SMART CITIES MANAGEMENT IN THE POST-COVID ERA: RESILIENCE, DIGITAL GOVERNANCE, AND THE RECONFIGURATION OF URBAN PUBLIC SERVICES

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ABSTRACT

The COVID-19 pandemic constituted an unprecedented stress test for urban management systems worldwide, exposing the structural vulnerabilities of existing governance architectures while simultaneously accelerating the adoption of digital technologies and contactless service delivery mechanisms at a pace that would otherwise have required a decade or more to achieve. This article examines the reconfiguration of smart city management in the post-COVID era, arguing that the pandemic did not merely accelerate pre-existing digitalisation trends but fundamentally altered the conceptual and institutional priorities of smart urban governance. Drawing on the comparative literature on smart city resilience, digital public administration, and post-pandemic urban recovery, supplemented by case evidence from European and global cities, the article analyses four principal dimensions of post-COVID smart city management: the transformation of digital public service delivery and the consolidation of e-governance as a permanent, rather than emergency, administrative mode; the reconfiguration of urban mobility and public space in response to changed behavioural patterns and environmental imperatives; the integration of public health intelligence into smart city data architectures; and the governance challenges generated by the accelerated deployment of surveillance and data collection technologies in the pandemic context. The article situates these transformations within the theoretical frameworks of urban resilience, the smart city as a sociotechnical system, and the political economy of digital urban governance, engaging critically with the risk that post-COVID smart city management reproduces or intensifies existing urban inequalities under a technological veil. The conclusion argues that the post-COVID moment presents a strategic opportunity to reorient smart city management toward a more equitable, participatory, and genuinely citizen-centred governance model — but that realising this opportunity requires deliberate institutional choices that current policy trajectories do not always guarantee.

KEYWORDS: *COVID-19, digital governance, e-government, post-pandemic urbanism, smart city management, urban resilience, public health data, digital equity*

J.E.L. Classifications: H11, H70, O18, O33, R58

1. INTRODUCTION

The COVID-19 pandemic, which emerged in late 2019 and within months had disrupted virtually every dimension of organised social life across the globe, constituted what urban scholars have characterised as a 'stress test of unprecedented scale' for cities and their management systems (Sharifi & Khavarian-Garmsir, 2020). Cities were the epicentres of the pandemic's human, economic, and institutional impact: high population density facilitated viral transmission; urban economic structures — heavily weighted toward services, hospitality, retail, and face-to-face interaction — were disproportionately disrupted by lockdown measures; and urban governance systems were confronted simultaneously with the immediate demands of public health emergency management and the longer-term challenge of maintaining essential services under conditions of unprecedented uncertainty and resource constraint.

For cities that had invested in smart city infrastructures and digital governance capabilities before the pandemic, the crisis exposed both the value and the limitations of those investments. On the positive side, cities with mature e-government platforms, digital payment systems, and data analytics capabilities were able to transition to remote service delivery more rapidly and more comprehensively than those relying on traditional in-person administrative models; digital mobility data enabled more targeted and evidence-based public health interventions; and smart infrastructure monitoring systems allowed essential services to continue functioning with reduced human presence (Allam & Jones, 2020; Kummitha, 2020). On the negative side, the pandemic revealed the fragility of smart city systems that had been designed for the optimisation of normal operating conditions rather than for robustness under crisis conditions, and it exposed the depth of the digital divide — the gap between digitally enabled and digitally excluded populations — as a structural barrier to equitable access to public services in the emergency context (Ogundele et al., 2023; van Dijk, 2020).

The post-COVID era — the period following the acute phase of the pandemic, characterised by the gradual relaxation of emergency measures, the consolidation of pandemic-accelerated changes, and the increasingly urgent need to address the long-term urban consequences of the crisis — presents a distinctive and historically significant moment for smart city management. It is a moment in which the investments, experiments, and improvisations of the pandemic period must be evaluated, institutionalised or abandoned, and integrated into coherent post-pandemic urban governance strategies. The choices made in this moment will shape the trajectory of smart city development for the next decade and will determine whether the post-COVID city is more or less equitable, more or less resilient, and more or less genuinely responsive to the needs of its citizens than its pre-pandemic predecessor.

