URBAN GEOGRAPHY Volume 46.1 / 2025

Urban Geography

Routledge Taylor & Francis Group

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/rurb20

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To cite this article: Mariana Reyes-Carranza & Dennis Mbugua Muthama (15 Jan 2025): Urban sprawl and the automation of building control in the peripheries of Nairobi, Urban Geography, DOI: 10.1080/02723638.2025.2450307

To link to this article: https://doi.org/10.1080/02723638.2025.2450307

Published online: 15 Jan 2025.

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https://doi.org/10.1080/02723638.2025.2450307

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Urban sprawl and the automation of building control in the peripheries of Nairobi

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ABSTRACT

The peripheries of Nairobi, especially Kajiado County, are experiencing rapid urbanization, leading to an urgent need for essential services and infrastructure. This surge, driven by an influx of middle-class residents and industrial developers, has prompted the county government to implement the Kajiado e-Development Management System (KeDAMS) – a web-based platform for automating construction permit applications. This paper, based on fourteen months of institutional observations and stakeholder interviews, critically examines the unfolding of automation in the physical planning sector of Kajiado. It explores the tensions between the government's push for technological solutions and the deeply politicized nature of urban planning, where discretionary power remains prominent among state and non-state actors. In analyzing the possibilities and challenges associated with KeDAMS, the paper builds on wider debates on smart urbanism and the automation of urban procedures in global South contexts.

ARTICLE HISTORY
Received 14 August 2024
Accepted 16 December 2024

KEYWORDS
Digitalization; automation; building control; urban planning; Nairobi

Introduction

In September 2022, a six-story building under construction collapsed in Oloolua, a town situated in Kajiado County on the outskirts of Nairobi. The collapse, which severely injured a passerby, ignited a debate about the causes of the incident. Some residents blamed the developer, citing the use of substandard construction materials, while others pointed to the lengthy building approval process managed by the county government. This bureaucratic delay, they argued, compels developers to take shortcuts to avoid project delays, which are often tied to significant investments from real estate developers (Murimi, 2022). The Oloolua collapse was not an isolated incident; numerous new buildings in Kajiado and neighboring counties have experienced structural failures, raising concerns about the effectiveness of local authorities in regulating and overseeing the construction sector (Githaiga, 2022; Kioko & Kimaiyo, 2023; Mwenda, 2022). This issue has been exacerbated by the region's construction boom, driven in part by its proximity to

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.

central Nairobi and the availability of affordable land. Over the past two decades, Kajiado's once-vacant parcels have been rapidly occupied by residential buildings, factories, and commercial complexes.

As part of the Nairobi Metropolitan Region, Kajiado spans an area of 21,292.7 square kilometres and has a population exceeding 1.1 million. The main economic activities in the area include pastoralism, tourism, and agriculture (Kenya National Bureau of Statistics [KNBS], 2022). However, these livelihoods are rapidly changing due to the region's proximity to the bustling capital. Major towns such as Kajiado, Ngong, Ongata Rongai, Kiserian, and Kitengela have seen increased construction and an influx of a growing middle class, which constitutes a robust labor force for Nairobi.[1]

As in other peripheral areas of African cities, rapid urbanization in Kajiado is outpacing the provision of infrastructure and services, placing increasing stress on the county's social and economic fabric (Bassett, 2020; Meth et al., 2021; Van Noorloos & Kloosterboer, 2018). Additionally, the area's rapid transformation is straining the county government's operations, particularly in curbing unplanned developments and addressing land fraud cases perpetrated by brokers and agents (Boone et al., 2021; Kariuki, 2020). In response to these pressures, Kajiado County has implemented several initiatives to improve planning and development controls, notably the KeDAMS (Kajiado's e-Development Management System), a web-based platform that automates the issuance of building permits and other regulatory processes. Launched in December 2020, KeDAMS was presented as the optimal solution to streamline procedures, enhance efficiency, and curb bribery and corruption in the land and housing sectors (County Government of Kajiado [CGK], 2020).

The introduction of KeDAMS did not happen in isolation. In recent decades, corporate and state-driven initiatives have targeted urban environments as key beneficiaries of digitalization worldwide. Increasingly, the economy and governance in cities are being driven by innovation, creativity, and entrepreneurship, trends captured by the literature on smart cities and smart urbanism. In this context, e-platforms, dashboards, apps, control rooms, sensors, and other technologies have become ubiquitous in monitoring and controlling urban processes (see Artioli, 2018; Barns, 2018b; Batty, 2013; Cugurullo et al., 2018; Datta, 2020; Kitchin, 2019; Luque-Ayala & Marvin, 2015; Sadowski, 2020; Srnicek, 2017; Townsend, 2013).

