the expansion of digital governance in public health, projecting a sense of protection and security in times of crisis. The slogan "Taiwan can help, and Taiwan is helping!" (Taiwan Centers for Disease Control, 2020) exemplifies how this 'new' mode of digitally mediated care was widely accepted as a 'success' story. And in Taipei, where digital surveillance was most intensive and the stakes of containment highest, this narrative of success was particularly pronounced. Yet, just as this highly securitised deployment of digital care was celebrated as an 'innovative' model of pandemic resilience, it also raised concerns for some. Critics pointed to the risks of 'digital pressure' — where individuals faced overwhelming expectations to engage with multiple health-tracking devices — as well as concerns about overexposure through data-sharing mechanisms (Taiwan Association for Human Rights, 2021). The filtering of access through residency, citizenship, health status, and biometric tracking has therefore effectively exposed emerging social fault lines. In other words, the system reinforced the authorities' paternalistic role — where 'everything I do is for your/our future' — but also revealed tensions between care, control, and coercion.

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<sup>1</sup> The term 團結防疫 (tuánjié fángyì) encapsulates the idea of collective action for disease prevention, emphasising the importance of unity in safeguarding public health. It signifies a coordinated effort to repair and stabilise the caring relationship between individuals and institutional security during the pandemic.

As such, while Taiwan's digital pandemic response was widely regarded as effective, it is essential to examine the boundaries between care and surveillance, particularly the risks of 'emotional blackmail' in institution-imposed caregiving structures. The Taiwanese case urges a rethinking of an ethics of care, questioning how digital infrastructures shape notions of responsibility, solidarity, and governance in times of crisis. The caring approach offers a new perspective to read Taiwan's pandemic governance, highlighting the dis/connections between different bodies. At the same time, it raises critical questions about the quality and equity of this newly engineered care relationship.

### **Digital technologies in everyday spaces of care in Seoul**

Similar to the Taiwanese case, the Korean government's responses to COVID-19 were internationally lauded, often referred to as one of the most successful models "based on innovation and public trust" (WHO, 2020). Primarily focused on testing, tracing, and treatment, which involved both the implementation of new digital infrastructures as well as innovative ways of using existing ones, the country weathered the pandemic without imposing stringent measures of mobility control, such as a complete lockdown.

Given that Seoul and its surrounding areas house around half of the country's total population, the city acted as a test bed for different kinds of measures pivotal to contain the spread of the virus, such as drive-through screening stations, non-face-to-face healthcare services. And just like Taiwan/Taipei, QR codes, home quarantine apps, digital infection maps, emergency alerts from regulatory authorities, and so on quickly became part of people's lives in Seoul during the pandemic. Although such implementation of digital infrastructures has attracted criticism regarding biopolitics and "technological self-governance" (Shin, 2021: 507), it has generally been discussed as "a unique example of applying advanced science and ICT in maximizing the efficiency of coping with the crisis" (Asian Development Bank, 2021: 1), alongside portrayals of the population as digitally well-equipped and compliant with government restrictions.

However, there existed a flip side to this 'success' story: digitally mediated care practices in everyday spaces can be found beyond the reach of biopolitical techniques, which both shape and are shaped by the deployment of wider-scale digital infrastructures. For example, in a 2023 documentary film, titled <The Teachers: Pink, nature trail, ridge between rice paddies, and plum>, attention is cast on an after-school childcare facility in Seoul that "shifted to an emergency care system when schools and private educational institutions were closed, playgrounds and libraries shut down, and streets froze over due to social distancing" (Park, 2022). The film illustrates that, despite government measures against the pandemic being deemed 'successful', critical gaps remained in the provision of childcare in the city. The gap was particularly stark against other pandemic restrictions such as home quarantine, the shutdown of public childcare facilities, and minimal lockdowns to limit negative impacts on economic activities (see Kim et al., 2020). Essential care labour for children, usually provided by individual households and childcare facilities, could not be maintained because of the absence of caregivers at home who were either working as usual or home quarantining — the very 'achievements' enabled by digital urban governance approaches (Lee-Geiller and Lee, 2022) — while public schools remained closed.

Still, as the documentary shows, there were various moments where such care needs — vital to sustaining daily lives of those involved and, by extension, the wider city — were met by digital technologies in innovative ways. A significant example illustrated in the documentary was the role played by smartphones in facilitating not only the necessary care labour but also caring relations across different spaces, such as the childcare facility, individual homes, streets, and public spaces. Here, we outline two scenes to elucidate the intertwinement of digital devices, bodies, and care labour that gives life to different caring subjectivities in Seoul.