This article examines the principal dimensions of this reconfiguration. Section 2 reviews the theoretical frameworks — urban resilience, the smart city as a sociotechnical system, and the political economy of digital urban governance — that are most relevant to the analysis of post-COVID smart city management. Section 3 analyses the transformation of digital public service delivery and e-governance in the post-COVID context. Section 4 examines the reconfiguration of urban mobility and public space. Section 5 addresses the integration of public health intelligence into smart city data architectures. Section 6 engages with the governance challenges generated by pandemic-era surveillance technologies and data collection practices. The concluding section advances the article's central argument about the strategic opportunity — and the institutional risks — of the post-COVID moment for smart city governance.

2. THEORETICAL FRAMEWORKS: RESILIENCE, SOCIOTECHNICAL SYSTEMS, AND DIGITAL URBAN GOVERNANCE

2.1 URBAN RESILIENCE AND THE SMART CITY

The concept of urban resilience — the capacity of a city and its systems to absorb disturbances, adapt to changing conditions, and recover from shocks while maintaining essential functions and the ability to transform — has become one of the central organising concepts of contemporary urban studies and urban policy (Folke et al., 2010; Meerow et al., 2016). Prior to COVID-19, urban resilience scholarship focused primarily on the resilience of cities to climate change, natural disasters, and economic shocks; the pandemic extended and stress-tested the concept in the domain of public health emergency, revealing both its analytical utility and its

limitations as a practical guide to urban governance under conditions of radical uncertainty (Sharifi & Khavarian-Garmsir, 2020; Cheshmehzangi, 2021).

The relationship between smart city technologies and urban resilience is theoretically complex and empirically contested. A strong version of the smart city-resilience thesis holds that the data collection, real-time monitoring, predictive analytics, and networked infrastructure management capabilities that characterise mature smart city systems substantially enhance urban resilience by improving situational awareness, enabling faster and more targeted responses to disruptions, and facilitating the coordination of recovery efforts across multiple city systems simultaneously (Allam & Jones, 2020; Kitchin, 2014). A more critical version acknowledges these potential benefits while noting that the same networked, data-intensive infrastructure that enables smart city capabilities also introduces new vulnerabilities — to cybersecurity attacks, to system failures with cascading effects across interdependent urban systems, and to the social and political risks generated by the concentration of urban governance authority in technically opaque digital systems (Townsend, 2013; Hollands, 2008).

The COVID-19 pandemic provided empirical evidence for both perspectives. Cities with well-developed digital governance infrastructure — Seoul, Singapore, Tallinn, Barcelona — demonstrated the resilience benefits of smart city investment through rapid deployment of contact tracing applications, vaccine registration platforms, and real-time crowd management systems (Kummitha, 2020; Lee & Lee, 2014). At the same time, cities that had invested heavily in smart infrastructure without adequate attention to data governance, citizen engagement, or digital inclusion found that their systems generated new forms of exclusion and new governance controversies in the pandemic context, as the debates about surveillance applications and data privacy in numerous jurisdictions illustrated (Zuboff, 2019; Floridi et al., 2020).

2.2 THE SMART CITY AS SOCIOTECHNICAL SYSTEM

The framing of the smart city as a sociotechnical system — a configuration in which technical artefacts, organisational structures, regulatory frameworks, and social practices are mutually constitutive rather than independently determined — provides a more analytically adequate account of smart city dynamics than purely technocratic or purely social-constructivist approaches (Geels, 2004; Jasanoff, 2004). From a sociotechnical perspective, the introduction of a new digital technology into urban governance does not simply solve a technical problem; it

reconfigures the relationships among urban actors, redistributes authority and resources, creates new dependencies and vulnerabilities, and generates new social and political tensions alongside whatever efficiency gains it delivers. The pandemic accelerated this sociotechnical reconfiguration at a pace that outstripped the capacity of existing regulatory and governance frameworks to manage it — creating a post-COVID moment characterised by significant institutional uncertainty about the appropriate governance of pandemic-era digital innovations.