Considering the explosion of digital innovations across African urban contexts, scholars in urban geography, architecture, critical data studies, and related disciplines have sought to unpack the possibilities and challenges associated with the digitalization of urban governance. Some have critically examined the role of digitalization in measuring, controlling, and anticipating processes like housing, migration, infrastructure development, and land use change (Cinnamon, 2020; Cirolia et al., 2023; Guma, 2021; Guma & Monstadt, 2021; Migozzi, 2023; Odendaal, 2023; Watson, 2014), while others have extensively analyzed the implications of digital tools in shaping and transforming urban spaces, with a focus on the genealogies of smart urbanism policies (Cinnamon, 2023; Söderström et al., 2014; Yang, 2020), or the values, designs, and models encapsulated by this approach (Sadowski, 2020; Sadowski & Bendor, 2019). Relatedly, feminist and anti-colonial approaches to smart city initiatives have demonstrated that digital technologies in urban Africa cannot be disentangled from gender and racial relations (Listerborn & Neergaard, 2021; Migozzi, 2024) nor from the "uniqueness of place" (Odendaal, 2021, p. 646).

Recent geographical work has also highlighted how automation systems are being integrated into existing urban digital networks, extending the capabilities and capacities of human agency and infrastructure networks, and reshaping everyday urban experiences (Krivý, 2018; Leszczynski, 2016, 2019; Macrorie et al., 2021). This article contributes to this dialogue by exploring the recent intensification of automated system management in Kenya's county governments. Specifically, we focus on KeDAMS as an example of how digital tools are increasingly leveraged "to replace, reduce, supplement, enhance, extend and/or simplify human calculation and/or control in the management of systems underpinning the functionality of the city" (Macrorie et al., 2021, p. 201).

Our analysis considers KeDAMS alongside a broader endeavor to extend and strengthen Kenya's digital ecosystem, an effort that has given the country the moniker of "Silicon Savanah" (see Cirolia et al., 2023; Poggiali, 2016). As part of this nationwide focus on digital innovation, state institutions have promoted a broad range of digitalization initiatives in the land, housing, and urban planning sectors. At the national level, for example, reiterative efforts to digitize land records have culminated in the creation of the National Land Information Management System (NLIMS), a digital platform designed to streamline land administration and replace the country's paper-based land information infrastructure, in place since the colonial era. Colloquially known as Ardhisasa, this platform has largely been framed on the narrative of enhancing efficiency, effectiveness, accountability, as well as the democratization of public service delivery, representing, in official accounts, a significant step towards national digital governance (see Hoefsloot & Gateri, 2024).

Similarly to Ardhisasa, KeDAMS was championed as a flagship project for the digitalization of Kajiado's bureaucratic infrastructure. The platform was introduced in 2020 with the purpose of addressing backlogs and inefficiencies in the land and planning sector, a regime historically marked by relationships of clientelism, corruption, and coercion among multiple actors (Bassett, 2020; Boone et al., 2021). As Catherine Boone et al. (2021) note, Kenya's post-independence land regime bears the brunt of historical injustices and power imbalances that favor elites' control over land and resources and preclude the realization of the constitution's calls for equity and justice in land matters. In this scenario, the reworking of land institutions and administration from 1963 onwards, has only partially addressed the numerous challenges that riddle the sector, namely pervasive corruption, non-compliance with zoning and building statutes, and the uneven enforcement of legal dispositions (Bassett, 2020).

Against this backdrop, this paper investigates the dynamics of automation in Kajiado's development control process. Through a case study of the KeDAMS, we explore how automation intersects with political and social factors in local urban planning. Following Söderström and Datta (2023, p. 5), we address the themes of automation and urbanism "through their power geometries and political confluences." That is, we weave critical geographies of the urban with the political geographies of automation to analyze the roles of state agencies, multilateral donors, and private corporations in transforming the city. Our central argument posits that the framing of KeDAMS relies on a techno-solutionist rhetoric that overlooks certain social and political factors shaping land administration and urban planning.

