

Diamniadio Smart City: Between Concept and Reality

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Abstract

The concept of smart city is strongly promoted on a global scale as a symbol of modernity and innovation, particularly in Africa, thanks to marketing campaigns by companies like IBM. This idea appeals to African decision-makers seeking futuristic development, attracting tourists and investors with the promise of advanced technological solutions and an improved quality of life. However, the definition and implementation of this concept vary considerably, encompassing a range of initiatives that leverage information and communication technologies (ICT) to optimize urban management, mobility, energy efficiency, and citizens' quality of life. This article focuses on Diamniadio, a new city under construction 30 kilometers east of Dakar, Senegal, which exemplifies the ambition to build a modern city integrating the latest technologies to serve as a model for sustainable urban development. The approach is distinguished by a cross-analysis that draws both on international literature concerning smart cities in the Global South and on original empirical data collected through semi-structured individual interviews conducted between 2017 and 2020. The objective is not only to document Senegal's experience by highlighting the challenges, progress, and prospects of this initiative, but also to examine the viability and local ownership of a model largely shaped by globalized logics.

Keywords

Smart city, technology, urban innovation, sustainable development, Diamniadio

Introduction

The term “smart city” has become a strongly promoted concept on a global scale, and particularly in Africa, through a marketing campaign orchestrated by the American company IBM. Often associated with modernity and innovation, this concept has attracted many African decision-makers, who have incorporated it into their urban planning. As a result, the concept (of the smart city) has almost become a panacea for attracting tourists and foreign investors, often accompanied by promises of advanced technological solutions and an enhanced living environment.

The idea of the smart city has quickly taken hold in political and economic discourse, even though its definition and implementation vary from one place to another. It encompasses a wide array of

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initiatives aimed at integrating information and communication technologies (ICT) to improve urban management, mobility, energy efficiency, and citizens' quality of life. However, this often idealized vision of smart cities clashes with a complex reality in Africa, where urban challenges are numerous. It is therefore crucial to distinguish the smart city as a political and discursive horizon from its practical implementation. Numerous studies emphasize that, in countries of the Global South, transposing imported models must contend with specific legal frameworks, technical capacities, and governance practices (Söderström et al., 2014; Odendaal, 2016).

The issue, then, is not only about “how” to integrate technology into the city, but also “for whom”, “at what pace”, and “according to which priorities” this integration should take place. How, then, can the concept of the smart city truly be understood, and what are its concrete implications on the ground? The case of Diamniadio, a new city under construction 30 kilometers east of Dakar, Senegal, provides a privileged site for exploring these issues. Since 2014, Diamniadio has represented a national ambition by the Senegalese state to create a modern city incorporating the latest technologies, envisioned as a model for sustainable urban development. Supported by both national and international public-private partnerships, the project aims to transform a previously rural area into a benchmark urban hub.

After having explained the methodology used, the article begins with a review of the scientific and historical literature to define precisely what constitutes a smart city by analyzing its various dimensions and ramifications. It then examines how this concept is concretely implemented in the creation of the new city of Diamniadio, outlining the challenges, progress, and future prospects of the project.

Methodology

A systematic methodological approach was employed, combining a literature review with interviews to analyze the smart city project in Diamniadio. The literature review was conducted via databases such as Google Scholar and Scopus, using search terms such as “smart city,” “urban digital transformation,” “Diamniadio,” ... The selection criteria involved recent academic publications, African and international case studies, and articles addressing basic infrastructure, implementation challenges, and the socio-economic impacts of smart technologies. This literature review provided a theoretical foundation centered on the main dimensions constituting the concept of the smart city, as well as recurring criticisms, particularly within the contexts of the Global South.

In addition to the literature review, we conducted semi-structured interviews between 2017 and 2020, as part of our doctoral research, with key stakeholders of the project, notably key representatives of the General Delegation for the Promotion of the Urban Poles (DGPU). These interviews aimed at gathering specific insights into the challenges and progress of the project. The data collected, cross-referenced with institutional documents, was qualitatively analyzed using content analysis methods, allowing for comparing of the project's initial ambitions and the actual state of its implementation. This comparison also made it possible to identify points of convergence and divergence between official discourse, field observations, and realities observed in other smart cities, both in Africa and internationally.

Finally, the reflexive stance adopted throughout the research led us to critically examine the very conditions under which the data was produced, as well as potential biases linked to the timing of the interviews, conducted during a period when the Diamniadio project was experiencing both progress, and political and financial uncertainties (related to institutional timelines). This interpretive caution aims to ensure that the findings and conclusions remain contextualized and avoid overgeneralization.