Particularly relevant to the post-COVID context is the concept of 'path dependence' in sociotechnical systems: the tendency of technological and institutional choices made under conditions of urgency or uncertainty to become locked in as permanent features of the system, even when the conditions that originally justified them have changed (David, 1985; Arthur, 1989). Many of the digital governance innovations deployed during the pandemic — remote service delivery platforms, digital identity systems, health data collection architectures — were implemented rapidly and at scale without the normal processes of pilot testing, stakeholder consultation, and democratic deliberation. The post-COVID challenge is to evaluate these emergency innovations systematically, to identify which of them represent genuine improvements that should be consolidated and institutionalised, and which of them embody trade-offs — between efficiency and privacy, between speed and inclusivity, between centralisation and democratic accountability — that the emergency context prevented from being adequately considered.

2.3 THE POLITICAL ECONOMY OF DIGITAL URBAN GOVERNANCE

The political economy of digital urban governance — the analysis of how the economic interests of technology companies, the fiscal constraints of urban governments, and the power relations among different urban social groups shape the development and deployment of smart city technologies — provides a critical complement to the technical and institutional analyses of smart city management (Söderström et al., 2014; Coletta et al., 2019). The smart city market — estimated by various industry sources to be worth hundreds of billions of dollars globally by the mid-2020s — is dominated by a relatively small number of large technology corporations whose commercial interests in expanding the deployment of their platforms and products may not align perfectly with the public interest in equitable, accountable, and genuinely responsive urban governance. The risk of 'corporate capture' of smart city governance — in which the priorities and architectures of digital urban systems are determined primarily by vendor interests rather than by the needs and

preferences of citizens — was present before COVID-19 and was, in some respects, exacerbated by the pandemic, as emergency procurement procedures allowed technology companies to expand their presence in urban governance systems with reduced competitive tendering and democratic oversight (Zuboff, 2019; Morozov & Bria, 2018).

At the same time, the pandemic also generated counter-tendencies: fiscal pressures on urban governments created incentives to develop lower-cost, open-source, and interoperable digital governance solutions that reduce dependency on proprietary vendor ecosystems; the experience of digital exclusion during the pandemic strengthened the political salience of digital equity as a policy priority; and the public health emergency context demonstrated the potential value of city-owned, publicly governed data infrastructures for the coordination of emergency responses in ways that are not contingent on the commercial interests of private data intermediaries (Morozov & Bria, 2018; Barns, 2020). These counter-tendencies are fragile and context-dependent, but they represent genuine opportunities for the reorientation of smart city governance toward more equitable and publicly accountable models that the post-COVID moment makes available.

3. THE TRANSFORMATION OF DIGITAL PUBLIC SERVICE DELIVERY: FROM EMERGENCY MODE TO PERMANENT ARCHITECTURE

The most immediate and consequential smart city management transformation generated by the COVID-19 pandemic was the forced, rapid, and large-scale digitalisation of public service delivery. In cities across Europe, North America, Asia, and beyond, lockdown measures made in-person access to municipal services physically impossible, compelling urban administrations to deploy or accelerate digital service delivery mechanisms that had previously been available as optional alternatives to in-person interaction but had not been adopted at scale. The result was, in many cases, a decade's worth of e-government adoption compressed into a period of weeks or months: online payment systems, digital permit applications, virtual administrative appointments, electronic document exchange, and remote citizen advisory services were deployed at emergency speed, generating both significant operational successes and significant failures as systems that had been designed for low-volume optional use were suddenly subjected to high-volume mandatory operation (OECD, 2020; Twizeyimana & Andersson, 2019).