Crucially, this study contributes to understanding the evolving landscape of land administration and development control in Kenya. It builds on extensive scholarship

that highlights longstanding issues in the country's physical planning system, such as ineffective master plans, repressive settlement policies, and weak enforcement of zoning regulations (Bassett, 2020; Cirolia & Berrisford, 2017; Goodfellow, 2022). As documented by scholars (e.g. Bassett, 2020; Boone, 2012), since the 2010 devolution of power to county governments, initiatives to improve transparency and public participation in local governance have been hindered by competing land interests and limited resources. With land being an increasingly coveted resource within an urbanizing market economy, our research further elucidates how automation initiatives championed by county authorities and multi-lateral development agencies play out in a physical space largely shaped by the agency of political elites and the values defined by a voracious land market.

The paper is structured as follows. First, we outline the methods used in our empirical study. Second, we examine the development and adoption of KeDAMS focusing on the techno-solutionist narratives justifying its introduction. Third, we discuss how Kajiado's e-permit platform was incorporated into a complex web of actors that engage with each other through relationships of collaboration, competition, and coercion. In the same section, we analyze the overtly technocratic nature of automation in Kajiado's Department of Lands and Physical Planning,[2] highlighting the influence of the World Bank and software developer OTB Africa. Finally, we conclude by summarizing the paper's contribution and pointing at possible avenues for further research.

Materials and methods

This paper is based on 27 semi-structured interviews and observational data collected over a fourteen-month period as part of the *Regional Futures* research project, which analyses the processes of urbanization and digitalization in Mumbai (India), Nairobi (Kenya), and Guadalajara (Mexico). To explore the development and implementation of KeDAMS, we conducted observations at various national and county-level institutions, including the State Department of Lands and Physical Planning, the National Land Commission, and the county Department of Lands and Physical Planning.

The interviews involved government officials, policymakers, and private practitioners. Our interactions with these professionals – including licensed planners, architects, and structural engineers – offered critical insights into the perceptions, tensions, and contestations that have emerged from the automation of the building permit approval process. Additionally, secondary data from digital media, policy documents, and publications from professional bodies further enriched our contextual understanding. All interviews were conducted in English, transcribed, and thematically coded using NVIVO software for qualitative data analysis.

The authors of this paper bring diverse identities and positionalities, which have offered complementary and contrasting perspectives, enriching our analysis. The Kenyan author, well-versed in the land and property administration system of the country, had easy access to local institutions and key informants, enabling the opportunity to accompany professional practitioners in both public and private sectors and observe their daily practices. Conversely, the Latin American researcher, with no prior experience in Kenya's urban planning sector, brought an outsider's perspective that proved useful in critically engaging with planners, architects, and other stakeholders.

This external viewpoint was invaluable in examining the institutional arrangements and political dynamics that led to the adoption of KeDAMS.

Results

Automating building permit systems in Kenya

Historically, land administration and urban development processes in Kenya have relied heavily on physical documentation, such as survey maps stored in Nairobi offices, land titles and leases kept in land registries, and allotment letters held in county records (Datta & Muthama, 2024). With few exceptions, land transactions and building development permissions require in-person visits to county offices, where citizens present physical documents and monitor application progress.

As with other state-controlled processes in Kenya, land administration and spatial development regulations have long been hampered by bureaucratic inefficiency. Despite efforts to rework land and planning institutions, issues like mistrust and corruption continue to strain both national and subnational land and planning authorities (Bassett, 2020; Mwangi, 2008; Poggiali, 2016). As Bassett (2020, p. 1173) notes, "informality and clientelism permeate urban planning – from the awarding of planning consultancies, to vetting qualified contractors, to the selection of planning graduates for governmental positions."

In response to these challenges, multilateral development organizations, including the World Bank, UK Aid, and the UNFAO, have implemented programs to strengthen local governance and modernize public services (see Cities Alliance, 2019; World Bank Group, 2022). With a focus on county governments, the World Bank's initiatives aim to improve infrastructure resilience, service delivery, and private-sector participation in urban planning (World Bank Group, 2024). This institution alone has invested around US$ 300 million in urban and land institution development, including approximately US$3.5 million to establish 49 municipalities across 45 counties, with a focus on urban development, spatial planning, and infrastructure building (World Bank Group, 2022).