*Scene 1: Delivering snack boxes*

*The care workers, accompanied by some children, delivered snack boxes to other children who were staying at home because of the pandemic restrictions, quarantining at home and/or voluntarily social distancing to reduce the density of the childcare facility. They enclosed a newsletter and a memo with the boxes to share their daily lives and longing for the times when they could get together freely. The memo said, 'How are you? We miss you so much. We have prepared a newsletter and some gifts for you. My lovely friends, let's meet up soon!' They made video calls to check in with those staying at home and to let them know that their snack boxes were delivered, right in front of their houses. They saw each other's faces through their smartphone screens while talking across doors that separated them in accordance with social distancing guidelines. The streets and the buildings echoed with the children's laughter and their voices saying, "We miss you! Take care! Let's meet soon!", which were captured and transmitted through the digital devices that mediated such care practices during the pandemic.*

*Scene 2: A graduation ceremony*

*The childcare facility actively utilised smartphones to organise events, which used to be held in-person, so as to accommodate as many people as possible. In a scene that showed a graduation ceremony that took place during the pandemic, people gathered in two different places to celebrate those who graduated that year. Throughout the ceremony, they set up a video call between the two places so that they could still experience the joy of meeting in-person and at the same time remaining connected to others who could not be in the same place due to social distancing measures. The smartphones connecting the two places sometimes were handed over to different people in each venue, enrolling different bodies through the same devices mediating such convivial, caring relations between the two separate, yet connected places.*

These uses of smartphones suggest an emerging sense of social connectedness alongside government measures, which, while often estranging people from one another, also foster different forms of care oriented towards public health, as illustrated in the cases of Taipei and Singapore. In the documentary, people did not abandon in-person meetings and communications altogether. Rather, the childcare facility even extended its working hours to meet additional care needs created by the shutdown of public schools, and parents and care workers organised in-person meetings whenever possible. However, these relations were not as same as before, given that individuals could no longer, as one of the care workers recounted, "slap high-fives and make eye contacts with each other when arriving at *Teojeon* [referring to the facility] and going back home, come close and hold hands to share warmth",

which were replaced by “a quick eye contact and waving in the air” (Han, 2022). And because of these changes that attenuated a sense of connectedness among this ‘community’, individuals had to make use of their smartphones in ways they had never thought of or previously found necessary to care for one another. Specifically, video calls emerged as a key technological mediation that enrolled and connected caring bodies and voices, as illustrated in the scenes above, fostering a sense of connectedness across the spaces in the city (i.e., individual homes, streets, the childcare facility, and so forth) and gesturing towards how people care with and through digital technologies to sustain not only basic care labour but also caring relations underpinning everyday lives.

Attending to the ‘innovative’ roles played by digital technologies in everyday spaces of care provides a different angle to think about digital and smart urbanism, especially with regards to the dominant, state-centric understanding of urban digitalisation and its critiques in Seoul and beyond (Joo and Tan, 2020), which reflects longstanding concerns over the rise of technocentric urban governance (McFarlane and Söderström, 2017). Through the lens of care, however, we argue that digital technologies are deeply entangled with multiple instantiations of care operating across different registers, be they governmental digital technologies for pandemic control, technological self-governance that (re)shapes mobility patterns (Shin, 2021), or everyday uses of digital devices to care for others. Moreover, the very smartphones used for video calls to foster social connectedness in the documentary could also enrol the same bodies into wider-scale digital infrastructures that facilitate social distancing for public health reasons. This tension substantiates a need to explore various moments in which different caring bodies and subjectivities emerge through the interfacing of bodies and digital infrastructures across the city. By analysing these interactions, we can better account for nuanced and innovative ways in which the notion of care and the digital co-constitute more caring urban environments, moving beyond the conventional dichotomy of top-down and bottom-up approaches mobilised to understand digital and smart urbanism.

### **Managing information flows in Singapore**

While smartphones fostered social connectedness within an after-school ‘community’ in Seoul during the COVID-19 pandemic, in Singapore they were leveraged by state authorities as key instruments for articulating civic care. As the coronavirus spread across the globe, so too did the rapid dissemination of misleading information. Misinformation, fake news, and scams related to the virus outbreak quickly became a public concern as they proliferated across social media and diverse digital communication platforms, inciting widespread fears and social unease. Even in Singapore, where the Protection from Online Falsehoods and Manipulation Act had been in force since 2019 and a city-state widely known for its ‘effective’ governance strategies, ensuring that the public received and circulated accurate, verified information remained paramount for the government, which was crucial not only to counter misinformation but also to allay the panic and disorientation that had gripped the city-state since the declaration of the pandemic in March 2020 by the World Health Organisation.

