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Original Research

Evaluating Strategic Digital City: strategies, public services, and City Information Management in Lagos, Nigeria

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Abstract

Cities require strategies, public services, and city and spatial information (CSI) for development, a high quality of life, problem-solving, and to be strategically digitized to enhance the duties of city managers and the efficiency of city dwellers. The objective of the research was to analyze Lagos city's strategies and public services, observing whether they aligned with the SDC's model and city and spatial information management policy. The case study research design was used, while the qualitative and quantitative techniques were used to analyze the data. The results revealed that Lagos City had 3 strategies and 30 public services. From the result, 36.7% of the public services were in line with the SDC model, 10% were in line with the CSI, and 53.3% were still awaiting implementation. In conclusion, it was recommended that Lagos city strategies and public services should be properly managed, and enshrined in the city information management system in line with the SDC model, increase public services by ensuring a good housing and land-use information, spatial policy, and geographic information, Medical, and health outreach information to guide access to medical facilities and services, transportation and traffic management information system among other recommendations.

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Résumé

Pour se développer, offrir une qualité de vie élevée, résoudre les problèmes et se numériser de manière stratégique, les villes ont besoin de stratégies, de services publics et d'informations urbaines et spatiales (IUS). Ces éléments sont essentiels pour améliorer le travail des gestionnaires municipaux et l'efficacité des citadins. Cette recherche visait à analyser les stratégies et les services publics de la ville de Lagos et à vérifier leur conformité avec le modèle de la DDC et la politique de gestion des informations urbaines et spatiales. Une étude de cas a été menée, et les données ont été analysées à l'aide de techniques qualitatives et quantitatives. Les résultats ont révélé que Lagos disposait de 3 stratégies et de 30 services publics. Parmi ces services, 36,7 % étaient conformes au modèle de la DDC, 10 % aux IUS et 53,3 % étaient encore en attente de mise en œuvre. En conclusion, il a été recommandé que les stratégies et les services publics de la ville de Lagos soient correctement gérés et intégrés au système de gestion de l'information urbaine et spatiale conformément au modèle SDC, qu'il soit amélioré en assurant une bonne information sur le logement et l'utilisation des sols, une politique spatiale et une information géographique, une information médicale et sanitaire pour faciliter l'accès aux installations et services médicaux, un système d'information sur les transports et la gestion du trafic, entre autres recommandations.

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1. Introduction

Societies and environments are made up of humans who live there and engage in daily economic and social activities. These societies and environments are often faced with several challenges because of daily human activities. Developments and demands have also led some people to move from one place to another to fulfil life's demands and responsibilities. Such movements are observed when people relocate from the less developed areas to the developed areas, which are from the rural to the urban centers (Mthiyane, 2022). Urban areas are locations with high population density, like cities and towns, which are often the main areas of employment and commercial activities (Cattiyelli, 2024).

The high level of activities and commercialization in the city has also posed a challenge to the citizens because of the large public services and amenities, and without structured and organized city and spatial information, the dwellers would face difficulties (Jiang, et al, 2024). City or Urban information, as asserted by Fadhel, *et al*. (2024), refers to the processed data for notification, instructions, guides, and communication between the city managers and the city dwellers on how to navigate and live right and access certain public services in the cities and urban areas. Lagos City, according to Lawanson and Nubi (2024), is an urban area and a large metropolitan city in southwestern Nigeria. With an upper population estimate of 21 million, it is the largest city in Nigeria and the most populous urban area on the African continent. Lagos was the national capital of Nigeria until the federal government's December 1991 decision to move its capital to Abuja in the country's center. Lagos is a major African financial center and the economic hub of Lagos State and Nigeria (Bigon, 2011). The city has a significant influence on commerce, entertainment, technology, education, politics, tourism, art, and fashion in Africa and is also among the top ten of the world's fastest-growing cities and urban areas (Lawanson and Nubi, 2024; Lagos State Government, 2024a). A megacity, it has the fourth-highest GDP in Africa with a GDP of $136.6 billion, and houses one of the largest and busiest seaports on the continent. Due to the large urban population and port traffic volumes, Lagos is classified as a Medium-Port Megacity. (Gilbert and Shi, 2024; Oyalowo, *et al*., 2024)

City strategies and public services made available in the cities are important to help lessen the stress of city dwellers and lighten the workload of the city or urban managers. These strategies and public services can be made more useful and objective when put together as a city and spatial information with the help of Information Technology. This, when done in line with the SDC projects model, would enhance urban management and a more productive city, especially considering the vast business activities operated in the city by the citizens and other foreign nationals. (Visvizi, *et al*., 2024, Al-Maqashi, *et. al*., 2024 ; Rezende, *et. al*., 2024 ; & Kim, *et. Al*., 2024, Zhou, *et al.,* 2019)

The research problems in Cities reveal that there are various activities like businesses, schools, hospitals, markets, transportation, traffic, housing, land use, and other remote activities that help progress the daily routine of the dwellers, visitors, and city managers. According to Yehorchenkova, *et al.,* (2024), most cities have a problem managing, updating, and converting the city strategies and public services to the city and spatial information, considering the SDC model. Some cities do not follow the SDC model that is successfully adopted in other cities, and some cities do not have functional city strategies and public services, and such cities cannot progress. Some cities do not communicate the city's public services to the citizens through the city information management system, where the services can be accessed, navigated, and used by the citizens, and managed by the city or urban managers (Wang *et al*.,

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2024; Iskandar *et al.,* 2024). All these are the problems this research seeks to analyze in Lagos.