Since 2015, the World Bank has also funded the automation of building permits in Kisumu, Kiambu, Mombasa, Nairobi and Kajiado counties (see World Bank Group, 2024). Collaboration with Kajiado began in 2019, when the World Bank offered technical and financial assistance to digitize its building permit issuance process, which had previously been handled manually by the Department of Lands and Physical Planning. The Kajiado County government accepted the offer, entering a four-year bilateral agreement and initiating a tender competition to develop the necessary software. The contract was awarded to OTB Africa, an IT company recognized as a prequalified supplier for the World Bank and experienced in public-sector projects across Kenya, Lesotho, Rwanda, and Tanzania. In 2020, Kajiado launched the KeDAMS platform, adjusting its budget to cover IT support and web hosting services from OTB Africa through Amazon Cloud (NA240423I059, 2024).

According to a software developer at OTB Africa, KeDAMS was designed to digitalize development application processes, providing a centralized web-based interface (NA240423I059, 2024). When the platform launched, developers could choose between submitting applications online and visiting the Department of Lands in

person. Today, all public and private developers must use KeDAMS to apply for new building or modification permits.

On the platform, certified professionals initiate applications by uploading their practizing credentials and project documents, such as land titles, drawings, site plans, and survey plans. Once complete, applicants pay a fee online, enabling county officers to review proposals. For example, officials from the Department of Health Services assess the project's sewage system to ensure it poses no public health threat; if revisions are required, they return the proposal for resubmission. Applicants, project owners, and county staff can track the back-and-forth process in real-time. Upon final approval, the applicant pays an additional fee online, marking the start of the construction phase (see Figure 1).

A key change introduced by KeDAMS is that only licensed professionals can submit applications through the e-platform. This requires them to first register on the portal by providing their professional registration and practizing certificates issued by professional bodies.[3] This restriction has been lauded as a key measure to prevent dubious practices in the building sector. As Kajiado's deputy governor stated during a public address, "limiting online submissions to certified practitioners enhances public safety by barring unqualified individuals from conducting business in the county" (Murigui, 2020). However, this change has faced pushback, with some public officers arguing that this rule creates a monopoly over the application process, deterring developers from using the platform – an unintended counterproductive effect (NA240417I013, 2024).

When discussing KeDAMS, many of our interviewees expressed support for the e-permit platform, noting its increased oversight of private practitioners in the building

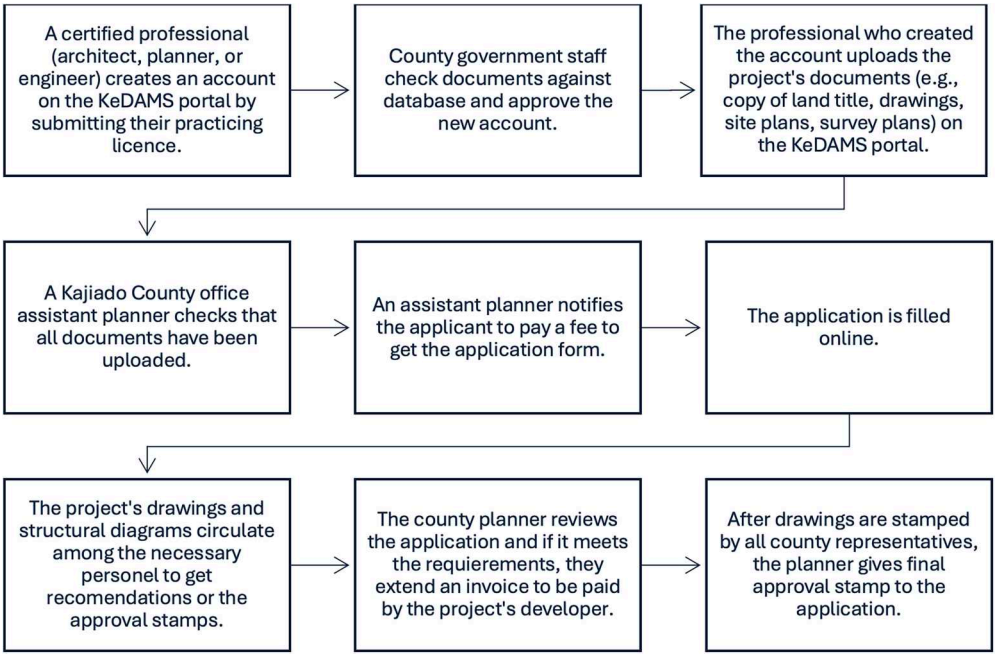

Figure 1. Diagram illustrating the workflow for evaluating and approving applications on the KeDAMS online platform.

industry. Similarly, some appreciated that the platform promotes transparency by limiting access to those familiar with planning regulations. This feedback reflects the commitment of public servants to transparency and efficiency in the planning sector. As some staff members noted during our interviews, Kajiado County has benefitted from greater accountability due to the platform's monitored transactions.

