The Lagos Lagoonal Economy up to the Present Time: Dredging, Sand Mining, Water Transportation and the Rise of Waterfront Cities

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Abstract

This paper examines the economy of Lagos State in Nigeria as the product of a lagoonal construct. From colony status in 1861 which served the British Raj as a beachhead for penetrating the hinterland, the Lagos lagoonal system aided the steady rise of the city to assume ever-increasing sociopolitical significance, including the capital of the Colony as well as the newly independent Nigeria in 1960. These developments consolidated its lead in internally generated revenue (IGR) over other sub-national authorities. Primary and secondary data sources were used with qualitative analytical methodology, including quantitative illustrations and tables, to study the role of the lagoon system in the city's overall morphology. The findings show that the lagoonal system critically supported the major productive sectors such as inland transportation, manufacturing, sand mining, real estate development, and mercantilism. The conclusion includes an analysis of two critical issues in the future of the megacity, namely, harnessing the waterways to ease longstanding commuting difficulties in a N41 trillion market touted as Africa's 5th richest economy and the likely impact of emergent societal factors on its decline as a historic political and economic powerhouse.

Keywords: Lagoonal system, Lagos megacity Nigeria, waterfront cities, sand mining, Timberville, Lekki peninsula, Eko Atlantic City, Ikate Elegushi

1.0 Introduction

The Lagos lagoonal economy represents the largest concentration of industrial enterprises amongst the river basin systems of Nigeria, giving rise to the richest state in the country with average monthly internally generated revenues over N77.1 billion in 2023 and N41 trillion annually (Balogun 2023; Akoni 2024). When it made colonial news headlines that Nigeria was by far the greatest of the British holdings in Africa, much of that reputation was inherent in the burgeoning commerce and industry which the early administrators found in the Lagos colony after the deposition of the slave-trading King Kosoko in 1851. Much arguments have been made around the supremacy of the Lagos economy over other commercial centres in Nigeria but available evidence clearly shows that as the beneficiary of governmental development funds since the 1861 Treaty of Cession, which gave the overlordship of the colony to the British Raj, the Lagos metropolitan area never stopped attracting huge financial inflows, either for construction of public municipal infrastructure, by sundry entrepreneurs from within or outside the country, or in the form of foreign direct investments (Tamuno 1969). As

early as 1899, the creditworthiness of the Lagos colony was sufficient to guarantee loans from abroad as noted in the report that "…Legislative Authority has been provided to raise by loan the sum of £780,000 for the construction of the Railway and Bridges now approaching completion" (Colonial Reports Annual Nigeria 1899:8). More loans followed in the subsequent years whenever the revenue of the colony was deemed insufficient to support its annual budget.

Hence, the tradition of development through loanable funds continued till today as Lagos State remains the most indebted state in Nigeria, the highest receiver of dollar-denominated loans, and the highest internally generated revenue (IGR) earner in the federation, thanks to the vibrancy of the lagoonal economy (Ujah 2022). This paper examines the historical morphology of industries around the lagoon and upon its waters and dissects the significance of emerging trends of its development in various sectors. It is divided into five sections as follows: historical background; geographical overview of the lagoonal waterways; sectoral economic activities in the lagoonal system: markets, water transportation, barge operations, sand mining, logging and sawmilling, and the rise of waterfront cities; charting, hydrography and channel deepening, and the concluding analysis of future transportation dynamics and the impact of political push factors that may cause a decline of the megacity as an economic powerhouse.

Historical background

Since the 16th century, the Lagos Lagoon system has provided navigable waterways for trade and social contact among indigenous peoples, settlers and visitors. One of the first major actors who traded along the waterways were Europeans who were based in the metropolis and inhabitants of the hinterland from the Ijebu Kingdom, the Egbas and their neighbours (Dioka 2001: 297-314).[1] In the 1850s, the lagoonal system supported the trade by inhabitants of Lagos, with a population of 60,000, who maintained the canoe-borne export trade in slaves, Ijebu cloth, and palm oil (up to 70,000 gallons per annum) (Law 1983; Olubomehin 2021). This was the famous Ejinrin market on the northern bank of the lagoon near Ikorodu, patronized by traders from far-flung places such as Abeokuta, Ile-Ife, Owo, Epe, Okitipupa, Gbongan, Ilesha, Ilorin, and Oyo. After the abolition of the slave trade and subsequent colonial rule, activities in the lagoon expanded diversely, in tune with the high rate of migration into Lagos fueled by economic opportunities (Echeruo 1977:15; Peil 1991:19ff).

The perceived greener pasture of the metropolis was enhanced by the British establishment of the Colony of Lagos in 1861 and the subsequent government expenditures for the development of the city to serve imperial purposes and cater for the cosmopolitan population drawn from Europe and West African countries. Eventually, Lagos became the political, administrative, industrial and commercial capital of Nigeria, especially from 1914, when the country was amalgamated, and the city's annual development budget exceeded that of other cities in the country. The impact of this trend on the economy of the Lagos lagoon was positive. As the waterway provided the first inland transportation channel for communication with the hinterland and West African interior until the subsequent development of the railways and axial road networks, it also witnessed a variety of socioeconomic activities which we analyze in this paper, including prosperous markets on its shores, passenger transportation, barge operations, fishing, sand mining, civil engineering constructions, mid-stream and