The research questions are;

1. But how does Lagos City information align with the strategic digital city concept of strategies, public service, and information technology resources, considering city information policies?

2. But what are the city strategies and public services in Lagos?

The objective is to determine Lagos city strategies and public services, the application of a strategic digital city model based on city strategies, and public services in Lagos city using the city information management system.

The research justifications embody how city information management can help organize city managers and city dwellers and enable the citizens to navigate and achieve their daily activities and needs by accessing the city strategies, and public services ranging from health services, environmental, land use, and navigation services, traffic and transportation services, security services, emergency services, etc., which can also strengthen citizens' confidence in the government and enhance the city's quality of life with public services (Yehorchenkova, *et al.,* 2024; Yang. *et. al.,* 2021). Technological resources help the city to be digitized and enable it to access all information about the city's public services digitally and easily. They can be used to disseminate information and advertise government achievements for further engagement and re-election of managers. It also enables the workability of spatial and geographic information services. (Fumagalli *et al,* 2022; Makkonen, & Inkinen, 2024; Rajabifard, *et. al*., 2018). The SDC project will help to classify the city into various municipalities and organize strategies and services using information technology, which will lead to a transformed city and informed citizens who know what to do, how to do it, where to do it, and when to do every activity of their lives in the city. (Rezende *et. al*., 2024)

2. Literature review

2.1. Concept of Strategic Digital City (SDC)

The SDC is a concept proposed by Rezende (2023) as the application of information technology resources in the management of city strategies, public services, and city information, which are the components and sub-projects of the SDC. It also involves providing information and services to the citizens while running their daily activities, and based on the city management strategies. This, the author noted, goes beyond offering the citizens internet or placing the citizens in a global space where they can browse and connect with people around the world, but this focuses on the strategies adopted by city managers with the use of ICT to ensure that necessary services are provided to the citizens by helping them solve their daily problems and achieve their aims and objectives with ease (Rezende, *et. al*., 2024). This concept is like a smart city, which is an urban development using Information and Communication Technology (ICT) and Internet of Things (IoT) to provide useful information to effectively manage resources and assets. This includes data collected from citizens and mechanical devices, which are processed and analyzed to monitor and manage traffic and transport systems, power plants, water supply networks, waste disposal, etc.

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2.2. Concept of City Strategies

Strategies involve a plan of action or policy designed to achieve a major or overall objective. It describes how the ends (goals) will be achieved by the means (resources). Strategy can be intended or can emerge as a pattern of activity as the organization adapts to its environment or competes. It involves activities such as strategic planning and strategic thinking; it is an elaborate and systematic plan of action. A good strategy precisely diagnoses the problem being solved; sets a guiding policy that will address that problem; and proposes a set of coherent actions that will deliver that policy (Kamana, *et. al*., 2024; Fumagalli *et al*., 2022; Klausen, 2024). It is important to note at this point that one can have a plan, but without a strategy, the plan fails. Plans typically have to do with the resources you're going to spend, places you are going to, and things you wish to achieve; those are more comfortable because you control them. A strategy, on the other hand, specifies a competitive outcome that you wish to achieve and ways you will go about achieving the plan by anticipating obstacles to your plan and also putting in place systems and resources for avoiding the obstacles and ensuring you achieve your goals and aspirations (Alizadeh and Amanpour, 2023; Bostanci, 2024). Consequently, city strategies have to do with city plans, systems, and resources that would aid a city to continuously achieve its goals and objectives (Kamana, 2024).

2.3. Concept of Public Service

Public services are amenities that the government and other organizations provide to the public, dwellers, and community members. Such services include emergency, security, schools, courts, health, transport, traffic, lands, and housing services, etc. (Sienkiewicz-Małyjurek, 2024 ; Latupeirissa *et al*., 2024 ; Emre *et al*., 2024 ; Aryal *et al*., 2024). Serving the public is an essential duty that every government, organization, and agency needs to take as a very serious activity. The government and city managers need to relate and engage with the public to carry them along in the activities of government and respond to the needs of the citizens (Cheng and Liu, 2024; Lemekoana, and Selepe, 2024).

2.4. Concept of City Information Management

City Information management concerns the gathering, sorting, classifying, organizing, storing, accessing, delivering, and disseminating of city area or urban area records and information for urban area managers and dwellers. This information, when properly managed and placed in the right perspectives, is useful for planning, projection, guidance, direction, and notification. It will enable urban managers in their city management and public relations duty to ensure that every piece of information about the city or municipality needed by the public is disseminated to them through the city and spatial information system, and that the public or city dwellers are living right and help to protect and develop the urban areas and cities (Yehorchenkova *et al.,* 2024; Okon, *et al*., 2024a, Shi, *et al*, 2024). Information is the conveyance, giving, or receiving of ideas, knowledge, and intelligence to be properly guided in carrying out related activities and achieving goals. This implies that the city residents must be well-informed to be well-equipped, and knowledgeable about available public services and how to access and utilize them to better their livelihood in the city (Fadhel, *et. al*., 2024; Leonteva *et. al*., 2024; Ribeiro, *et. al*., 2019). The information, in this case, must be efficient, effective, and timely to assist in decision-making, including qualitative and quantitative indicators, and serve as an operational,