When addressing Kenya's broader digitalization efforts, interviewees often referenced the nation's ambition to lead in digital governance innovation. One interviewee described Singapore's digitalized government as Kenya's role model, commenting:

> Every time we talk about Singapore, we're looking at our level of growth. At one time, we even assisted them [with technological development] (…). They borrowed from us. Yeah, they were struggling as an independent country; we were rich compared to them. We were able to assist them with some finances to put the infrastructure in place. Kenya was rich then. Years down the line, we are now a third world country while they are a first world nation. (NA240417I013, 2024)

Speaking enthusiastically about Singapore's efficient government institutions, our interviewee continued to highlight the potential benefits that digitalization could unlock in Kenya:

> [In] Kenya, under the structure of expanding knowledge and improving service delivery within the system, [government officials] are taken to Singapore, so that they learn better skills of service delivery. So, we say Singapore is about where we want to be … (NA240417I013, 2024).

Other participants highlighted how automation can counteract bureaucratic opacity by record interactions and user actions online. As a county planner explained,

> (…) when online, everything is recorded. When you submitted, when [the application] was evaluated, who evaluated it, what comments they made, whether it was rejected or not, everything is registered, step-by-step. All those things are there. But [with the] manual [process], there is no (…) if I open this [physical] file, nobody will know that I opened it. (NA2306191024, 2024)

This planner viewed KeDAMS' transparency features as essential to ensuring proper conduct among county staff members, contrasting it with the previous opaque manual system. These sentiments align with research looking into programs and policies that associate digitalization with public transparency and objectivity. As well-documented by social scientists, digitalization in urban management contexts is often linked to values like objectivity, accuracy, common sense, and even apoliticality (Kitchin, 2015; Sadowski & Bendor, 2019; Söderström et al., 2014). In Kenya, these associations portray digitalization as essential for simplifying government procedures and achieving long-sought-after accountability in state institutions. As captured by a World Bank blog entry describing e-permitting systems, "[automated construction permits] reduce the time needed to review applications and ease the burden on county officers" (World Bank Group, 2015, p. n.p.). Moreover, these views on KeDAMS echo techno-optimistic narratives about digital technologies as tools for transforming public service management, enhancing stakeholder participation, and strengthening urban governance (Barns, 2018a; Barns et al., 2017; Krivý, 2018; Luque-Ayala & Marvin, 2015; Marvin et al., 2015). Indeed, our interviewees not only

underscored the platform's surveillance capabilities but also positioned Kenya in a race toward modernization that could be accelerated through digital infrastructure investment and technical training.

Analysing positive perceptions of KeDAMS alongside critiques of techno-solutionist narratives in urban governance (e.g. Cirolia et al., 2023; Hollands, 2008; Kitchin, 2014b, 2023; Odendaal, 2021), we argue that the automation of building control in Kajiado did not occur in isolation but in close relation to ideals of corporate and entrepreneurial-oriented governance emphasizing efficiency and transparency. Relatedly, our participants' descriptions of KeDAMS as a precursor to improved urban planning reinforce discourses linking automation to businesses growth and economic development (Cugurullo, 2020; Hollands, 2015). It is no coincidence that one of the slogans used to promote the platform was "Doing business made easier" (CGK, 2021). What these dominant narratives often overlook, however, are the social and political dynamics embedded in land management and urban planning practices. The next section explores this issue further.

The technocratic nature of KeDAMS

The initial version of KeDAMS was launched with considerable fanfare at a public event attended by prominent figures, including the county's then-deputy governor, Martin Moshisho, and other local politicians (see Rop, 2020). During the event, Mr. Moshisho asserted that the platform would streamline building permit issuance, enhance controls on unauthorized developments, and stimulate business investment in the region. He emphasized that "development permits are not just random administrative requirements; they are crucial for generating wealth, attracting investment, and ensuring better protection for the environment and the community." He concluded by stating that KeDAMS would benefit "land buyers, investors and residents of Kajiado County" (Murigui, 2020, n.p.). Such assertions were not atypical, but aligned with broader institutional perspectives. The World Bank, for example, describes permit automation as a strategy that "facilitates the creation of businesses and attracts more private investment" (World Bank Group, 2015), reflecting a focus on business growth through urban development regulation.