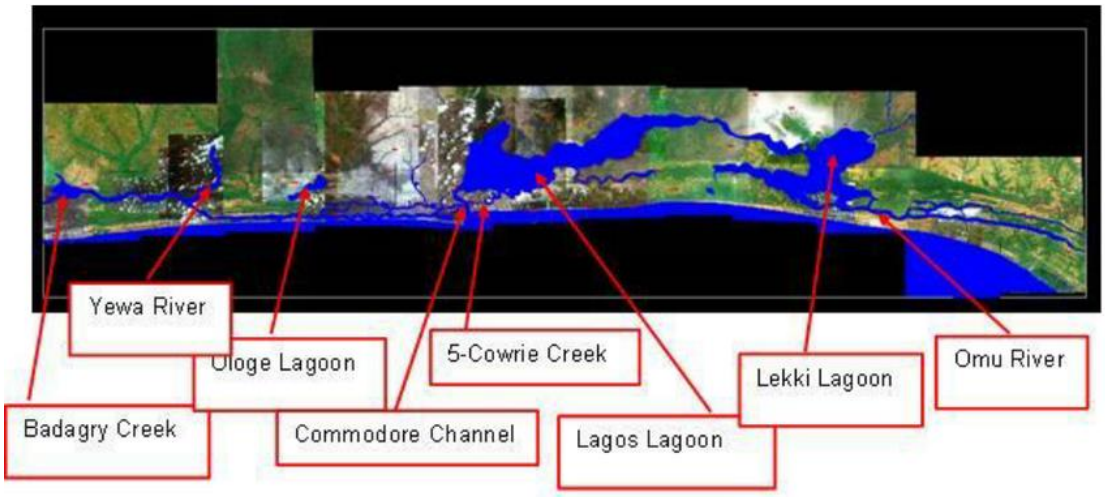
[1] The lagoonal system includes the Lekki, Kuramo, Yewa, Badagry, Iyagbe, Epe, Apese, Ologe, Mahin, Omu lagoons, rivers, and creeks.

waterfront real estate activities. Recent studies of the lagoon system, including Nwobi (2023) and Iwuagwu (2022), highlighted the prevalence of commercial passenger and goods transportation, students' daily trips to and from school, movement of construction workers and building materials and machinery in and out of Epe and surrounding localities such as Ikorodu and neighbouring newly formed communities, dredging, sand mining and port-related activities. In the new millennium, the Lagos lagoonal economy expanded at an astronomical level following the megacity's population explosion to more than twenty million people by 2021 (Wikipedia).

2.0 The lagoonal waterways system: a geographical overview

The Lagos lagoonal system essentially includes three major lagoons: Ologe, Lagos, and Lekki, with their tributaries, Badagry Creek, Yewa River, Commodore Channel, and the Omu River. See Figure 1.

Figure 1: Lagoons and water bodies in Lagos Nigeria



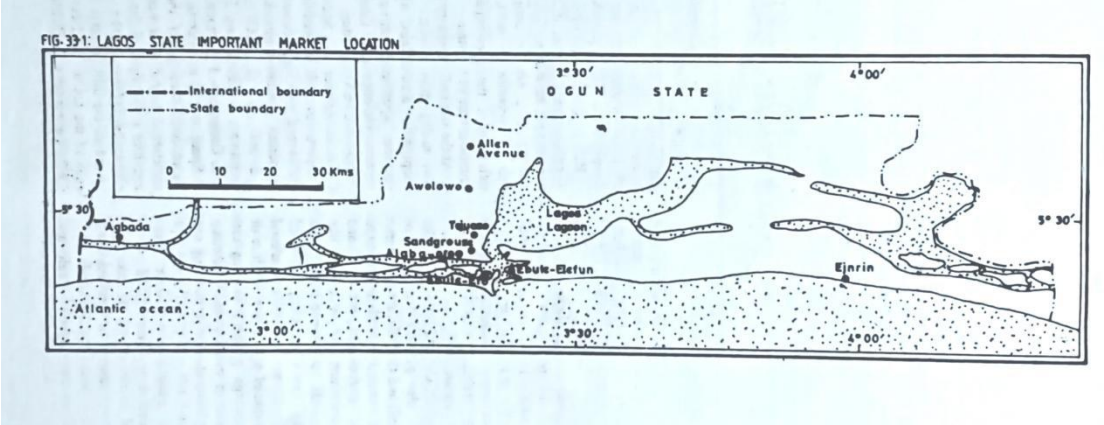
Source: Badejo O.T., Olaleye, J. & Alademomi, A. (2014)

2.1 Economic Activities by Sector in the Lagoonal System

Markets

Many markets, specializing in various merchandise segments, operate on the shores of the lagoonal system, with the largest concentration at Lagos Island. These include Ebute Ero, Ebute Elefun, Jankara, Apongbon, and Sandgrouse. The markets serve traders, importers and exporters from all over Nigeria. Buyers come from distant locations around West, North and Central Africa, including Tchad, Cameroon, Mauritania, and Namibia. Stretched lorries with capacity for long-distance cargo haulage park for days around the markets waiting for the traders to conclude bulk purchasing of goods before expert loaders lade them many metres high for the long drive home, which usually commenced at night to avoid the city traffic snarls (Lawal 2023).

Figure 2: Lagos State Nigeria Important Market Locations



Source: Odumosu (1999:101)

From ancient times, the lagoonal markets began to flourish with prominent ones such as the Ejinrin market (Epe), the Agbada market (Badagry), and the Ebute Elefun market (Lagos) (see Fig. 2), which held with varying periodicity of four-, five-, seven- and nine-day intervals (Odumosu 1999:99). With the increase in the city's population, some of the emerging markets in the urban areas such as Ebute Elefun, Sandgrouse, and Ebute Ero grew into daily markets. In contrast, their rural counterparts continued to maintain days-long periodicities. Unlike the wares in the olden days markets, which were dominated by farm products sold by part-time itinerant traders from nearby localities, the modern full-time traders in the urban markets catered to a rich and populous clientele composed of the city's metropolitan populace which comprised colonial workers, expatriates, traders from around Nigeria, and visitors from Asia, Europe, North and South America, as well as the buyers from North, West and Central African countries (Echeruo 1977:16ff).