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managerial, and strategic resource for the cities. Service and spatial indices are crucial in database systems for efficiently managing service utilization data, geospatial data, and optimizing spatial query processing, which is essential for applications, finding, and locating location-based services, and urban planning information (Leonteva *et al*, 2018; Kim *et. al*., 2024; Mberede, 2024; and Zhou *et. al*., 2019). Other urban services and information problems that concern this research are due to inadequate open spatial city information on environmental, safety risks, emergency services, road traffic management, health services and information, and other routine city service information and records (Zhu, et. al., 2024; Firman, et. al., 2024; Daniel *et al*., 2024; Ouyang, 2025). Information technology will be used to actualize this idea. This service has been applied in virtually every aspect of life, and it has helped to make life much easier and make activities fast, effective, efficient, and secure in some cases. (Hu, *et. al*., 2024 ; Okon *et. al*., 2024b ; Wu and Manoharan, 2023 ; Hu, *et al*., 2024 ; Levesque, *et. al.,* 2024). Any city not driven by information technology resources is likened to being in the Stone Age and not a progressive city. Information technology is applied to all aspects of life in cities like education, business and commerce, governance, hospitals, farming, law enforcement, transportation, traffic forecasting, etc, so IT needs to be present in all municipal management. (Das, 2024; Yildiz, *et. al*., 2024; Lu, *et. al*., 2024).

2.5. Examples of City Information Services

- Health Service Information (Hospitals, Pharmacies, Ambulance services)
- Traffic Service Information (Managing traffic flow information, especially during road constructions, floods, obstructions, etc.)
- Emergency Service Information (Police, fire department, ambulances)
- Environmental Service Information (Waste disposal, flood management, air and water pollution, pollination, climate regulation, biodiversity conservation, etc.)
- Security Service Information (Safety measures, CCTV surveillance, and access control, as well as cybersecurity measures like data protection and threat detection)
- Land Use Service Information (residential areas, commercial zones, industrial parks, recreational spaces like parks, and transportation infrastructure like roads and railways, etc.)
- Housing Service Information (assistance with finding housing, rent subsidies, and services to help people maintain their homes)
- Educational Service Information (schools, tutoring, online learning, teacher training, educational consulting, and special education services)
- Transport Service Information (Cab, Bus, Rail, Air, Bicycle, Marine Transportation services, Couriers, etc.
- Basic Amenities Service Information (water, sanitation, heating, cooling, power, internet, etc.) (Zhang et al., 2025; Okonta et al., 2025; Whu *et al*., 2025)

2.6. Examples of City Information Management Systems

1. Geographic Information Systems (GIS): GIS is a computer-based system that analyzes, stores, and displays geographically referenced data. It's widely used in urban planning, transportation, and emergency services.
2. Urban Planning Information Systems (UPIS): UPIS integrates data on land use, zoning, infrastructure, and demographics to support urban planning decisions.

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3. Land Information Systems (LIS): LIS manages data on land ownership, use, and value, supporting land administration and management.
4. Spatial Data Infrastructure (SDI): SDI is a framework that enables the sharing and integration of spatial data across different organizations and levels of government.
5. Building Information Modeling (BIM): BIM is a digital representation of a building's design, construction, and operation, used in architecture, engineering, and construction.
6. Smart City Platforms: Smart city platforms integrate data from various sources, such as sensors, IoT devices, and social media, to support urban management and decision-making.
7. Urban Data Platforms (UDP): UDP collects, integrates, and analyzes data on urban systems, supporting data-driven decision-making and urban planning.
8. 3D City Modeling: 3D city modeling creates digital representations of cities, used in urban planning, architecture, and emergency response.
9. Web-based Mapping Platforms: Web-based mapping platforms, such as Google Maps or OpenStreetMap, provide interactive maps and spatial data for various applications.
10. Spatial Decision Support Systems (SDSS): SDSS integrates spatial data and analysis with decision-making tools, supporting informed decision-making in urban planning and management. (Yu, *et al*, 2025; Chen, *et al*., 2021; Akindele *et. al*., 2025)

3. Methods

3.1. Research methods

The research methodology used was the case study research design carried out in the city of Lagos, while the qualitative and quantitative research techniques were used for the analysis of data (Pilcher and Cortazzi, 2024). The availability, management, and accessibility of the city and spatial information by the city managers and dwellers shall be analyzed. Data shall be obtained from the Lagos State Ministry of Innovation, Science and Technology, and other officially published records about the city. The reason is that this is the ministry that handles issues concerning smart cities and every activity in the digitization of Lagos city, information, strategies, public services, ICT, etc. (Lagos State Government, 2024a). Published texts and data were also consulted. This was used for the gathering of information concerning the municipality of Lagos and the description of its characteristics. This method was considered effective because we have an already defined and operational situation and system with the objective of determining the situation of the phenomenon.

The databases surveyed were the Lagos State Government Resilient City Strategy Database, the Ministry of Innovation, Science, and Technology database, and other available sites.

The research protocol was designed for the development of a case study analyzing strategic digital city concepts. It was investigated through qualitative analysis and explanatory variables for city strategy, public services, and city information management (Walravens, *et. al*., 2019). Analysis of constructs was done on the following variables: name of municipal strategy, name of municipal problem, source of municipal strategies, name of public service, name of municipal issues, the service addressed, and source of the public service.

The city of Lagos is an urban area and a large metropolitan city in southwestern Nigeria. With an upper population estimate of 21 million, it is the largest city in Nigeria and the most populous

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urban area on the African continent, with a significant influence on commerce, entertainment, technology, education, politics, tourism, art, and fashion in Africa, and is also among the top ten of the world's fastest-growing cities and urban areas. A megacity, it has the fourth-highest GDP in Africa (Bigon, 2023; Bigon, 2011; Emordi and Osiki, 2008).