Definition of the Concept of « Smart City »

The definition of “smart city” is complex and varies depending on the context. According to Albino et al. (2015), there are at least twenty-three (23) different definitions of the concept. This plurality of interpretations stems from the inherently multidisciplinary nature of “smart city”, which spans various fields of research (Angelidou, 2015).

Initially, the concept evokes a “connected” city, referring to digital access, technology, and the internet. Dupuy (1992) even speaks of the “digitization of the city” to describe this connection between the city and technology. This relationship between the two seems obvious, although it can encompass a wide range of uses and levels of appropriation (Douay & Henriot, 2016). In this sense, “smart city” conveys a standardized discourse, a kind of “socio-technical imaginary” (Jasanoff & Kim, 2015; Datta, 2015), crafted by tech companies to attract urban stakeholders and expand into new markets (Hollands, 2015; Sadowski & Bendor, 2019; Wiig, 2015), promoting digital connectivity, seamless mobility, energy efficiency, and economic competitiveness as core criteria of modernity. However, this idealized projection often conceals the recurring constraints of African cities: deficits in basic infrastructure, socio-spatial inequalities, and weakness of participatory planning (Watson, 2014; Robinson & Parnell, 2019). In this sense, a smart city, as a “label” (Vanolo, 2014), refers to territorial marketing that does not guarantee its actual translation in tangible benefits for local populations.

The smart city, as a response to various demographic, economic, and environmental challenges, is now perceived as a system that must be optimized to function more effectively. To address these challenges, technology companies position themselves as “obligatory passage points” (Söderström et al., 2014), offering technological solutions that connect urban systems through the collection, use, and analysis of data. This vision rests on the assumption that increasing the volume and quality of available data will systematically lead to better urban governance (Shelton et al., 2015). However, numerous studies emphasize that data is not neutral: it is produced, selected, and interpreted within specific political, economic, and cultural frameworks (Kitchin, 2014). In African contexts, where the capacity to process and update data is often limited, there is a risk of reproducing inequalities or favoring already well-equipped sectors to the detriment of others, less connected but equally strategic for urban life.

Moreover, the reality goes beyond the technological framework to encompass many other elements: leisure, housing, transportation, and access to basic services such as water, electricity, and, more recently, internet connectivity. The different urban components are elements of a broader set of systems that must be considered collectively to address major urban challenges. The company IBM pioneered the design of smart cities, structured around planning, service management, infrastructure, and human factors. These pillars form individual systems, as the city functions as a “system of systems” (Söderström et al., 2014). This idea from IBM was then established as a model, disseminated globally, and adopted by cities around the world, serving as a political argument and evolving into a form of brand (“urban labelling”, according to some [Albino et al., 2015]). According to IBM, “the city must be approached as a place of integration, collaboration, and management of multiple interdependent systems...” (Guérin-Jabbour & Bauchot, 2016, p. 6), offering infrastructure management techniques thanks to the collected data.

Furthermore, this systemic paradigm echoes the urban thinking of “cybernetics” from the 1950s to 1970s, when the city was conceived as an information system. This vision focuses on the interconnection of urban elements through feedback loops (Townsend, 2013). In this perspective, Giffinger et al. (2007) identifies six dimensions to define a smart city: a smart economy, smart governance, a smart environment, smart mobility, smart living, and smart people. In other words, a smart city harmonizes multiple subsystems around economic, social, and environmental issues, using digital technologies as tools.