Official endorsements of KeDAMS reveal that the deployment of digital technology for physical planning and construction permitting has been driven by an institutional focus on legitimate business growth and wealth production. However, our discussions with county planners revealed a more nuanced reality. Planners noted that bribery, corruption, and unauthorized developments remain pervasive in Kajiado, an issue corroborated by local media reports (see Kioko & Kimaiyo, 2023; Ngotho, 2023). Additionally, officers pointed out that many developers in Kajiado remain unaware of the requirement to obtain permits, leading to inconsistent use of the platform (NA240417I013, 2024). Another significant challenge highlighted by county planners was that the enforcement of fines falls under the National Building Inspectorate, a state body that subcontracts low-skilled workers as inspectors. Poor coordination between the Inspectorate and the Department of Lands and Physical Planning has thus created opportunities for irregular practices and corruption.

As expressed by our interlocutors, the approval of development projects in Kajiado is heavily influenced by local power dynamics. Simply put, lobbying from powerful actors shapes development approvals and directly influences the creation of housing, commercial complexes, and industrial facilities, sometimes leading developers to flout zoning regulations. A physical planner working for the county went on to emphasize the discretionary nature of urban planning, describing it as inherently intertwined with political agendas and stakeholder alliances:

> Planning and politics, let me tell you, [are] one and the same thing (…) You want to develop a town. You already have it in your mind that this area is industrial, this one is residential, this one is commercial. But people will not choose that. They will not choose your point. And you don't want to tell them to make this one commercial. So, what you do? That's where politics come [in]. You have to let them choose with the intention of making them choose what you want … In fact, a planner is a politician. (NA230310I004, 2023)

Our interlocutor suggested that KeDAMS does not operate in a vacuum but is entwined with the practices of patronage and clientelism that characterize political work in Kenya (Dyzenhaus, 2021). Indeed, although the platform has accelerated permit issuance, approvals remain entangled with extant power hierarchies among planning authorities, investors, and private developers. Decisions on zoning regulations or controlling building activities can sometimes be influenced by those with sufficient political and social leverage, within and beyond government. In the words of another county officer, personal interests often influence project approvals, particularly when it comes to large, politically backed plans:

> personal interests [often influence] development applications. Maybe there is a very serious developer, with a massive project, for example, which could have big environmental consequences. But it comes with political backing, then it can go through without standardised paperwork. They can really push you to the wall. (NA230619I024, 2023)

This context suggests that technological interventions like KeDAMS are neither objective nor apolitical. They are embedded within existing networks of influence where historical, political, and social factors shape the production, circulation, and interpretation of the informational and material infrastructures that define the city (Batty, 2013; Cinnamon, 2020; Milan & Treré, 2019; Prasad, 2022). KeDAMS must thus be understood within the broader powers driving urbanization, land fragmentation, and real estate speculation in a complex and lucrative land sector (Bassett, 2020; Boone et al., 2019).

While KeDAMS has introduced efficiencies in permit issuance and storage at the Department of Lands and Physical Planning, the relationships among politicians, developers, and planners remain largely unchanged. This mirrors analyses that question the extent to which automation can replace human decision-making or resolve issues of corruption and coercion in government institutions. Although "smart city" and "smart urbanism" initiatives aim to reduce human biases, most automated systems still rely heavily on human input (Atanasoski & Vora, 2019; see also Macrorie et al., 2021; Winfield, 2014, p. 38). Rather than reinforcing the distinction between humans and technology, the integration of robotics and autonomous systems in urban environments often presents "a blending of human-machine intelligence in socio-technical systems" (see also Gandy, 2005; Macrorie et al., 2021, p. 200). In other words, the delegation of control from users to automated systems blurs the boundaries between humans, technology, data, and

infrastructures, potentially creating new hybrid spaces and collective identities (Bennett & Segerberg, 2013; Kitchin & Perng, 2016; Macrorie et al., 2021).