The phases of the research were conceptualization of the research idea in the first phase, the second phase reviewed the literature on concepts, the third phase stated the materials and methods outlining how the research was carried out, the fourth phase presented the results, the fifth phase discussed the findings, and then the conclusion. The time of the research was between June 2025 and November 2025.

4. Results

4.1. Analysis of Strategies, Constructs, and City Information in Lagos

This section examines Lagos city strategies, which are also known as the Lagos resilient strategy, and are made up of various public services in the city of Lagos, focusing on the various aspects of city information and associated variables. The Lagos Resilience Strategy creates an opportunity for the government, civil society, private sector, academia, and residents to respond to the prioritized shocks and stresses that Lagos faces through a cohesive, multi-level, and cross-functional approach. The 3 pillars (Strategies), made up of public services, initiatives, and sub-actions in the Resilience Strategy, seek to ensure a more innovative, inclusive, and prosperous Lagos, focusing on the parts of the city that are most vulnerable to various shocks and stresses. In the broader view, the city of Lagos has three (3) Strategies: Efficient city strategy, inclusive city strategy, and enterprise city strategy. (Lagos State Government Resilience, 2019; Lagos State Government, 2024b)

4.1.1. Efficient City Strategy Analysis

This concerns science and technology, portraying the public services rendered or put in place by the Lagos city managers. The 4 sub-strategic services or goals under the efficient city strategy are to; (1.) improve access to clean water and sanitation, (2.) enhance the provision of affordable and reliable energy, (3.) enhance the city's resilience through spatial and land-use planning, develop a robust, multimodal, and (4.) integrated transportation and traffic management system. The 13 initiatives and public services from this strategy include: Providing public toilets and bathrooms in each local government and local council development area; constructing community wastewater treatment plants; developing an integrated waste management system; expanding and protecting water sources to improve the city's water supply; conducting an energy audit to determine infrastructure and supply gaps; delivering clean and safe energy for cooking; developing a campaign to promote efficient energy use; strengthening the implementation of operative physical development plans; increasing access to affordable housing; strengthening the Lagos urban renewal program; implementing the Lagos state strategic transport master plan (LSTMP); expanding the water transportation network with increased private sector participation; developing an e-platform that coordinates and integrates public transport services. Implementation of geographic and spatial information systems (GIS) - Organizations worldwide use GIS technology to manage location-relevant information. The intuitive power of maps combined with the analytical power of a GIS often reveals trends, patterns, and opportunities that may not be detected in tabular data alone and can help provide a

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competitive edge. Electronic Document Management System (EDMS) - captures paper-based documents and converts them to a digital format for easy and secure storage and retrieval. All these are strategies that have been broken down into public services in the city of Lagos, and are to be transmitted into the city and spatial information management system, to properly guide the city dwellers and managers.

4.1.2. Enterprise City Strategy Analysis

This city strategy has three goals, which are (1) to position Lagos as an attractive and open city, value cultural and environmental assets, strengthen information management and disaster preparedness, (2) prepare youth for a changing economy, and (3) support individual and collective entrepreneurship as a driving force for innovation and development. These were further bro-ken down into 11 initiatives or public services, which are: broaden the scope of information and communication technology (ICT) in the school curriculum; scale up the code Lagos programme; strengthen the creative sector in Lagos by establishing a film village; promote sustainable waterfront tourism to improve livelihood in coastal communities; resuscitate farm centers and explore urban agriculture opportunities to strengthen food security; expand the master craftsman project; Strengthen the Lagos state employment trust fund to support job creation; establish at least one innovation and incubation hub in each of the 57 Local government areas/ Local council development areas (LGA/LCDAS); upgrade market infrastructure; establish an information and communication technology (ICT) village that will incorporate the current computer village; expand the master Craftsman project.

4.1.3. Inclusive City Strategy Analysis

This strategy has three goals, which are (1) to create an inclusive environment for all city residents, (2) to strengthen information management and disaster preparedness, and (3) to improve the health system to support Lagos residents in times of shock. This strategy and goals are further broken down into 6 workable public services and initiatives: Implement the Lagos state health scheme, upgrade public healthcare facilities, develop an e-health system that incorporates disease surveillance; expand the use of the Lagos state citizens gate platform for effective e-governance; strengthen the state's emergency response system; strengthen the state's capacity for collection, analysis, and dissemination of data; community participatory flood management; scale up implementation of Lagos state special peoples' laws.

Table 1. *Quantitative analysis of strategies and public services compliance with SDC and City Information (CI). (**Source:** Fieldwork data, 2025.)*

S/N	Strategies	Public Service	SDC	CI	Awaiting Implementation
1.	Efficient City	13	4	2	7
2.	Enterprising city	11	5	1	5
3.	Inclusive city	6	2	-	4
	Total	**30**	**11 (36.7%)**	**3 (10%)**	**16 (53.3%)**

It is observed from the data presented above that there is still more work to be done by the Lagos State Government, with 53.3% of public services yet to be implemented and enshrined as city and spatial information. The city managers still have a lot of work to ensure that their public services are aligned with the SDC model and are also enshrined in the city and spatial information system for a smooth-running city and proper urban management.