In terms of the predominant mode of transportation, whereas the Murtala Muhammed International and local airports serve as landing points for the affluent nowadays, many visitors to Lagos markets travel by road. City transportation is also mostly by road (95%) and waterways (5%). Skeletal city rail infrastructure, the Lagos Rail Mass Transit, whose construction started in the first decade of the new millennium only came into the trial stage of the first Blue Line (Marina to Mile 2) in the second half of 2023, with the rest of the Green Line, Purple Line, Yellow Line, Orange Line, and Red Line still under construction or on the drawing board (Bolaji 2023). Hence, most buyers at various Lagos markets would transport their wares using commercial vehicles operated by long-distance motor drivers, cargo haulage companies, third-party logistics (3PL) firms, and motorbikes. The surge in the use of motorcyclists around Lagos markets and city centres for delivering goods and cargoes of all sorts and meals-ready-to-eat is one of the latest trends in the development of cargo delivery services around the megacity (*Thread* 2020).

The total movement of buyers, sellers, and head porters around Apongbon, Ebute Ero, Enuowa, and adjacent markets daily has been estimated at six million, hence the unceasing traffic gridlocks at Lagos Island all year round (Odutola 2021). For itinerant traders, many days were usually spent by buyers from distant locations buying and loading their vehicles, mainly trucks, before their convoys embark on the arduous return journeys lasting days and weeks to reach far-off cities such as Maiduguri, Katsina, Kano, Calabar, or Jalingo and other destinations in Ghana, Cote d'Ivoire, Senegal, Burkina Faso, Mali, Tchad, Mauritania, Cameroon or Namibia (Lebrand 2022). Major

articles sold include footwear, plastic products, beverages, manufactured food, tyres and motor spare parts, electric cables, wires and electronics, textiles, tools and hardware for building, construction, waterworks, and packaging, to mention just a few. The mantra is, if you name it, you will find it. In comparison with the ancient markets, the buildings, superstructures, and daily organization have changed: wooden planks and earthen floors have changed to lock-up shops and warehouses in cement-and-steel structures, tiled floors, some 2-, 3- or more storeys high. Their organization has also progressed from locally organized indigenous overseers to management companies and market associations of members in the various segmented markets dealing with planks and lumber, electronics, general goods, motor spare parts, and electricity and power sector materials (Interview with James Kakawa, Lagos State Ministry of Local Government, 21 May 2024).

Since the new millennium, the services of civil engineering contractors popularly called "developers" for the reconstruction of markets in the state became widespread, with fairly known general procedures. They would reconstruct old markets along modern architectural lines and add sophistication such as toilet facilities, car parking lots, security posts, and other appurtenances. For example, the former ramshackle and poorly organized Iddo waterfront market was marked for demolition and reconstruction in early 2023. The project was undertaken by a developer on the terms of build and sale, in conjunction with the local government authorities. The developer quickly rebuilt the structure in modern lock-up and open stalls, rented out on 25-year leases ranging from six million Naira (N6m) to twenty-five million Naira (N25m), depending on the space size (Interview with Iddo Market Developer's Agent, 18 January 2024). To understand the government policy behind the management of markets, we interviewed the Permanent Secretary, Lagos Statement Ministry of Local Government, Community Affairs and Rural Development. He was represented by Mr. James Kakawa, an officer in the Ministry who explained that there were 300 recognized markets in the state (see Table 1) under the direct management of the local councils and local council development areas, with oversight by the Lagos State Market Development Board. According to him, the State Government's sole function in their affairs is to register market associations and regulate general policy matters in line with the Lagos State Market Association Law 2015.

The local councils exercise full control in creating the markets, operating them, generating internal revenue from them, and rebuilding them whenever they are due for reconstruction. According to Mr. Kakawa, the rebuilding designs were submitted to the Ministry of Physical Planning and Urban Development for approval after which the local councils take over the projects either by themselves or through selected private developers. When questioned about the problem of frequent fires being experienced in markets around the state and any plans for providing insurance remedies, the council official revealed that the council of the 57 LCDA chairmen called "Conference 57" was interacting with various insurance companies, the traders' Associations, and the Ministry to finetune harmonious options acceptable to all parties and stakeholders for the best way to go forward.

Table 1: Sources of Commodities by Market (Lagos State) Nigeria

Market	Size	% from District Markets	% from Factories	% from Local Markets
Abeokuta Okuta	335	17.6	11.8	70.6
Ademiua	250	3.4	0.0	96.6
Ajegunle	419	41.9	16.1	41.9
Ajegunle Boundary	754	7.4	14.8	77.8
Alade	439	16.1	16.1	67.7
Alayabiagba	1892	43.5	13.0	43.5
Ariyoke	350	16.7	0.0	83.3
Awolowo	2165	33.8	6.2	60.0
Ebute Ero	1761	60.8	1.7	37.5
Ebute Elefun	770	30.0	0.0	70.0
Egerton	667	21.2	12.1	66.7
Iddo	448	87.5	1.6	10.9
Jankara	3312	22.9	20.0	57.1
Kajola	998	31.2	0.0	68.8
Laleye	534	30.0	15.0	55.6
Latilewa	320	6.1	0.0	93.9
Mushin	2050	45.5	11.4	43.2
Obalende	455	11.8	23.5	64.7
Oyingbo	2899	34.3	10.5	55.2
Oshodi	420	20.0	0.0	80.0
Papa	201	0.0	0.0	100.0
Sandgrouse	1300	9.8	0.0	90.2
Tejuosho	1200	36.4	12.7	50.9

Source: Dada and McNulty (1981) cited in Tayo Odumosu (1999: 100)

The markets sited along the lagoonal waterways had the added advantage of inland water transportation. Canoes and speed boats of various sizes and characteristics were parked by jetties or sandy beaches to embark or disembark passengers or load and unload cargoes for traders, as seen at Ebute Ero, Iluburin and Alaba International Market. Some of the lagoonal markets in the urban centres continue to maintain special periodicities as at Iluburin waterside near the Third Mainland Bridge landfall at Adeniji Adele area or at Badagry, where canoe-bone Ilaje traders of crayfish, smoked fish, palm oil, and palm fruits, seafood, and forest products from Okitipupa, Ogun River and the Niger Delta rivers bring their wares for sale periodically (Oluwayemisi & Anetekhai 2020). The traders lived in their canoes which they usually moored along the shores and turned into shops, in the fashion of the ancient barracoons of the pre-colonial European traders - a routine well known to their customers. As for the Ebute Ero market, the presence of point-of-sale (POS) cash exchange merchants and a busy jetty by the lagoon where a flotilla of passenger and cargo boats were moored, waiting for patrons going to other parts of Lagos, attest to the vibrant up-to-date service provision, competition, and customer satisfaction driving the markets of the megacity.