The post-COVID challenge for smart city management in the domain of digital public services is threefold. First, cities must evaluate the emergency digital service delivery mechanisms deployed

during the pandemic against criteria of quality, security, accessibility, and citizen satisfaction, distinguishing between those that represent genuine improvements in service delivery and those that were merely acceptable under emergency conditions but require significant refinement to serve as permanent administrative infrastructure. Second, cities must address the digital equity dimension of their pandemic-era service transformations: wherever the shift to digital service delivery created barriers for digitally excluded citizens — those without reliable internet access, digital devices, or the skills to use digital interfaces — post-COVID governance must develop hybrid service delivery models that preserve the efficiency gains of digitalisation without sacrificing the inclusivity of universal public service access (van Dijk, 2020; Mossberger et al., 2008). Third, cities must institutionalise the organisational and cultural changes that enabled rapid digital service deployment during the pandemic — including streamlined procurement procedures, cross-departmental data sharing, and the development of internal digital competence in municipal workforces — within regulatory frameworks and governance structures that ensure democratic accountability and data protection compliance in the non-emergency context (OECD, 2020; Janssen et al., 2004).

Several European cities provide instructive examples of the post-COVID consolidation of digital public service delivery. Tallinn, Estonia — long regarded as a global leader in digital government — expanded its already comprehensive e-government platform during the pandemic to incorporate new services including digital health certificates, remote notarisation, and AI-assisted administrative decision-making, and has used the post-COVID period to evaluate and refine these additions within its established data governance framework (Vassil, 2016; European Commission, 2022). Barcelona's Decidim platform — an open-source, participatory digital governance infrastructure — was adapted during the pandemic to enable remote citizen participation in urban planning and budget processes, and has since been consolidated as a permanent component of the city's democratic governance architecture, demonstrating that digital service transformation can extend beyond administrative efficiency to encompass participatory democratic innovation (Barandiaran et al., 2021). These examples illustrate that the post-COVID consolidation of digital public services is not merely a technical project of system improvement but a governance project of institutional redesign, requiring deliberate choices about the values — efficiency, equity, accountability, participation — that digital urban governance is designed to serve.

4. RECONFIGURING URBAN MOBILITY AND PUBLIC SPACE IN THE POST-COVID SMART CITY

The COVID-19 pandemic profoundly altered the patterns of urban mobility and the use of public space in ways that have persisted, in modified form, into the post-COVID period and that have significant implications for the management of smart city mobility systems. The immediate pandemic-era changes — massive reductions in commuting as remote work became standard for large segments of the urban workforce; dramatic shifts in modal share away from public transit and toward walking, cycling, and private vehicle use; the temporary pedestrianisation of urban streets and the expansion of outdoor dining and public space; and the collapse of city-centre economies dependent on office worker foot traffic — generated a complex and still unfolding reconfiguration of urban spatial and economic geographies (Honey-Rosés et al., 2020; Mouratidis, 2021).

Smart city mobility management systems — which prior to COVID had been developed primarily for the optimisation of high-volume, predictable commuting flows in dense urban environments — were confronted during the pandemic with demand patterns that diverged radically from their training data and operational assumptions. The post-COVID period has required the recalibration of these systems for a more volatile, multimodal, and temporally irregular urban mobility landscape, in which the patterns of morning and evening peak demand that characterised pre-pandemic commuting have given way to more distributed, unpredictable trip generation (Jittrapirom et al., 2017; Shaheen & Cohen, 2020). This recalibration has in many cases prompted significant investments in micromobility infrastructure — cycling lanes, e-scooter and e-bike sharing systems, and pedestrian priority zones — that both respond to changed mobility preferences and contribute to the decarbonisation of urban transport systems, a policy priority that has been reinforced rather than weakened by the post-COVID recovery agenda.