This emerging societal challenge was accordingly managed by the Singapore government through two broad, mutually reinforcing registers. First, and importantly, individuals were enlisted by the state into ‘the fight against the virus’, as then Senior Minister of State for Defence Dr. Mohamad Maliki Bin Osman explained in a speech at the Ministry of Defence Committee of Supply Debate 2020:

*“When you receive messages or unsubstantiated information over WhatsApp or other online platforms, do not forward or circulate them. Always check the information against official sources, like the government websites or the official news releases. If you are unsure, do not spread the information. Such discipline will go a long way in our fight against fake news.”*

Second, and in parallel, the Singapore government introduced a selection of digital ‘solutions’ to manage the pandemic and protect the safety of citizens. Building on the Smart Nation initiative that was well underway at that time (Calder, 2016; Kong and Woods, 2018b), the Singapore government — more precisely, the Smart Nation and Digital Government Group (SNDGG) — implemented smart and digital technological interventions to monitor and regulate the flow of mis/information throughout the city-state.

Notably, the SNDGG assembled and established six channels for individuals to access ‘verified’ (read: state-confirmed) information around the clock (Smart Nation and Digital Government Office, 2025a). The first of these schemes was the COVID-19 Situation Report. Compared to the Taiwanese’s Social Distancing App where individuals could upload their data voluntarily, the COVID-19 Situation Report is a technology developed by the Singapore Ministry of Health, with consolidated statistics updated weekly from 13 February 2023. Second, the Singapore government tapped into popular social media platforms, such as Facebook, Instagram, WhatsApp, Telegram, and Twitter/X, to disseminate daily updates and information on the virus to subscribers in multiple languages. These broadcast channels were outlined as ‘official’ sources of information, marked by a blue verification tick next to the account name (gov.sg), serving to assure members of the public of the validity of information received and helping them to distinguish reliable information from fake news. Relatedly, the third innovation was the Gov.sg Info Bot, which was programmed to provide ‘credible’ news and information about the virus during the pandemic. Highlighting the effectiveness of this bot, the Smart Nation and Digital Government Office reported on its website that: “As of December 2020, the tireless bot addressed over 865k COVID-19-related queries”. The final three innovations comprised the GoWhere suite of services: FluGoWhere, TokenGoWhere, and MaskGoWhere. These three GoWhere platforms were designed to help citizens locate primary healthcare providers under the Public Health Preparedness Clinics, collection points for the Bluetooth-operated tracking tokens used during the national lockdown, and distribution centres for state-sponsored surgical masks (see Das and Kwek, 2024 for a detailed analysis of the GoWhere suite).

Reading these digital ‘solutions’ closely reveals how information flows in Singapore are fundamentally governed through the placing of bodies (and materialities like masks, tokens, and information) within digital urban infrastructures and their attendant socio-technical networks. On the one hand, individuals and their bodies are enrolled into these digital infrastructures in multiple, sometimes overlapping, ways, including as labour (Gregory and Sadowski, 2021), as data (Andueza et al., 2021; Kitchin, 2021), and as ‘dividuals’ (Bruno and Rodríguez, 2022). The six ‘official’ digital channels legitimised by the Singapore government actively recruited citizens into ‘collective’ and everyday efforts to combat misinformation by only promoting and consuming verified and authenticated news related to the COVID-19 pandemic. As individuals receive real-time updates and are drafted by these digital urban infrastructures, they are simultaneously mobilised as digital data for the functioning of interventions like the COVID-19 Situation Report, contributing their own data in order to facilitate the continuous monitoring and management of public health information across

the city-state. On the other hand, these digital dashboards and ‘official’ information channels created by state authorities were more than broader fact-checking systems and protocols through which pandemic-related information was variously produced, authenticated, verified, and disseminated by government officials. Rather, they also functioned as public services through which emotional and affective care for individual citizens was performed by the state, for example, by providing members of the public “assurances that information was accurate with multiple sources of information” (Smart Nation and Digital Government Office, 2025b).