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4.1.4. Lagos Municipal Problems Analysis

The major problem in the city of Lagos has to do with vehicular traffic management, Transportation systems, flood management problems, waste management, informal housing problems in the trenches, and city information availability and accessibility problems. Some strategies have been put in place to address some of these issues, like the traffic management and transportation system, but a whole lot still must be done on the waste management system, which contributes to causing flooding in the coastal city. The transportation system is also grossly inadequate, given the kind of city Lagos is and the population and mass movement activities. Also, the citizens are not made aware of the services rendered by the city managers by having a city information management system that encompasses all aspects of the city strategies and services to enable the city dwellers and managers to access such platform or application and use it to better the quality of their life by knowing what service to use and how to use the services to solve their municipality problems. In a city of 22 million people, a city where there are 25% of car users, 30% walk, 45% use public transportation, 65% live in informal settlements and without sanitation etc. the city requires immediate action and implementation of the structured strategies and public services ensuring that they are well articulated and enshrined in the city information management system and made accessible and efficient. Other problems are the implementation of the public services outlined and transmitting them into the city's information management system. (Lagos state government, 2024c).

4.1.5. Source of City Strategies Analysis

The source of the Lagos city strategies and services was basically: (i) Lagos Resilient Strategy 2020 database, (ii) Lagos state government websites, (iii) Lagos state ministries databases. These sources contained over 80% of the strategies and services being planned for and delivered by the city managers.

4.2. Analysis of the Broad Categories of Public Services, City and Spatial Information Management

The city of Lagos based on their strategies has some public services that are being offered, but a situation where services are offered without carrying the city dwellers along by way of the city services information management through various systematic platforms that can aid the dwellers to make use of the services, then such service is as good as not meeting the needs of the citizens and bettering their lives. The following services are analyzed based on their alignment with the city's information management protocols.

4.2.1. Analysis of Transportation Services, City and Spatial Information Management

The Lagos State Ministry of Innovation, Science and Technology (LSMIST), concerning technology and traffic management, introduced an Automatic Number Plate Recognition (ANPR) system in 2017, which verifies vehicle documents such as vehicle license, roadworthiness, and insurance synchronized on e-platforms, has brought about easy accessibility to vehicle status while removing human intervention, which impedes traffic. They also have the Traffic Management Solution (TMS) device. The TMS is a Traffic Law compliance scheme that allows the real-time capture of pictures and video evidence of road traffic and vehicle compliance violations as they occur. Public transportation has been expanded with the Bus Rapid Transit (BRT) buses, the blue line and red line rail system, Lagos ferry, and water transportation system. The Uber services are also available for use. In the aspect of how these services are managed

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through the urban information system, it was noted that Lagos city only operates a radio program to inform the city dwellers of the transport and traffic situations in the city; private transportation companies in the city have a database of all their regular travelers and also send them information and travel advice with digital booking services. The Lagos Metropolitan Transport Agency (LAMAT) also noted that they have transportation updates on their sites. The services can also be accessed from a smartphone with internet access from anywhere. (Lagos state government, 2024c).

4.2.2. Analysis of Environment and Safety, City Information Management

The Lagos State Ministry of Environment and Water Resources (LSMEWR https://moela-gos.gov.ng/agencies/lagos-state-environmental-protection-agency-lasepa/) ensures the safety of the environment of the city and carries out all the duties and activities that ensure a clean and orderly environment. The ministry has established agencies to carry out various projects including the ministry to include Lagos State Environmental Protection Agency (LASEPA), Lagos Water Corporation (LWC), Lagos State Parks and Gardens Agency (LASPARK), Lagos State Signage and Advertisement Agency (LASAA), Lagos State Wastewater Management Office (LSWMO), and Lagos Waste Management Authority (LAWMA). All these agencies work in synergy to ensure that the Lagos city environment is in order without any form of pollution. Some of their services and projects are disposal of solid waste, recycling of household waste, education and awareness creation, a relationship with the Lagos city dwellers, and an academy for research and training of personnel. The Monitoring, Enforcement, and Compliance Department of this Ministry is saddled with the responsibility of carrying out daily monitoring of the state of the environment. The monitoring activities result in the generation and compilation of information, data, and pictorial representations of nuisances observed across the State. The department is also charged with the responsibility of enforcing the provisions of environmental regulations, laws, and standards in the State, issuing sanitation alarms or environmental alerts to government agencies, public institutions, and individuals, and advocating environmental compliance and sustainability by all Lagos city dwellers by way of information.

The Lagos State Safety Commission (LSSC https://lasgsafety.com/) ensures the safety of all Lagos city dwellers by: Developing public relations (PR) campaigns and media relations strategy; Collaborating with internal teams and maintaining open communication with senior management; Editing and update promotional materials and publications (brochures, videos, social media posts etc.); Preparing and distributing press releases; Organizing PR events {e.g. workshops and press conferences} and serving as the commission's spokesperson; Seeking opportunities for partnership, sponsorship, and advertising; Address inquiries from the media and other parties; Track media coverage and follow media trends; Prepare and submit PR reports; Manage public relations issues; Develop a marketing communications plan including strategy, goals, budget, and tactics; Develop media relations strategy, seeking high-level placements in print, broadcasts, and online media; Coordinate all public relations activities; Direct social media team to engage audiences across traditional and new media; Leverage existing media relation-ships and cultivate new contacts within the commission and the media; Manage media inquiries and interview requests; Create content for press releases, byline articles, and keynote presentations; Monitor, analyze, and communicate PR results every quarter; Evaluate opportunities for partnerships, sponsorships, and advertising on an ongoing basis; Build relation-

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ships with the media to enlighten the public on safety awareness; Maintain a keen understanding of safety trends affecting the public and make appropriate recommendations regarding communication strategy surrounding them; With the above services, the city's environment and safety information is managed and disseminated. (Lagos State Safety Commission, 2025; Lagos State Ministry of Environment, 2023).