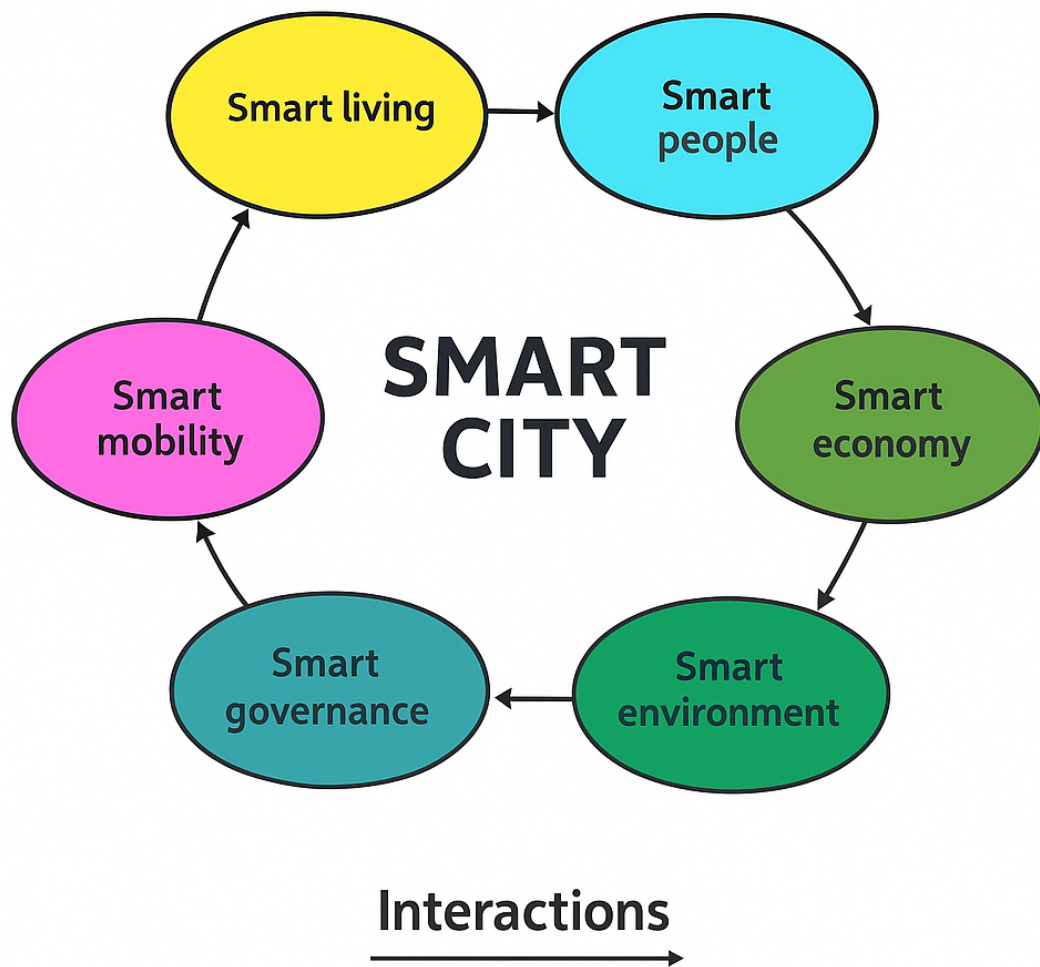


Figure 1: Global Functioning of the Smart City

Figure created by Cheikh Cissé, 2022, inspired by Giffinger et al., 2007

However, in the context of countries in the Global South, several authors (Watson, 2014; Datta, 2015; Odendaal, 2016) emphasize the importance of contextual adaptation. It is not only about transplanting “ready-to-use” technologies, but about conceptualizing the smart city as an incremental and hybrid process, one capable of combining modern infrastructures with informal practices. “Smartness” is not limited to advanced technologies; it lies above all in the ability to adapt these technologies to local social and cultural realities, making them genuinely useful to residents and responsive to concrete urban needs such as access to water, waste management, or the organization of informal transport.

Several African states, in a race to build new cities on the peripheries of their capital cities, are striving to position themselves within an international dynamic of innovation, technology, modernity, and sustainability. The digital economy is at the heart of their strategies, with a strong focus on smart cities. Examples such as Konza Technology City and Smart City Kwame Nkrumah, on the peripheries of Nairobi and Accra respectively, Eko Atlantic City in Greater Lagos, or the Smart Africa Alliance initiative, chaired by Rwandan President Paul Kagame in 2014, and Senegal’s New Deal Technologique (Technological New Deal) launched in 2025 across all urban sectors, all illustrate this trend. While increased access to digital technologies and the internet is seen as an asset, and

even a selling point, by policymakers when promoting the smart city, the digital divide and limited access to basic services such as electricity remain persistent challenges across Africa, and present major challenges for the implementation of smart cities. In reality, Africa remains one of the least electrified continents, with an electrification rate of just 43% in 2016. However, one cannot envision a smart city, as it is commonly defined, without sufficient access to electricity. Chenal (2020) highlights that electrification remains the main challenge for connected cities, as better internet connectivity is correlated with economic growth (Tchounand, 2020).