In planning, decisions about land use, infrastructure, and other spatial issues are increasingly informed by spatial and quantitative data (Kitchin, 2023; Porter et al., 2019; Potts, 2020). KeDAMS exemplifies this trend, allowing county staff to link building applications with plot locations. However, none of our respondents suggested that the e-platform could fully automate development regulation or replace human labor. Instead, they described the current planning landscape as one where human judgment matters as much as it did before KeDAMS. This reflects scholarly work questioning the notion that planning can be entirely automated. As Potts (2020, p. 282) points out, planners bring their own sets of interests to their practice, and there is little evidence to suggest that "planning will become automated, particularly due to the subjectivity and value judgments involved in much of planning practice."

Ultimately, Kajiado's permit system operates within a dual reality characteristic of automated building controls elsewhere in Kenya. While KeDAMS is seen by its advocates (i.e. county high-rank officials and World Bank representatives) as a step towards a streamlined, paperless future, end-user experiences reveal critical limitations, including the lack of awareness about its mandatory use, influence from powerful actors, and insufficient site inspections.

While some officials noted that KeDAMS will enable data-driven urban planning, our research found inconclusive evidence that data from this system currently informs policy at either the county or national level. Additionally, unlike planning applications and assessment systems outside Kenya (see Kitchin et al., 2024), data generated by KeDAMS are not made available as open data. This limitation may hinder opportunities for external accountability and public engagement in monitoring and tracking urban planning and development. It remains to be seen whether the Department of Lands and Physical Planning will actively process and utilize the data collected from KeDAMS, and whether future open data interventions will significantly transform development control practices in the region.

Discussion

Nairobi, one of the fastest-growing urban areas in Sub-Saharan Africa, faces significant challenges in urban planning and service provision (Van Noorloos & Kloosterboer, 2018). As local authorities grapple with these challenges, automated platforms for land use and building management – like KeDAMS –, have gained traction. This paper has explored the use and aspirations surrounding automated systems for development regulation in Kenya, focusing on Kajiado County's KeDAMS platform, introduced in 2020 to combat corruption and enhance transparency in the building sector. Through ethnographic observations and interviews with key stakeholders, we analyzed KeDAMS within Kenya's broader push towards digitalization – a movement that has earned the country the moniker "Silicon Savannah" for its role as Africa's digital technology epicenter (Cirolia et al., 2023; Poggiali, 2016).

In a context where state-led and corporate efforts increasingly emphasize digitalizing and automating urban life (Datta & Muthama, 2024; Guma, 2021; Meru & Kinoti, 2022), automated platforms like KeDAMS are often portrayed as silver-bullet solutions to

pervasive issues in the land and building sectors, including backlogs, bureaucratic delays, and the risk of document loss. Automation is also frequently presented as a means to curb bureaucratic corruption by streamlining services and monitoring interactions on digital platforms. Reviewing KeDAMS's inception and implementation, our analysis suggests that public officials, built environment professionals, and World Bank representatives have promoted a techno-utopian narrative, viewing automation as a neutral, objective fix for urban management and land use regulation challenges. In other words, KeDAMS embodies a techno-optimistic approach, associating digital technologies with paperless, real-time, and highly efficient public service delivery (see Barns et al., 2017; Luque-Ayala & Marvin, 2015; Marvin et al., 2015).

In examining the World Bank's role in the creation of KeDAMS, we have drawn attention to the multilateral donor as a key enabler of digitalization and automation in Kenya. This has, in turn, strengthened the position of private software companies like OTB Africa. As these public-private partnerships evolve, private actors increasingly shape the "digital skin" of the city, a network of software, hardware, and informational infrastructures capable of geo-location and automated processing (Rabari & Storper, 2015; see also Macrorie et al., 2021). By providing IT support and server hosting to county governments, OTB Africa not only secures public funds but also expands its technological influence in the East African region. The rise of e-permit systems thus reflects a corporate vision of "urban smartness," often privileging global IT corporations and concentrating capital among firms with technological expertise (Hollands, 2015).

KeDAMS also illustrates an entrepreneurial ethos within local governance (see Brenner & Theodore, 2002; Guarneros-Meza & Geddes, 2010). While it may be premature to suggest that OTB Africa controls Kajiado's building permits process, the company's role in providing digital services aligns the county's urban management closer to a business-oriented paradigm (see Grossi & Pianezzi, 2017; Hollands, 2008; Marvin et al., 2015; McNeill, 2015). Seen in this light, the shift from manual to digital processes, facilitated by the World Bank and private software providers, reflects not an apolitical turn but rather an institutional synergy that underscores how public-private arrangements are shaping local planning and urban management practices.