The relationship between smart city data systems and the management of public space — which received unprecedented attention during the pandemic as cities deployed crowd monitoring technologies to enforce social distancing requirements and to manage the use of parks, beaches, and other public spaces under capacity restrictions — has generated some of the most significant governance controversies of the post-COVID period. The deployment of CCTV networks with AI-enhanced facial recognition, bluetooth-based crowd density monitoring, and drone surveillance for public space management during the pandemic established operational precedents and technical

capabilities that have subsequently been difficult to contain within the emergency context in which they were justified (Kitchin, 2020; Zuboff, 2019). The post-COVID management of urban public space requires cities to distinguish, with institutional clarity, between the monitoring capabilities that are legitimately required for routine urban management and safety — and that can be justified by reference to established legal frameworks and democratic oversight mechanisms — and those that were introduced as emergency measures and whose continuation in the non-emergency context raises disproportionate risks to civil liberties and privacy rights.

The reconfiguration of public space in the post-COVID smart city has also generated new opportunities for participatory urban design — the use of digital tools to engage citizens in decisions about the allocation and redesign of urban space. Several cities have used post-COVID public space reconfiguration as an occasion to deploy digital participatory platforms — enabling citizens to propose, discuss, and vote on temporary or permanent changes to street layouts, pedestrianisation schemes, and public space programming — that represent a significant advance in the democratisation of urban spatial governance. These digital participatory tools, when designed with adequate attention to inclusivity and accessibility, embody a model of smart city governance that prioritises citizen agency over technical optimisation and that treats digital infrastructure as a means to democratic ends rather than as an end in itself (Barandiaran et al., 2021; Foth et al., 2011).

5. PUBLIC HEALTH INTELLIGENCE IN SMART CITY DATA ARCHITECTURES: INTEGRATION, GOVERNANCE, AND ETHICS

One of the most consequential and contested developments in smart city management during and after the COVID-19 pandemic has been the integration of public health intelligence into smart city data architectures. Before COVID-19, the intersection of urban data systems and public health was a relatively underdeveloped area of smart city research and practice: most smart city data architectures focused on mobility, energy, environment, and governance domains, with public health data typically managed through separate national or regional health system frameworks that were poorly integrated with municipal data infrastructures (Kummitha, 2020; Allam & Jones, 2020). The pandemic forced a rapid and often improvised integration of public health data — infection rate maps, hospital capacity monitoring, contact tracing data, vaccine

registration and coverage statistics — into the operational data environments of city governments, creating both new analytical capabilities and new governance challenges.

The analytical capabilities generated by the integration of public health and urban data are significant and, in the post-COVID context, increasingly well-documented. Cities that developed robust integration between mobility data, demographic data, and epidemiological data during the pandemic were able to identify high-risk populations and locations more precisely, target public health interventions more effectively, and monitor the impact of non-pharmaceutical interventions on transmission dynamics with greater accuracy than cities relying on traditional epidemiological surveillance systems alone (Kummitha, 2020; Cheshmehzangi, 2021). The experience of cities such as Seoul, which deployed a comprehensive contact tracing and quarantine management system that drew on credit card transaction data, mobile phone location data, and CCTV footage to reconstruct the movements of confirmed cases, demonstrated the epidemiological effectiveness of integrated urban data systems while simultaneously raising fundamental questions about the proportionality, necessity, and legal basis of such data use (Lee & Lee, 2014; Floridi et al., 2020).

The governance challenges generated by the pandemic-era integration of public health and urban data are at least as significant as the analytical opportunities it creates, and they have generated an extensive policy debate in the post-COVID period. The core challenge is the tension between the legitimate public health imperative to collect, share, and analyse health-relevant data at the population level and the privacy rights and data protection entitlements of individual citizens — a tension that the General Data Protection Regulation (GDPR) in the European context addresses through a framework of derogations for public health purposes that were widely invoked during the pandemic but that were applied inconsistently and sometimes in ways that raised serious proportionality concerns (European Data Protection Board, 2020; Morley et al., 2020). The post-COVID governance challenge is to develop durable, democratically legitimate frameworks for the integration of public health and urban data that can be deployed in future public health emergencies without requiring emergency derogations from normal data protection standards, by designing data architectures and governance structures that are sufficiently flexible to support emergency public health responses while maintaining robust privacy protections and democratic oversight in the non-emergency context.