More significantly, these digital ‘solutions’, while designed to combat misinformation, ostensibly point to two instantiations of care, where the state’s responsibility for safeguarding public health intersects with the nurturing of individual accountability and perhaps even social solidarity. Firstly, these state-promulgated innovations seem to foster a sense of care that foregrounds cautiousness towards misinformation by slowing down information flow through verification and authentication processes, which require time and effort to cross-check and confirm the validity of the information against official channels, as well as providing space-times for reflection among citizens to occur when encountering news on digital platforms to avoid potential damage or risks, such as falling victim to scams. In this interpretation, we argue the Singapore example shows to some extent how the state can play an active and caring role in adding system friction and delays to digital sharing mechanisms in order to encourage public awareness, vigilance, and attentiveness, offering a complementary angle to the existing scholarship on digital and smart urbanism that has focused on the generative possibilities of ‘glitches’ (Leszczynski and Elwood, 2022) or everyday negotiation by urban dwellers (Datta, 2020b; Söderström and Datta, 2024; Yeo, 2023, 2024).

Secondly, there is also an underlying understanding of care as protection in the discourse surrounding these digital technological interventions. Through these ‘solutions’, the state is foremost positioned as the provider and curator of verified news, establishing a clear demarcation against fake news. Relatedly, care is also detailed as an effort to restore social fabric, deploying digital urban infrastructures to manage public anxiety through timely information dissemination and hopefully fostering social resilience among the citizenry body in the face of crisis and confusion. While existing critical literature on the digitalisation of Singapore tends to analyse these digital urban interventions through surveillance and biopolitical control (Das and Zhang, 2021; Lee and Lee, 2020) — an approach commonly marshalled against the paternalistic state governance (see Luger, 2022) — we propose seeing these strategies through a broader sensibility of care, underlining the practices and processes undertaken by the state to care for its citizens, for example, by balancing the urgency of rapid information dissemination during the COVID-19 pandemic with thorough verification processes. By reframing these digital innovations, we illuminate the nuanced ways state institutions can simultaneously manage public information and demonstrate a form of institutional care.

## **Conclusion**

Drawing on three cases in Asia widely known to be ‘successful’ in dealing with the COVID-19 pandemic, this paper has explored how care is performed with and through digital urban infrastructures across different domains of urban living in times of crisis. Our findings suggest

that first, digital technologies play a crucial role in generating caring spaces in cities. Such caring spaces are wide-ranging, from borders to homes in Taipei, from social media platforms to the territory of the city-state that is updated and managed in real-time online in Singapore, and from individual childcare facilities to the wider community that they constitute in Seoul. All these spaces may not have been thought of as necessarily caring and/or digitally mediated; however, in the face of the global health crisis, they have been reconfigured as pivotal sites of care, closely aligned with different ways in which the relationship between (city) authorities and urban dwellers is organised in and through the digital. What animates the making of caring spaces here are entanglements of various bodies and entities enrolled in digital urban infrastructures that enact specific versions of care (e.g., control, surveillance, maintenance, trust, and solidarity) amidst the COVID-19 pandemic. In Taipei and Singapore, the datafication of bodies and labour, both voluntary and involuntary, helps regulatory bodies to support their citizens confronted with the virus and its accompanying social unease. While similar developments were found in Seoul, our paper foregrounds a different avenue of 'innovation', spotlighting how people engage with digital technologies in everyday spaces of care in the face of a childcare gap engendered by pandemic restrictions — a flip side of the 'successful' public health governance the three cities have in common. Specifically in Seoul's example, the bodies converted digitally into numerous pixels on smartphone screens foster a 'community-led' sense of care among those involved, while adhering to government measures that operate care through regulations related to the public health crisis. In this context, the Seoul example highlights community-level responses that both complement and extend institutional digital governance, offering a contrasting perspective to the more policy-focused examples from Taipei and Singapore. More widely, what a comparative approach reveals is that individual smartphones wired to digital urban infrastructures often serve as a primary avenue through which various caring bodies and subjectivities are constituted even in the face of different care needs and practices.

Second, and relatedly, our case studies reassess digital urban interventions, particularly those deployed during the pandemic, in relation to the (re)structuring of caring relationships between urban authorities and dwellers, as well as between people themselves. Singapore's case study, for example, offers a different reading of its 'paternalistic' state that has been often confined to a ready-made categorisation of authoritarianism. Here, we suggest a care perspective offers more nuanced approaches to understanding a broader spectrum of ways that institutions can demonstrate care, both practically and affectively, through digital infrastructures. The Singapore state assuming the responsibility to verify and provide 'accurate' information to the public could be seen as intrusive and controlling; but it may also be read as a form of care that operates in and through institutions. Similarly, the COVID-19 related apps discussed in the case of Taipei, alongside the discursive framework proposed by authorities, cultivate an awareness of solidarity among its people to exercise collective responses to the pandemic. Learning from previous epidemic outbreaks such as SARS, individuals readily accept public health regulations and voluntarily provide their private information to institutionally monitored apps to care for themselves and others. In addition, the example from Seoul illustrates the emergence of a sense of care as social connectedness in the wake of a seemingly disintegrating urban fabric due to social distancing measures. Compared to Singapore and Taipei, Seoul's case highlights care that works through an interpersonal level, tapping onto digital infrastructures to (re)produce caring relations across the neighbourhood, which potentially also reinforces the kind of social solidarity observed in Taipei's and Singapore's cases. In this light, we suggest that digital infrastructures have the