3.0 Water Transportation

Water transportation in the Lagos Lagoon system is quite extensive, covering all the local governments and their cities (Balogun 2023). There are many takeoff points. The watercraft in use range from open canoes with outboard engines carrying up to twenty passengers, to water buses with capacity for 200 passengers. The evolution of water transportation has been slow in development. The administration of Lateef Jakande in

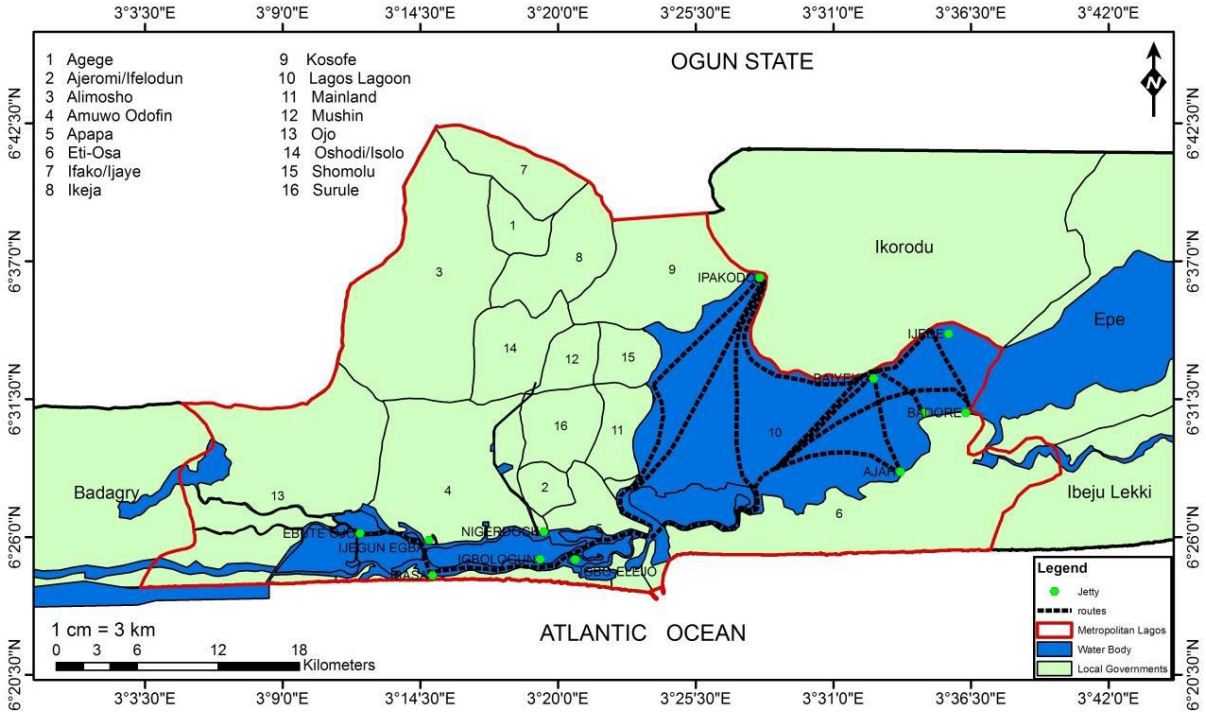
the 1980s was known for the first robust government investment in high-capacity water buses such as the popular motor ferry, *MF Baba Kekere* (Ologunagbe 2022). She used to ply between Marina, Ikorodu, Badagry, and Epe. Since the new millennium, however, the number of public- and private-sector water transport operators has increased, including many one-man wooden canoe pullers and fibreglass outboard-engine open and covered speed boats. The primary takeoff points which also serve as major jetties include CMS Marina, Ibeshe Ikorodu, Liverpool Roundabout Apapa, Epe, Alaba International Market Ojo, Badagry, Agbara Junction Ojo (see Plate 1). Journey times are comparatively the fastest among the major modes of mass transportation in the mega city, with nearby destinations clocking in around 30-minute to 1-hour journeys (Adejare et al 2011).

Plate 1: Open Canoes and Passengers at Liverpool Roundabout Under-bridge Jetty at Apapa Lagos Nigeria

Source: Edmund Chilaka (2023)

Along the routes of their voyage, the boats usually stop intermittently to remove weeds and debris which clog the rotors of their outboard engines, the waterways being littered with plastics and other debris. Of the twenty Local Government Areas in Lagos state, 12 are drained by rivers, namely: Badagry, Ojo, Amowo-Odofin, Apapa, Lagos Island, Eti-Osa, Kosofe, Somolu, Lagos Mainland, Ikorodu, Epe and Ibeju Lekki. The state's inland water transport network (see Figure 3.1) covers twelve major routes, namely: Ikorodu-Marina/CMS; Marina-Mile 2; Ikorodu-Addax/Falomo; Ikorodu-Ebute Ero; Marina-Ijegun Egba-Ebute-Ojo; Mile 2-Marina; CMS-Mekwen-Falomo; Badore-Ijede; Badore-Five Cowries; Marina-Oworonshonki; Ebute Ojo-Ijegun Egba; Oworonsonki-Five Cowries; and Baiyeku-Langbasa.