The concept of the 'health-smart city' — a city whose data infrastructure incorporates public health intelligence as a routine dimension of urban management rather than as an emergency add-on —

has emerged in the post-COVID literature as a promising framework for the institutionalisation of pandemic-era data integration (Allam & Jones, 2020; Kummitha, 2020). Health-smart city architectures would embed environmental health monitoring (air quality, noise, green space access), social determinants of health data (poverty, housing quality, access to services), and epidemiological surveillance into the routine data management systems of city governments, enabling earlier detection of emerging health threats, more equitable allocation of public health resources, and more effective prevention and health promotion programming. The realisation of this vision requires significant investment in data infrastructure, inter-institutional data sharing agreements, and governance frameworks that ensure public trust — and it requires deliberate attention to the risk that health data integration amplifies existing patterns of surveillance and social control rather than advancing public health and equity.

6. SURVEILLANCE, DATA GOVERNANCE, AND THE DEMOCRATIC ACCOUNTABILITY OF POST-COVID SMART CITY MANAGEMENT

The most politically contentious dimension of post-COVID smart city management concerns the governance of the surveillance and data collection capabilities that were rapidly expanded during the pandemic and that have proven difficult to contain or reverse in its aftermath. The pandemic created both the technical infrastructure and the political justification for a significant expansion of urban surveillance: contact tracing applications collected granular location and proximity data from tens of millions of users; smart city platforms integrated feeds from public CCTV networks, mobile phone operators, and social media platforms to monitor compliance with movement restrictions; and AI-enhanced analytics systems processed this data at a scale and resolution that had no precedent in non-emergency peacetime urban governance (Kitchin, 2020; Zuboff, 2019).

The post-COVID governance of these surveillance capabilities raises fundamental questions about the appropriate balance between security and liberty, between public health and privacy, and between the efficiency of centralised data management and the democratic accountability of distributed, citizen-controlled data governance. Shoshana Zuboff's concept of 'surveillance capitalism' — the economic logic by which behavioural data extracted from digital interactions is commodified and used to predict and influence human behaviour for commercial gain — provides a critical framework for analysing the risks that pandemic-era data collection creates for the

governance of post-COVID smart cities (Zuboff, 2019). Where the data collected for public health emergency purposes is retained, commercialised, or repurposed for non-health uses — whether by government agencies, technology vendors, or third-party data brokers — it creates the infrastructure for forms of social monitoring and control that are difficult to reconcile with democratic governance values (Floridi et al., 2020; Morley et al., 2020).

The emerging governance framework for post-COVID smart city data — exemplified by the European Union's Data Governance Act (2022), the AI Act (2024), and the Digital Services Act (2022), as well as by city-level initiatives such as Barcelona's City Data Commons and Amsterdam's Data Strategy (2021) — reflects an attempt to develop institutionally robust responses to these governance challenges that go beyond the emergency derogations and ad hoc arrangements of the pandemic period. These frameworks share several common commitments: the principle of data minimisation — collecting only the data strictly necessary for specified, legitimate purposes; the requirement of democratic oversight of algorithmic decision-making systems used in public administration; the priority of open, interoperable, and publicly governed data infrastructure over proprietary vendor-controlled alternatives; and the embedding of citizen rights — including rights of access, correction, and objection — into the design of urban data systems rather than treating them as post-hoc limitations on otherwise unlimited data collection (European Parliament & Council, 2022; Barns, 2020; Morozov & Bria, 2018).