Despite the dominant narrative linking automation with efficiency and transparency, our research revealed that KeDAMS is not immune to the human values and political interests that have long influenced development control and planning in Kajiado and Kenya more broadly (see Bassett, 2020; Boone et al., 2019). Stakeholders within and outside local government institutions acknowledge that planning and building processes remain influenced by local politicians, built environment professionals, real estate agents, and intermediaries such as land brokers, who use their social and political capital to secure construction permits, influence zoning changes, or obstruct projects. These findings align with the broader understanding that spatial planning cannot fully eliminate human factors; personal values and sociocultural dynamics continue to shape planning practices, even in contexts increasingly dominated by algorithms and artificial intelligence (Potts, 2020; Stratigea et al., 2015). Simply put, planning systems and urban spatial issues are deeply interactive and political, not neutral or linear phenomena (Healey, 2020).

While planning scholarship increasingly shows that machine learning and algorithmic intelligence can assist planners in filtering, integrating, and generating meaningful insights (Bugs et al., 2010; Horelli et al., 2015; Potts, 2020; Wallin et al., 2012), it

remains uncertain whether Kajiado's county authorities will fully utilize data-driven solutions for effective development control and spatial transformation. Further research could critically engage with the potential of big data to address challenges in rapidly urbanizing areas like Kajiado (see for example Kitchin, 2023). Additionally, as digital platforms and algorithms become more entrenched in planning departments, it is essential to address concerns about data privacy and the ultimate use of collected data. Literature indicates that smart city initiatives continue to raise questions about whether data is genuinely used in the public interest (Batty, 2013; Cinnamon, 2020; Kitchin, 2014a; Söderström & Datta, 2023). As Rob Kitchin (2014b, p. 12) notes, given the role data-driven systems are likely to play in urban governance, "there is a pressing need to interrogate the nature and production of urban big data, the composition and functioning of urban analytics and control centers, and the implications of technocratic, corporatized, and real-time forms of governance."

Furthermore, future studies might examine the implications of private IT corporations in automation initiatives and their growing role in providing tech-based solutions to county governments. In Kajiado, for instance, the dependence on OTB Africa's software design and hosting services means that the county's ability to issue permits is now tied to the performance of this private entity. Greater scholarly attention to these dynamics could clarify how increased private sector involvement in governance influences state-centered policymaking and the geographical scales at which governance takes place (see Barns et al., 2017; Cirolia & Harber, 2022; Harvey, 1989; Swyngedouw, 2005).

As the automation of urban planning and development control becomes an expanding research field, we hope this analysis of KeDAMS serves as an entry point for reflecting on the role of automation in transforming county governance and shaping urban spaces, information infrastructures, and everyday life. While our findings are not conclusive, they underscore the need for greater scholarly focus on the interventions required to address the challenges faced by rapidly urbanizing regions. Ultimately, we suggest that further geographical research should examine not only the economic opportunities generated by digital technologies but also the entanglements between technology, power, and urban space that these interventions produce.

Notes

1. In popular parlance, Kajiado is the bedroom of Nairobi.
2. The full name is Department of Lands, Physical Planning, Housing, Urban Development, and Municipalities.
3. In Kenya, professional bodies maintain and publish lists of their active members, which county officials consult when approving applications from professionals. Professional registrations are issued by the relevant professional bodies, such as the Architectural Association of Kenya, while practicing certificates are granted by regulatory authorities, including the Board of Registration of Architects and Quantity Surveyors, the Engineers Board of Kenya, and the Physical Planners Registration Board.

Acknowledgements

The authors extend their heartfelt gratitude to all the participants who generously shared their insights during interviews for this research. Special thanks go to Robin Bloch, Ursula Rao, Wen-I Lin, and the entire team of the *Regional Futures* project for their invaluable contributions

and support. We are also deeply grateful for the feedback received from attendees at the *Data Stories Workshop: The Data Politics of Planning and Housing, the RGS-IBG Annual Conference 2024*, and *The Transcalar Politics of Urban Development Conference*. Any remaining errors are solely our responsibility.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 Research and Innovation Program (Grant agreement No: 101019318).

Research ethics and consent

Informed consent to participate in this research for the purpose of data collection and scientific production was provided by the research subjects in written form.

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