Modeling of Diamniadio Smart City

In the new city of Diamniadio, the first of the four planned districts is specifically dedicated to the digital hub (the digital park), aimed at establishing a “smart” management system for the city. In 2016, Diamniadio was selected as an “affiliated city” within the I3E competition, which aims to support the creation of smart cities focused on digital applications, thereby surpassing Casablanca, Tunis, and Buenos Aires¹.

The Diamniadio Digital Technology Park, envisioned as an oasis spanning 25 hectares, was established in 2016. This race for innovation led to the deployment of infrastructure centered on information and communication technologies within the new city. With the ambition of positioning Diamniadio as the first technology hub in Senegal, and potentially in all of West Africa, similar to other nations that have already taken the lead in this field, such as Nigeria, South Africa, and Morocco, the Senegalese state planned for cutting-edge digital infrastructure. According to the head of the smart city project in Diamniadio, this includes “high-speed and ultra-high-speed internet, “data centers” for digital data storage, as well as efforts to optimize energy flows in buildings to reduce energy consumption and meet the current needs of the population.”

At the time of our research, the Diamniadio smart city project, in addition to be considered as an “affiliated city,” receive partial funding from the African Development Bank (AfDB), amounting to €71 million. Initially just a concept, the Diamniadio smart city has become a priority for Senegalese authorities and is led by the urban development agency, the General Delegation for the Promotion of the Urban Poles (DGPU). The Project and Smart City Lead explained to us during an interview in 2019 that the initiative was based on three main pillars: “energy efficiency through effective thermal insulation techniques, the construction of smart buildings equipped with sensors, and the introduction of various digital solutions.”

1 Information gathered during our 2016 interview in Ouakam with the Smart City Lead the General Delegation for the Promotion of the Urban Poles (DGPU) in 2016.



Figure 2: Diamniadio Datacenter Project

Source: Magazine *Nouvel Horizon*, Special Issue on Diamniadio, New City, Special Edition No. 8 paired with Issue No. 1021, January 5–11, 2017.

Among the priorities, digital technology occupies a central role as a lever for improving local living conditions. At the time of our fieldwork, the digital hub was already beginning to attract companies and start-ups specialized in technological innovation, including the presence of telecommunications operators such as Orange, Tigo, Expresso, major IT firms like Atos, as well as agencies from the energy sector such as ADEME.

This positioning aligns with a political context shaped by the *Plan Sénégal Émergent* (PSE), adopted in 2014 under President Macky Sall, which promoted the creation of urban hubs (Diamniadio, Lac Rose (Pink Lake), and so on), a tool to reduce congestion in Dakar and stimulate private investment. In this vein, Diamniadio was not designed solely as a residential area but rather as a multifunctional hub comprising administrative spaces, conference centers, commercial areas, and light industry. The stated goal is to attract not only new populations but also businesses and international institutions.

The design of Diamniadio heavily draws from the logic of “greenfield cities”, analyzed by Watson (2014), i.e., urban development projects built *ex nihilo* on vast, undeveloped land, designed to embody a futuristic urban vision. However, these initiatives are frequently criticized for targeting a financially solvent clientele, effectively excluding lower-income populations. This socio-spatial selectivity fuels the unpopular and elitist nature of the approach (Moser, 2015).

In concrete terms, the planning of Diamniadio is structured around three successive phases: the emergence phase (2014–2019), the development phase (2020–2025), and the completion phase (2025–2035). Although digital services (especially telecommunications networks) are included in Diamniadio’s master plan, their deployment was not prioritized during the new city’s early stages. The launch of digital infrastructure was only scheduled to begin in the second phase. During our interview conducted in July 2019, the Project Lead for the deployment of the digital hub at the DGPU stated that: *“Digital technology is still perceived as a bonus, not a necessity. No specific timeline has been set for its full deployment,”* as the project was still in the diagnostic phase at that time.

However, as of 2025, the planning phasing of the new city has not been strictly followed: some tasks from the initial stages, such as sanitation, remain incomplete. This lag is partly explained by the political transition in 2024, which brought a new president, Bassirou Diomaye Faye, to power. His urban priorities do not necessarily align with those of his predecessor, Macky Sall, the principal initiator of the Diamniadio project as part of his former politico-economic agenda.

Moreover, the project’s dependence on external funding makes it vulnerable to fluctuations in international aid and the conditions imposed by donors. While the African Development Bank (AfDB) supports part of the project, other components rely on public-private partnerships, whose negotiations are often long and complex. The experience of Eko Atlantic City in Nigeria illustrates the risks associated with such arrangements: while the project succeeded in delivering high-end infrastructure, it lacked true integration into the existing urban fabric (Grant, 2015). Still under construction, Diamniadio retains some room to maneuver to avoid a similar pitfall.