4.2.3. Analysis of Health/ Emergency Services, and City Information Management

The Lagos State Ministry of Health (LSMH https://lagosstate.gov.ng/lagos-floats-smart-health-information-platform-for-patients-data-management/) has a Smart Health Information Platform (SHIP) to transform data transmission and management across all State-owned healthcare facilities. The digital system will eliminate loose data sharing and transmission through manual systems while providing improved protection and privacy for patients' data. The Lagos State Emergency Management Agency (LASEMA https://lasema.lagosstate.gov.ng/) handles the city's emergency issues. The Agency was statutorily charged to provide adequate and prompt response as well as sustaining intervention in all forms of emergency/disaster situations in the city and its territorial boundary. It performs this onerous task through Emergency/Disaster prevention, preparedness, mitigation, recovery, and relief. They cater to emergencies like fire outbreaks, floods, collapsed buildings, accidents, etc. (Lagos State Ministry of Health, 2023).

4.2.4. Analysis of Security Services and City Information Management

The Lagos security information management system is considered classified and not accessible to the public. However, some security tips are given to the city dwellers to keep them on alert and to also make them careful, especially while carrying out their daily business. Lagos, being a highly populated city with a whole lot of business activities, also has a high rate of crime, and dwellers need to be aware of such prevailing crimes and be able to guard against them. Some of these criminal activities are cybercrime, kidnapping, armed robbery, etc. Security emergency numbers are displayed on the Lagos city police websites for dwellers to call in cases of insecurity and emergencies. To further help, the Lagos State Security Trust Fund (LSSTF https://www.devex.com/organizations/lagos-state-security-trust-fund-139113) was established by a Law of the Lagos State House of Assembly in September 2007 as a direct response to the security challenges in the State. The establishment of the LSSTF became imperative after the State Governor received and reviewed the report of a high-powered Security Committee which it established under the chairmanship of the former Inspector General of Police, to look into ways and means of combating the growing menace of violent crimes in the state and the seeming inability of the police and other security agencies to confront this challenge despite their best endeavors. (Lagos State Safety Commission, 2025).

4.2.5. Analysis of Housing Services and City Information Management

The housing deficiency in Lagos, especially for the poor and low-income earners, is becoming alarming because of its increasing population and urbanization. The Lagos State Ministry of Housing (LSMH http://housing.lagosstate.gov.ng/) is empowered to ensure the provision of adequate and good quality housing in Lagos megacity and facilitate easy access of its citizens to home ownership and land use. Hence, the need for the establishment of the Lagos State Mortgage Board, which is helping bridge the gap of the current housing deficit in Lagos State by providing affordable homes for the residents of the State through a sustained mortgage scheme and other home ownership finance options, plus spatial activities. This information is

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expected to be disseminated to all Lagos city dwellers so that they can key into the initiative to solve housing, land use, and geographical information problems. (Lagos State Ministry of Housing, 2024).

4.2.6. Analysis of Educational Services, City and Spatial Information Management

Education is a very important tool for the progress and development of any city. Once the inhabitants are well educated and equipped, then the level of poverty reduces and development increases. In Lagos, there are a whole lot of young school dropouts who engage in different commercial activities to make money; child labor is prevalent there, and it is not the best for a city of its magnitude. Hence the Lagos state government established the Lagos State Universal Basic Education Board (LSUBEB https://lasubeb.lg.gov.ng/) that is charged with increasing access to public education in primary and secondary schools; Make learning conducive by renovating schools; Expose teachers constantly to set skills needed to enhance professionalism and effective performance; Enhance the growth of Lagos as a smart city through technology; Optimization of technology to allow entrepreneurs and SMEs to thrive; This urban city education information is expected to be made available to all members of Lagos city for compliance. (Lagos State Universal Basic Education Board, 2020).

4.2.7. Municipal issue addressed by the public service offered in Lagos

The city of Lagos, through its public services, addressed some aspects of the transportation issues to the level of 30% by providing some city and spatial information that is used by the residents to access the transport services. Other services like health services, security services, and education services have not addressed the issues they should. This is attributed to the fact that they are mostly works in progress.

4.2.8. Source of the Public Service of Lagos City

The source of public service variables corresponded with the official websites and databases of each of the services, since they are from different ministries, and this represented the main source of information. This information was accessible from websites and databases, but has not been properly classified into an application that can be used to access the services. (Lagos State Government, 2024c)

5. Discussion

According to the results obtained, it is obvious that there is a whole lot of work in progress concerning strategies by the Lagos state government. The three strategies that have various goals are undergoing implementation, and the strategies are mainstreaming resilience, collaborative engagement, monitoring, and evaluation. In tackling the objectives of the research and the various city strategies that form the city information management, efficient city strategy, enterprise city strategy, and inclusive city strategy, harmonize the ideas of city information management as discussed in the research. These city strategies are in line with the study objectives as they will make all the necessary strategies and public services available through city information. It will enable proper mainstreaming, collaboration, monitoring, and evaluation of the system, and benefit the residents of the city and the city managers. Implementation of the Resilience Strategy will require significant coordination and collaboration, similar in many regards to the efforts required to develop this vision for resilience. The Lagos Resilience Strategy will be implemented through existing organizations and partnerships, and many of the

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initiatives being proposed are not new. However, the strategy brings a resilience lens to enhance the co-benefits resulting from the implementation. New delivery structures and working groups will only be established where appropriate.