potential to enable “innovations” in caregiving and care-receiving, and in the process, variously reassembling the (caring) relationship between the state and society. While power inequalities and tensions exist and are pertinent in each case study – especially given the ‘authoritarian’ nature of Asian developmental states (Shin, 2019) – it is our intention to foreground a different, more generous reading of how care is digitally enacted in specific urban settings, building on the definition of care as life-enabling activities (Fisher and Tronto, 1990). Correspondingly, such an approach extends prevailing geographical understandings of ‘smart’ urban governance that frame digital interventions primarily as instruments for asserting top-down control.

Conceptually, by comparing Taipei, Seoul, and Singapore, we bring the increasingly crowded field of digital and smart urbanism into a conversation with geographies of care in two important ways. First, this paper draws on a care perspective to reframe the interdependencies between humans and digital technologies in ways that are, we suggest, more generative. Tracing care practices and relations between bodies and digital urban infrastructures, we build on Maalsen’s (2023) discussion on algorithms, broadening it to consider how diverse digital technologies, from QR codes to WhatsApp channels to digital dashboards, co-constitute “subjectivities and potentialities that come to be possible in a world already populated by [digital] possibilities” (Del Casino et al., 2020: 606). Doing so moreover productively departs from current geographical research that has predominantly examined the more harmful effects of digital interventions and, potentially, providing complementary resources for reimagining more progressive and hopeful future urban worlds (McFarlane and Söderström, 2017). Second, this paper has elaborated a range of articulations of care, including awareness building, protection, control, social connectedness, and solidarity, that emerge from the co-constitutive relationships between digital technologies and bodies. We contend that this level of precision in specifying the mechanisms and affordances of care helps to materialise broad theorisations of care dominant in prevailing geographical literature that have tended to concern identifying the labour and relations around care, which mostly draw on the work of Tronto (1998) and Puig de la Bellacasa (2017), by addressing the questions of how care is performed and to what ends (Mahony, 2023). Here, given that our analysis is primarily based on secondary data, we call for more empirical studies that can deepen understanding of the potential of digital urban governance as engendering new ways of institutional, collective, and individual caring in times of crisis. Importantly, taking seriously “the colonising effect of crisis-thinking” (McFarlane, 2025: 306), we argue for a more reparative stance that deliberately attends to the intricate ways in which various practices and relations of care emerge with and through digital technologies.

More practically, the comparative work undertaken in this paper highlights how new forms of urban governance might emerge through the entanglement of human actors and digital infrastructures in moments of crisis. At the core of this process lies the ‘conditions’ that enable individuals, technologies, and governmental apparatuses to converge and construct shared meanings of care. As Hanrahan and Smith (2018: 231) argue, “The problematisation of care and attention to its failings is particularly timely for the current political moment. Various crises are forcing us to ask about established notions of care and whether they are adequate for addressing these challenges”. The various articulations of care examined in this paper reveal new possibilities of thinking smart and digital urbanism with care in relation to ‘the global polycrisis’. For example, instead of repeating the well-rehearsed repertoires of

how multiple crises unfold and overlap, precipitated by digital infrastructures, we call for more care-informed and caring approaches to think about how digital innovations could foster a sensibility of care, and vice versa, in response to crises. Further, as our case studies illustrate, policy interventions supposed to foster a particular kind of care – for example, public health and awareness – can simultaneously cause significant gaps in care operating in different registers. Therefore, it is imperative for policymakers to grapple with such tensions in more productive and open-ended manners, that is, to take seriously the rather dynamic and multi-layered relationship between individuals, institutions, and digital infrastructures, all of which may or may not co-constitute more caring urban worlds. With this understanding in mind, we encourage scholars and policymakers to be more reflexive in unpacking this paradox and attentive to how digitally mediated care, even when operationalised at the institutional level, is both mundane and radical, capable of reproducing control but also fostering more ‘progressive’ urban futures.

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