Discussion

The analysis of Diamniadio’s smart city reveals a gap between technological ambitions and practical realities. The promises made by the State at its launch have struggled to materialize on the ground, as evidenced by delays in digital deployment and low involvement of the local population. In fact, the new city is still waiting for its populations; it is not yet sufficiently inhabited. Although ambitious, the project is hindered by logistical and financial challenges, as well as inadequate basic infrastructure, particularly electricity. These constraints highlight the need for a gradual and realistic approach that takes local conditions into account to ensure alignment between vision and practice.

The situation observed in Diamniadio is not an isolated case; it fits within a broader trend affecting smart city projects across Africa. For instance, Konza Technopolis in Kenya, announced in 2008 as the “Silicon Savannah”, still faces numerous delays today. These difficulties stem from governance issues, the complexity of securing financing, a lack of clarity about the real needs of users, and spatial incoherence due to its proximity to Kibera, the largest slum in Africa. Similarly, Eko Atlantic City in Nigeria, while advanced in real estate development, has been criticized for its elitist nature and lack of integration with the socio-economic realities of Lagos, where the Makoko slum persists. These examples highlight that a smart city project that is not rooted in the local context risks becoming simply a showcase with no real capacity for integrated urban transformation.

To successfully transition to a truly smart city, technological development must be accompanied by improvements in basic infrastructure. The involvement of local tech companies and the use of a participatory approach, including the local population and their everyday aspirations, are essential conditions to promote innovation and ensure the social acceptability of proposed solutions.

Another key issue lies in the digital divide. As Söderström et al. (2014) point out, a city cannot be considered “smart” if a significant portion of its population is excluded from access to digital infrastructure. In Senegal’s case, where internet access remains marked by significant regional and social disparities, priority should be given to expanding affordable digital services before deploying cutting-edge technologies concentrated in a limited area like Diamniadio.

The project’s governance also reveals a paradox: although Diamniadio smart city is presented as an innovative, forward-looking project, its decision-making process remains largely top-down, led by the State through a planning agency DGPU and its international partners, without any real mechanism for citizen participation. This lack of formal consultation limits the potential for social appropriation of infrastructure and may lead to latent resistance. Nevertheless, experiences in Kigali (Kigali Innovation City) or in Cape Town show that integrating participatory mechanisms such as community workshops, local surveys, and co-creation platforms helps enhance the relevance and sustainability of urban solutions (Odendaal, 2016; Robinson & Parnell, 2019).

Finally, the connection between Diamniadio and the rest of the Dakar metropolitan area is a real concern. If the project develops as an isolated high-tech enclave, it risks exacerbating spatial and economic disparities with already existing peripheral urban areas, thus reinforcing inequalities. Conversely, functional integration through efficient transport networks, economic complementarities, and service exchanges could turn Diamniadio into a driver of development, benefiting the entire Dakar metropolitan region.

Conclusion

The ambition to make Diamniadio a “smart city” reflects a desire for innovation, integrating technological advances into the new city project. However, adapting these technologies to local needs remains an ongoing challenge. The gap between the ideal conceptualization and actual implementation calls for a more realistic approach, one that pays close attention to the complexity of local practices and realities.

The project’s current trajectory shows that a smart city is not simply about digital infrastructure or connected buildings. It must be part of a systemic vision that integrates social, economic, and environmental imperatives, ensuring that technological innovations address concrete needs rather than symbolic or promotional objectives.

Balancing vision with practical constraints requires steering the project toward an achievable urban form, taking into account the hybrid nature of formal and informal practices. In concrete terms, the transition to a smart city demands the harmonious integration of technologies with the lifestyles, needs, and cultural specificities of the local population, and it primarily depends on strengthening universal access to electricity and basic infrastructures, a prerequisite for any digital deployment.

On an operational level, this means establishing institutional mechanisms for citizen participation at every stage of the project; involving local start-ups and SMEs in the design, implementation, and maintenance of digital services to strengthen the national economic fabric; planning for Diamniadio’s functional integration into the Dakar metropolitan area through efficient and accessible transport connections; and adopting a gradual approach with frequent evaluations to ensure coherence between initial objectives and actual outcomes.

In the longer term, comparative evaluations with other new cities in Africa and Asia will help identify the key conditions for a successful smart city in the Global South, highlighting the roles of public policy, strategic partnerships, and multi-level governance.

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