5.1. Efficient City Strategy

On making the city efficient, the results show that the city has not done a lot, but has plans on the ground for implementation. The strategies as outlined will be mainstreamed by coordinating the implementation of the Lagos Resilience Strategy (LRS) by assigning identified agencies and key LASRO staff to serve as coordinators and facilitators, working with these agencies to actualize the various initiatives. Developing and implementing a toolkit for institutionalizing and mainstreaming resilience thinking in the State through relevant city records and information, all Lagos State Government Ministries, Departments, and Agencies, who are the city managers to the city dwellers and residents, while ensuring that all programs, policies, and projects incorporate a resilience lens. Developing a strategic public campaign on resilience consciousness for all residents, including hosting the Lagos Resilience Week and coordinating the activities of the Resilience Forum. Ensuring progress in the achievement of resilient outcomes by the city managers being available for consultations, advice, support, and collaboration with communities, organizations, and institutions committed to resilience-building both locally and internationally. This is a strategy on the ground awaiting full implementation and ensuring it is enshrined as city information. The city must be efficient in transportation, housing, health and medical, education, spatial policy, etc., with the requisite city information through the information management system, and when all this is in place, it can lead to making Lagos city enterprising. Concerning the SDC subproject, it is a city strategy, and there are plans to make it a realistic city information system and then use the ICT to advance the ideas to the entire city. Table 1 below gives a summary of the discussed results.

Table 2. *Efficient City Strategy/City and Spatial Information Compliance Table (**Source:** fieldwork data, 2025)*

S/N	City Strategy	Public Services	City and Spatial Information	Remarks
1.	Efficient City Strategy	i. Clean water and sanitation services ii. Affordable and reliable energy services iii. Spatial policies, Land-use planning, and housing services iv. Integrated transport system services	i. Not available ii. Partially available iii. Not available iv. Available	All the services should be fully mainstreamed into the city's information management system and made accessible to the residents while the city managers use it for evaluation and administrative purposes.

5.2. Enterprise City

Having an enterprising Lagos city also requires certain city information that can enable the dwellers to go into productive and enterprising ventures. Results show that Lagos City is putting in place modalities for enterprising ventures like agriculture, education, and technology to ensure that the city is productive. When the information of this strategy is shared and made available to the city dwellers, they can key into it and become productive in providing ICT services that would help make the city's information available and accessible to the masses, thereby making the work of the city managers easier. It can also help in the areas of education,

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health, environment, and housing. Collaborative engagement can help make Lagos City enterprising, economically viable, and productive. The Lagos city collaborators can consist of individuals with interest, experience, and expertise in resilience-enterprise. The collaboration can be done to discover new opportunities to be integrated into the resilience agenda of the city, identify new conversations on economic issues impacting the city, promote the application of Lagos city resilience in the city activities, and ensure resilient learning in the entire city. The collaboration can bring partners that will provide support for capacity-building and resourcing necessary for the delivery of some of the actions contained in the Lagos Resilience Strategy. This can help in identifying and establishing framework agreements with key partners, which the Lagos State Government can also leverage partner platforms to accelerate the implementation of some initiatives. The enterprising city information needs to be shared and made available, and accessible on the city information management system so that both the residents and city managers can access, use, and review for a progressive and better service. About the SDC subproject, it is a city strategy and has some level of city information that requires ICT resources to make it more accessible. Table two below shows an overview of the results of the enterprise city strategy.

Table 3. *Enterprise City Strategy/City Information Compliance Table (**Source:** fieldwork data, 2025)*

S/N	City Strategy	Public Services	City Information	Remarks
1.	Enterprise City Strategy	i. Cultural, tourism, and environmental entrepreneurial services ii. Individual, craftsman, innovative, and agricultural entrepreneurial service iii. Youth advancement, economy, and digital entrepreneurial services	i. Not Available ii. Partially available iii. Partially available	Information concerning entrepreneurship should be made available and regularly updated on the city information management system. Enabling environment and loan facilities should also be provided

5.3. Inclusive City

The third city strategy, which is City inclusiveness, has to do with collaborating; it carries everyone in the city along, and opinions and information are gathered for the betterment of all stakeholders. In the case of Lagos city, the result shows that the inclusiveness is not applied, but there are strategies in place to ensure that it is institutionalized and implemented. When the residents are made to be a part of the formulation and implementation of the policies and strategies, it will help to ensure that the results are quickly achieved. All this being put in place, the Lagos city managers must ensure that the system undergoes some level of critical assessment and evaluation for further improvement. Table 3 below shows the summary of the analysis for the inclusive city strategy.

Table 4. *Inclusive City Strategy/City Information Compliance Table (**Source:** fieldwork data, 2025)*

S/N	City Strategy	Public Services	City Information	Remarks
1.	Inclusive City Strategy	i. Health care services ii. E-governance services iii. Emergency response services	i. Partially available ii. Partially available iii. Not available iv. Not available	Health and emergency response, and e-governance services are very important services that require city information so that they can

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	i. People-oriented inclusive services (Education, health, market etc)	help the city dweller live a comfortable life.

5.4. Lagos Strategies, Public Services, SDC, and City Information

To achieve all this, periodical evaluation and constant monitoring of the systems and strategies must be carried out to see if they meet the required expectations. The Lagos Resilience Strategy is said not to be an exhaustive and static document but will be periodically reviewed and monitored to see its alignment with the City's development priorities and to track the progress on resilience building. A Resilience Monitoring and Evaluation framework would be developed to monitor progress through established data sets, especially the ones linked to the implementation of the Lagos State Development Plan and achievement of the SDGs. The City Resilience Index (CRI), which is based on the City Resilience Framework (CRF), can be used as an evaluation tool for this exercise. The indicators must be accessible and used reflectively to identify areas of progress or continuing challenges to achieve communication, learning, and accountability. In addition, new indicators may be introduced as the strategy develops and unfolds. The Lagos city managers also plan to have a document that will provide: Periodic quantitative and qualitative performance assessments with information on progress on the goals and initiatives; emerging considerations that should be integrated into resilience practices; Emerging collaborations and/or funding opportunities that could support strategy implementation. This will help in reviewing the Lagos Resilience Strategy from time to time, like every five years, to have a concise resilience assessment process, identifying prevalent shocks and stresses, discovering areas of variation, introducing fresh initiatives, and upgrading the strategies.