The challenge for smart city management in the post-COVID period is to operationalise these governance commitments within the specific institutional, financial, and technical constraints that individual cities face — constraints that vary enormously across the diverse landscape of European and global urban governance. Small and medium-sized municipalities, in particular, may lack the in-house technical expertise, the legal capacity, and the financial resources to implement sophisticated data governance frameworks independently, creating a risk that the post-COVID consolidation of smart city data systems produces governance arrangements that are adequate for large, well-resourced cities but inadequate for the much larger number of smaller municipalities that constitute the majority of urban governance units. Addressing this governance capacity gap requires investment in shared digital governance infrastructure, inter-municipal cooperation frameworks, and national-level regulatory and technical support for local digital governance — investments that the European Union's Digital Decade targets and the national recovery and

resilience plans of member states have begun to support but that require sustained political commitment to be realised at the scale required.

7. CONCLUSIONS

This article has examined the principal dimensions of the reconfiguration of smart city management in the post-COVID era, arguing that the pandemic constituted a transformative moment for urban digital governance that simultaneously accelerated positive innovations and amplified existing risks in ways that require deliberate institutional responses rather than a simple return to the pre-pandemic status quo. The analysis has identified four major dimensions of post-COVID smart city transformation — digital public service delivery, urban mobility and public space, public health data integration, and surveillance governance — and has evaluated each in terms of its opportunities, its challenges, and the institutional choices that will determine whether its post-COVID trajectory contributes to or undermines the goals of equitable, resilient, and democratically accountable urban governance.

The overarching conclusion of this analysis is that the post-COVID moment represents a genuine strategic opportunity for the reorientation of smart city management toward a more citizen-centred, equitable, and democratically accountable model — but that realising this opportunity requires deliberate institutional choices that are not guaranteed by the dominant commercial and bureaucratic dynamics of smart city development. The risk of path dependence — the consolidation of emergency digital governance arrangements that were adequate for crisis conditions but embody problematic trade-offs between efficiency and equity, convenience and privacy, technical optimisation and democratic participation — is real and documented in the emerging post-COVID urban governance literature (Cheshmehzangi, 2021; Sharifi & Khavarian-Garmsir, 2020; Kitchin, 2020).

Avoiding this risk requires, at minimum, three institutional commitments that current smart city management frameworks do not always make explicit. First, a commitment to democratic governance of digital infrastructure: the decisions about what data to collect, how to use it, who has access to it, and what algorithmic systems are deployed on it are governance decisions with profound implications for the rights and life chances of urban citizens, and they must be subject to democratic deliberation and oversight rather than delegated to technical experts or commercial vendors. Second, a commitment to digital equity: any smart city management strategy that

improves services for the digitally enabled while creating new barriers for the digitally excluded is not a success but a failure of urban governance, and the post-COVID consolidation of digital services must be accompanied by sustained investment in digital inclusion programmes, hybrid service delivery models, and the public infrastructure — broadband connectivity, digital skills training, access to devices — that genuine digital equity requires. Third, a commitment to institutional learning: the post-COVID period is an opportunity to evaluate the emergency innovations of the pandemic years systematically, to identify what worked and what failed, and to build the evidence base for a more deliberate and well-grounded smart city management strategy — one that is oriented not by technological ambition or commercial opportunity but by a clear analysis of the urban governance challenges that digital technologies can most effectively address. The cities that emerge from the post-COVID period as leaders in smart urban governance will not necessarily be those that deployed the most sophisticated technologies during the pandemic, or those that most rapidly consolidated pandemic-era digital innovations into permanent administrative infrastructure. They will be those that used the crisis as an opportunity to develop a more reflective, more equitable, and more genuinely participatory relationship between digital technology and democratic urban governance — one that treats the smart city not as a technical achievement to be pursued for its own sake but as an institutional project whose value is determined entirely by its contribution to the wellbeing, the agency, and the equal citizenship of all who live within it.

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