Fig. 3: Lagos Inland Waterways Ferry Routes



Source: Akinbamijo, Ipingbemi and Bayode (2016)

The typical cost of journeys ranges from N500.00 for 30-minute journeys to N1,500.00 for longer distances. Charter services, which range from N5,000.00 for 30-minute journeys in canoes with outboard engines to N150,000.00 and N200,000.00 for covered boats capable of carrying 10 or more passengers for journeys of two or more hours are also available. Boat charters are also available for transportation to the beaches or other businesses. See Plate 2 and Plate 3.

Major associations formed by operators include the Association of Tourist Boat Operators and Water Transporters of Nigeria (ATBOWATON), the National Association of Tourist Boat Operators and Water Transporters, the Boat Owners Association of Nigeria, and the Waterfronts Boat Owners and Transporters Association of Nigeria (WABOTAN). At a meeting with the Lagos State Waterways Authority (LASWA) in May 2023, the National President of WABOTAN, Mr. Babatope Fajemirokun, said that the association had 250 registered members in the Lagos metropolis alone, not counting other suburbs such as Badagry, Ikorodu, or Epe (*Daily Trend* 2023). Hence, the Lagos lagoonal system is vibrant with huge self-employment opportunities which grow by leaps and bounds as the megacity population increases.

However, the policy thrust of the Lagos State Government for water transportation in 2024 was mainly safety and speed of travel. At a ministerial briefing to commemorate the first year of Governor Babajide Sanwo-Olu's second term in office, the Commissioner for Waterfront Infrastructure Development, Yacoob Alebious said that new jetties were being constructed to expand the market. According to him,

> To complement the existing jetties and create more avenues for water transportation, the construction of 13 new jetties are currently ongoing while some are at advanced stages of completion. This is in addition to the seven jetties and terminals commissioned and handed over to LASWA for management last year. At completion,

these jetties are expected to promote safe and easy water transportation, reduce travel time and travel distance of communities, reduce pressure on roads as well as enhance commerce and tourism (Akoni 2024).

Plate 2: Activity at Ijegun Waterside, Satellite Town, Lagos Nigeria

Source: Nairametrics 2021

Nevertheless, some of the problems with water transportation in Lagos include poor safety records of the operating boats and canoes, multiple fatalities during boat accidents, which were rampant, lack of aids-to-navigation such as well-maintained channels that are charted and buoyed, and total absence of public sector investment in the water transport industry. Although LASWA and the National Inland Waterways Authority (NIWA) man booths at major jetties such as CMS Marina Lagos to monitor the use of lifejackets by passengers, the report of deaths during capsizing accidents indicates considerable negligence of the ferry operators to ensure compliance with mandatory riders' precautions and regulations on personal protective equipment (PPE). Second, the lack of well-maintained channels was indicated by obstructions posed by weeds such as water hyacinths and plastic debris along the waterways. These constitute a challenge to the smooth hitch-free operation of the outboard engines used by the boats and canoes. Hence, frequent mid-stream stops were reported by passengers as pilots raised their outboard engines to clear them of debris before resuming the journeys (*Vanguard* 2019).

Plate 3: A LAGFERRY Water Bus moored at the Central Ferry Terminal Five Cowrie Creek Falomo Lagos Nigeria

Source: Edema (2023), The Punch, 22 December

Moreover, the lack of buoys and lighting meant that night journeys were risky and ill-advised. Both LASWA and NIWA regulations disallow "night journeys", defined as trips made after 6 o'clock in the evening, although the rule was seldom enforced beyond the locking of the jetty gates, which obdurate operators circumvented by using any makeshift platforms to embark willing passengers at such late unauthorized hours. To crown the abysmal public policy failure, no public sector mass transit ferry services were established in Lagos after the breakdown of *MF Baba Kekere* and *MF Ita Faji*, the popular mass transit water bus commissioned by the Lateef Jakande administration in the 1980s (Afolabi et al 2016). Edelman (2015) traced efficient ferry services in Lagos to the period when the city was the federal capital, when the Federal Inland Revenue Service (FIRS) operated services to Apapa, CMA, Ebute Ero and other central locations.

However, the decline of public sector investment in water transportation in the Lagos lagoonal system mirrored the national pattern of neglect whereby Nigeria's 8,575 kilometres of inland waterways contributes only 0.08% share of modal transport *vis-a-vis* other modes, compared with 32% in Bangladesh, 20% in the Philippines, 3% in Sierra Leone, and 0.15% in India (Ezenwaji 2010). In 1921, the Lagos State Ministry of Tourism, Art and Culture claimed that water transport modal share versus other modes was 3.2% while the Lagos Ferry Services Company (LAGFERRY), which had ferried 200,000 people in 2020, set a new target to transport 480,000 people daily out of the 1.6million daily bus commuters in Lagos metropolis (Ukpe 2021). Other estimates suggest that five million personal motor vehicles ply the streets of Lagos, with over 200,000 commercial vehicles on active daily business, giving an average of 227 vehicles per kilometre (George 2023). However, a LASWA recent bulletin stated that ridership in the lagoonal system for selected years beginning from 2013 showed that more than 21m people travelled by water in 2022, up from nearly 10m in 2013 (see Table 2).

Table 2: Total Number of Commuters ferried by water in the Lagos Lagoonal System, 2013-2023

Year	Total No. of Travellers by Water	% change
2013	9,978,546	-
2014	10,345,281	+3.7
2015	11, 067,756	+6.9
2016	11,851,837	+7.1
2017	13,787,624	+16.3
2018	11,984,930	-13.1
2019	14,131,786	+17.9
2020	14,105,816	-0.2
2021	14,105,816	nil
2022	21,887,738	+55.2

Source: Authors' analysis based on secondary data (Oritse 2023)

Hence, to encourage robust development of the water transport sector in the lagoonal system, the substantial role of hundreds of canoe and boat operators in the logistic infrastructure needs urgent policies that remove insensitive and inefficient regulatory activities such as double taxation. Instead, incentives such as safety measures by LASWA and NIWA interventions ought to be prioritized. With the kick-off of the Lagos Blue Line metro rail, which would predictably draw much traffic from the other modes, a sea change may likely affect the megacity's transportation dynamics soon. See Plate 4.