Lagos's information management system should consist of well-thought-out and planned items that would help the city dwellers access the various strategized municipal services and gain knowledge and experience that would guide them on what to do in and around the city. All the various public services should be made available in the city's information management system. This will help in ensuring efficient transportation services and information to coordinate and integrate public transport services, a water transportation network with increased private sector participation, and implement the Lagos State Strategic Transport Master Plan (LSTMP). Information and improved access to clean water and sanitation, which aims at sharing information on expanding and protecting water sources to improve Lagos' water supply, developing an integrated waste management system, constructing community wastewater treatment plants, and providing public toilets and bathrooms in each local government and local council development area. Provision of affordable and lasting energy, which aims at giving information and services about efficient energy use, clean and safe energy for cooking, and closing the energy infrastructure and supply gap. Land use planning and housing by strengthening the Lagos urban renewal program, increasing access to affordable housing, and ensuring a physical development plan to curb housing deficit and encourage planned city initiatives.

The public services on the Enterprise City strategy, when added as part of the city and spatial information management system, will support individual and collective entrepreneurship as a driving force for innovation and development, strengthening the Lagos state employment trust fund to support job creation. The public services on the Inclusive city strategy, when mainstreamed in the city information management platform, will make the citizens stakeholders of the encouraging collaboration and inclusion. Overall, it is important to note that all the Lagos city strategies and public services are linked with the SDC sub-projects of city strategies, public

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services, city information, and ICT resources. Ranging from transportation information management, education information, health information, emergency services information, environmental information, housing information, and security information management are all linked to city strategies because they are all planned services. They are also related to public services because they are all services that are rendered by the city managers to the city dwellers. They are also related to city information, as the services will be transformed into information and hosted on the city information management system for proper application and use to carry the city dwellers along and make them aware of the various services available for their use, while ICT resources are used to ensure the workability and accessibility of the various services.

5. Conclusion

The research objective was achieved by analyzing the projects of various Lagos city-managing agencies to assess their alignment with the strategic digital city's objectives. Based on the research variables, the various agencies of the Lagos state government concerned about public services were analyzed to see if the services are enshrined in city information management. This was also placed side by side with the strategic digital city (SDC) to see if it took into consideration the subproject of the city strategies. The SDC model has to do with the proper and careful integration of city strategies, public services, city information, and information technology to enhance the city life. The results obtained showed aspects of the Lagos city strategies that have been put in place, and the strategies and services that are being upgraded. City information on all the strategies was analyzed, and it was observed that the city information did not have all the strategies properly fitted in the information system, as compared with the SDC strategy of city information. Interestingly, Lagos city has public services that are still undergoing modification and upgrading. Hence, based on the result, it is pertinent for Lagos city to ensure that all its public services are well encapsulated in the Lagos city information system and made accessible to the city dwellers to guide them in their daily activities. The research inputs and recommendations suggest that for Lagos city to be strategically digitized with the required city information that is in line with the SDC model and like other big cities of the world it needs to: (1) Increase its public services by ensuring good housing system and spatial information; (2) Medical and health outreach information to guide access to medical facilities and health information; (3) Emergency services be made more accessible and reachable by the masses; (4) More organized transportation system with accessible and useable information that can help simplify movement from one place to another and also reduce traffic jam in the city;(5) More sensitization on environmental management and proper environmental attitude to manage waste and avoid flooding;(6) Build a formidable urban information system that would contain guides for access to the various public services and reasonable feedback systems to help the city managers assess their performances and improve where necessary.

This research contributes to the development of a system for managing city information, spatial information, and geographic information that will help citizens to be able to navigate and access any public services or facilities required for daily transactions. It will also help city or urban managers to be more organized, render service, be accountable, receive feedback, and improve the functionality of the system. The research presented city and spatial information management, which is built from the available city public services in Lagos, and compared it with the strategic digital city project to observe the extent to which Lagos city has ensured that it is strategically digitized and provides the requisite city information to its dwellers. With this in

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place, the city managers can assess their performance and improve public services based on feedback mechanisms while also improving the quality of life of the city dwellers. Finally, the research will improve the situation in Lagos city and other developing cities if the findings are applied. It will improve public services and strategies, ensure that the citizens' quality of life is improved, and make public administrators and city managers more productive and useful to the city. It will also increase knowledge by making the world know about Lagos City and its situation for further research and development, while increasing the research in urban management and city information. The research contributes to the African Cities Journal by expanding its knowledge database and contributing to the world's discovery about city and spatial information management of city public services and development in an African city.

Author contributions

- **Godswill Udoh OKON:** Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Visualization, writing original draft, Writing review & editing
- **Denis Alcides REZENDE:** Conceptualization, Formal Analysis, Resources, Supervision, Validation, Writing review & editing

Use of generative AI

The authors confirm that no generative AI was used in this research.

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Conflicts of interest

The authors declare and confirm that there are no conflicts of interest for this research work.

Data Availability Statement

The authors hereby confirm that the data supporting the findings of this study are available from the corresponding author (GUO) upon reasonable request.

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