Plate 4: The Lagos Blue Rail Line

Source: The Punch (Lagos) 2023

Barge Operation

The operation of barges in the lagoonal waters became imperative with the problem of cargo transfers between the seaports and their destinations or points of origin in the hinterland (Chilaka 2019). The hinterland of the Lagos seaport complex ranges from Apapa, Iganmu, Yaba, Amuwo Odofin, Ojo, Agbara, Badagry to Lagos Island, Victoria Island, Lekki, Ibeju Lekki, Epe, Ikorodu, Sagamu, and other states in the south-west, south-south, south-east, and the northern parts of the country. Among all the ports in the country, the Lagos ports complex recorded the highest patronage and throughput volume, followed by Onne, Port Harcourt, Warri, and Calabar in that order. From the

late 1990s, the buildup of cargoes inside the Lagos port system became unwieldy and traffic gridlock became the order of the day at Apapa as trucks and tankers struggled to exit the ports and deliver cargoes either within the primary hinterland of Lagos or the secondary hinterlands farther from the port gates towards other nearby states and the northern states (Chilaka 2019).

In context, about 65% of Nigeria's total throughput of non-crude oil cargoes, 57m tons in 2007, passed through the Lagos ports which, with the successful port concession of 2006, rose to 76m tons in 2010 and 84,951,927m tons in 2014 (Chilaka 2019). The overstretch in the installed capacity of the Lagos ports system was such that port operators and stakeholders lamented that Tin Can Island Port's installed capacity of 30m tons had been stretched to 80m tons in 2018 (Bivbere, 2018). Hence, barges were urgently pressed into the service of the ports, and they hauled containers and other cargoes all over the lagoonal waters to Ikorodu, Epe, Mile 2, Agbara, Ojo, Badagry, and just about any navigable jetty in the megacity (Uba et al 2023). As a new modal transport solution, the Nigerian Ports Authority went about the processes of establishing standard operating procedures (SOPs) while the operators formed unions to agree on basic rules and regulations for the market. The Barge Operators Union of Nigeria is composed of six major players, 30 mid-level players, and 50 other "unstructured players" having between them 150-200 barges operating in Lagos waterways, according to information released by the union (Onyekwelu 2020).

4.0 Sand mining

The first experience of mechanized dredging and sand mining activity in the lagoonal waters began during the 1906/1907 campaigns to deepen the entrance into the Lagos harbour by the colonial government (Chilaka 2021). To maintain the deeper draft achieved by capital dredging, many dredgers were mobilized and deployed for maintenance dredging routines, including *The Lady Clifford*, *Child*, *Queen Mary*, *Sandgrouse*, and *Romulus* with the sand or spoils removed used to reclaim the Iddo Island or dumped at sea (Colonial Reports Annual 1924: 24). This may have given the city dwellers the first glimpse into dredging sand mining. Artisanal sand mining activities by indigenes in the lagoonal system followed much later but well before 1960. For example, the Ebute Ilaje people who live adjacent to the University of Lagos and other communal miners who use baskets and canoes claimed to have started in the trade before the promulgation of the Ports Act of 1954 (Chilaka 2008). Other major locations where artisanal sand mining took place in the lagoonal system include the former Maroko Island (Lekki Phase 1), Ajah-Badore axis, and the waterfront communities of Sangotedo, Langbasa, Awoyaya, Ibeju Lekki, Epe, Badagry and Ikorodu. Overall, three major categories of sand mining have evolved here, namely: artisanal, large, mechanized mining using foreign dredgers, and medium-scale mechanized mining using locally manufactured Chinese technology called 'Keke' dredgers.

Plate 5: Loaders at Ebute-Ilaje Lagos Nigeria offload Sharp Sand after a Mining Expedition

Source: Chilaka 2008, https://www.ddhmag.com/artisanal-sand-mining-nigeria-ifesowaso-associates-ebute-ilaje-lagos/

The artisanal sand mining practiced in the Lagos lagoonal system is the simplest format in terms of equipment and methodology *vis-a-vis* other categories of the business. Those operating just by the shoreline use canoes of various sizes to scoop the mineral from the riverbed onto their boats and offload at the sand dump ashore. Other miners hardly need boats as their baskets are filled within wading distance of the river from the shore where they harvest sand and bring same to the shore. However, some of their fellow miners row various distances ranging from two kilometres to ten kilometres to reach midstream locations from where they use wooden ladders to go down to the river bed and scoop sand in baskets. The miner climbs up the ladder and pours the sand into his canoe. The operation is repeated until the cavernous depths of the large canoes fill to the brim. Then they row back to the shore where brawny off-loaders descend on the haul until the product is landed on the dump and made ready for sale to 5-ton Bedford truckers who supply users around the vicinity (see Plate 5). Other means of propulsion include sails, rigged to big boats just as they were used for international voyages in the 1600s and 1700s (see Plate 6). In 2009, when a report was made in a local dredging magazine, *Dredge Drill & Haul*, large flotillas of these sailing canoes were seen on the lagoon waters from the Third Mainland Bridge off Oworonsoki community as they sailed towards Ikorodu on a sand mining trip (Chilaka 2008).

Plate 6: Wind-driven Sails power Artisanal Sand Miners' Trips in the Lagos Lagoon

Source: Chilaka 2008, https://www.ddhmag.com/artisanal-sand-mining-nigeria-ifesowaso-associates-ebute-ilaje-lagos/

In the Bariga area of Ebute Ilaje community in Lagos, the 5-ton lorry-load was sold for about N45,000.00 in 2010. The operators at this location formed the Ifesowapo Sand Miners Association, which became a forum for business and social organizations for the welfare of the members and to pursue court cases whenever threatened by other corporate entities (see Plate 7). For example, in the 1980s, they sued the Nigerian Ports Authority in court when the Authority moved to extend its activities to cover their operational location at the Ebute Ilaje waterfront (Interview with the Secretary of the Association in 2009).

Plate 7: A Meeting of the Ifesowapo Sand Miners Association Ebute Ilaje, Lagos Nigeria

Source: Chilaka 2008, https://www.ddhmag.com/artisanal-sand-mining-nigeria-ifesowaso-associates-ebute-ilaje-lagos/

The next category of sand mining in the lagoonal system was executed using mechanized dredgers imported from Europe, China, and the US. These dredgers ranged from 8-inch to 20-inch machines, delivered with Multicat marine components and

watercraft to support operational movements while working. The third category of sand mining activity in the lagoonal waters is also mechanized, namely, the medium-scale Chinese dredging technology using locally fabricated 'Keke' dredgers (Chilaka 2019a). The use of 'Keke dredgers' gained ground from the second decade of the new millennium when its local fabrication, ranging from 6-inch to 10-inch pump sizes, began to be preferred to the exorbitant foreign ones costing millions of dollars to import and clear from the ports. The comparatively cheaper Chinese 'Keke' dredgers (see Plate 8) opened the gates wide for all comers to try their hands at the business of dredging and sand mining in Nigeria. With as low as six million Naira (N6m) some local fabrication engineers were churning out the new machines for their customers, most of whom were already engaged in the dredging business and would have either owned dredgers previously or formerly leased them for various operations (Chilaka 2019a). Now, equipped with cheaply fabricated dredgers, albeit with lesser life spans than the imported dredgers, operators were released from costly operating environments as 'Keke' were also cheap to maintain and mostly used locally available spare parts and inputs.

Plate 8: A 'Keke' Dredger on Reclamation Job around Tin Can Island Port Waters in Lagos Nigeria

Source: Chilaka 2023, https://www.ddhmag.com/the-pioneers-of-indigenous-dredging-activities-in-nigeria/

The first generation of the 'Keke' dredgers in Nigeria were sold as a package of one mother dredger with three transporters. The operational concept was that the mother dredger, equipped with the main suction pump, was stationed in midstream locations with proven sand reserves and it pumped the slurry of sand and water mixture into the transporters called daughter dredgers. When each transporter filled up, it was driven with an outboard engine to the shore or other desired location to pump out using a pumping machine. The three transporters working together usually fulfilled the set milestones of most dredging plans. Locations where 'Keke' dredgers clustered to do

their sand mining activities included Majidun in Ikorodu; Ilashe, Ijegun and Ibeshe communities off Snake Island/Tin Can Island Port waters; Badagry, Epe, and Ibeju Lekki axis.

5.0 Logging and Saw Milling

There are many sawmills in Lagos but the Oko Baba sawmillers community at Ebute Metta is the largest and contributes up to 80% of the planks and sawn wood sold in the megacity (Gbonegun, 2021). The sawmill depends on the lagoon for receiving bundles of logs floated downstream from as far away as Edo State (see Plate 9). The community came into existence during colonial times when it became the source of exported redwood and mahogany (Wikipedia 2022). However, following complaints of poor environmental and hygiene standards such as sawdust pollution, intermittent fire outbreaks with risk to surrounding residential estates, and the merging of the sawmills to the Makoko slums, the Lagos State Government adopted an ambitious resettlement policy in 2008 to relocate the over 2000 saw millers to a modernized facility at Agbowa-Ikosi, properly constructed to cater to the concerns raised against the Ebute Metta site (Olasunkanmi 2022). Also, facing the Third Mainland Bridge, which is preferred by the elites and foreign nationals to connect to the Ikeja international and local airports, Oko Baba saw millers' activities were seen as avoidable eyesores, hence the state government's policy to relocate them. The proposed new location is accessible by water from the Lagos Lagoon and by road from Ikorodu and Epe.

According to the relocation project's specifications (see Plate 10), the re-settlement scheme earmarked 34 hectares of land at Agbowa Ikosi to be reclaimed out of virgin swamp forests to a general level of three metres above sea level, with dredging works to deepen the waterfront of the abutting lagoon water to 1.5m and prepare a navigable channel for boats and logging activity, including wood floats.[2] Other provisions included a graduated shoreline for lumber activity, a shore protection wall of the waterfront and jetties, building of offshore band saw sheds, loading bay, timber market, lorry parks, 204 workshops and offices, water and electricity connections, meeting halls, conveniences and canteens, with a 160-unit housing estate.[3]

Plate 9: Aerial View of Oko Baba Saw Millers with Wood Floats (foreground) waiting to be sawn into Planks

[2] Research data in authors' possession

[3] Research data in authors' possession

Source: Gbonegun 2021, The Guardian Newspaper, 26 July

Plate 10: Lagos State Government Billboard at the Oko-Baba Resettlement Project Site, Agbowa Ikosi, 2013

Source: Edmund Chilaka © 2013

6.0 The Rise of Waterfront Cities

Since the second decade of the new millennium, proposals for the development of waterfront cities and their construction have flooded the Lagos State Ministry of Waterfront Infrastructure Development at Alausa. As of mid-2024, many of such city plans are located at Lekki Phase 1 area of the peninsula on the shores of the lagoon, including the Imperial International Business City (IIBC), Periwinkle Estate, Apple Island, and Diamond Island. Most of these are at the land reclamation stage of the mostly swampy allocations or under skeletal construction. The IIBC land allocation is 200 hectares into the lagoon, planned to be separated from land by a man-made canal abutting the general area of the original Ikate-Elegushi waterfront. For the bulk of the reclamation exercise, the IIBC awarded contracts to three dredging contractors, including Blue Bay Nigeria Ltd, Exomozen Nigeria Ltd, and Oraton Nigeria Ltd.[4]

With the full development of the ocean-front Eko Atlantic City to the civil construction stage, the full business data of the large-scale property has emerged to show that it was designed as a reclamation and provision of infrastructure project, on approximately 844 hectares of land and the construction of 8.5km defense wall known as the Great Wall of Lagos built to the height of 8.5m above sea level. The project is covered by a 2006 public-private concession agreement between the Lagos State Government and South EnergyX Nigeria Ltd to solve the Lagos Bar Beach shoreline erosion in Victoria Island, with the State Government entitled to 5% of the sale on each plot of the land (Akoni 2024).

Across town at the lagoon front conversely, is the proposed Imperial International Business City (IIBC) (see Plate 11), a close runner-up to Eko Atlantic City in terms of structural and financial organization. Announced as a $300million 200-hectare estate to be reclaimed from the Lagos lagoon adjacent to the Ikate Elegushi kingdom in the Lekki peninsula, the project was formally declared open in April 2016 by Saheed Elegushi, the Oba of Ikate Land, and touted to be the first eco-friendly smart business city in Africa co-financed by US investors (Vanguard 2016). The joint-venture partners were announced to be the Elegushi Royal Family and Channeldrill Resources Limited. The project was scheduled to start with the reclamation phase of the land with Kedari Capital and Cordros Capital as financial advisers. Other large waterfront reclamation projects under development are the proposed 150-hectare commercial and real estate at Majidun-Awori said to be jointly owned by Fresh Water (FW) Dredging Ltd, Amosu Awori Family of Majidun, and Garland Trade and Investment Ltd, and the lagoon front reclamation beside the Makoko saw millers near the University of Lagos jetty, said to be for a housing estate (see Plate 12).[5]

[4] Research data in authors' possession

[5] Research data in authors' possession

Plate 11: Graphic Impression of the Ikate Imperial Business City

Source: The Guardian, 14 November 2016

The IIBC's major stated aim is real estate investment, with the land use proposed as 30% for residential areas, 10% for commercial areas, 30% for business district developments, 10% for leisure and entertainment applications, and 20% for infrastructure, roads, and recreational green parks (Vanguard 2016). Other architectural provisions include fibre-optic telecommunications installation, a farmers' fish and meat market, shopping malls with a cinema and entertainment complex, two hospital buildings, a school, a sports complex, a mini-marina that will accommodate forty yachts, sewage, and fire service stations, dedicated water transportation within the city, water treatment plant, independent gas-fired electricity, and cooking gas piped to every house.

Plate 12: Land Reclamation Project at Makoko Community in Yaba, Lagos Nigeria

Source: Edmund Chilaka (2023)

Charting, Hydrography, Channel Deepening

Charting Nigerian waterways, from the Lagos lagoon to far-flung inland waters, was commenced during the colonial era. Until the second decade of the 21st century, no new charting record was added to the work of colonial hydrographers that ceased around 1946 as the Nigerian Hydrography Office (NHO) after independence continued to be beholden to the UK Hydrography Office (UKHO) for the authorization of new charts for use by master mariners within Nigerian territorial and inland waters. However, a news report in *PRNigeria* (2020) stated that the Nigerian Navy broke the jinx and succeeded in producing charts that covered "Badagry Creek from Ogunkobo through Navy Town and Mile 2 to Tin-Can Island…" as well as "Nigerian Navy Ship Beecroft and Nigerian Naval Dockyard Limited waterfronts, port guide of Lagos harbour, and operations charts of the entire Eastern Naval Command" (*Emergency Digest* 2020). In 2023, it was also reported that the Nigerian Navy, using the *NNS Lana*, undertook a survey and charting of the Lower River Niger from River Agge in Bayelsa State to Lokoja in Kogi State (*The Sun*, 2023).

Nevertheless, surveys and charting activities continued at the Lagos Lagoon. The Lagos State awarded contracts for charting the Badagry Creek from Badagry up to Eti Osa Local Government Area, according to information and data in the possession of the authors, especially as widespread industrial activities ramped up within the lagoon and around its waters, including sand-mining, mid-stream and waterfront real estate development, the 4th Mainland Bridge construction, the Lekki Deep Sea, and the 650,000 bpd multibillion-dollar Dangote Petroleum Refinery, the biggest refinery in Africa (*Sterling* 2023). Although the history of channel maintenance in the Lagos Lagoon is of olden provenance, the dedicated authority over the waterway became disputed in 2008 when the Lagos State Government promulgated the Lagos State Waterways Authority (LASWA) to challenge the traditional regulatory functions exercised by the National Inland Waterways Authority (NIWA), an agency of the Federal Government. The matter was later resolved by the Supreme Court in favour of the Federal Government (Ejekwonyilo, 2024).

However, the Lagos State Government contracted Harris Dredging in 2007 to deepen the channel from Etiosa to Epe to remove shallows and facilitate safer canoe and ferry boat movements around the lagoon waterways (Chilaka 2015). In 2017, the administration of Akinwumi Ambode embarked upon a major waterfront reclamation project at Oworonsoki, said to be for the construction of "one of the biggest transportation, tourism, and entertainment hubs in Nigeria", planned to "transform the blighted areas of Oworonsoki waterfront", according to the Lagos State Commissioner for Waterfront Infrastructure Development, Engr. Ade Akinsanya (DDH 2017). Although the mega-bus terminus is yet to be constructed, the state government has expedited the construction of modern jetties in many locations of the lagoon such as Ebute Ilaje, Ikorodu, Ijegun, Oworonsoki, Badagry, Falomo, Ajah, and Epe, ostensibly to take advantage of the natural endowment for mass water transport schemes. However, the widely recommended high-capacity water buses remain to be launched in a subsector still dominated by low- to medium-cadre water transport companies. On their part, they deploy mainly wooden canoes, fibre-glass speed boats, and few 18- to 25-seater ferry boats. As shown in the lagoonal economic map (see Figure 5), the vibrancy and huge employment trend in Lagos mega city flow from the plenitude of industries, commercial concerns, and markets dotted all over the rivers that compose the lagoon system.

Figure 5: Lagos Lagoonal Map with Development of Industries and Infrastructures

Key:

1. Alaba International Market and Barge Jetty
2. Agbara Barge Jetty
3. Badagry jetty and sand mining sites
4. Badagry Deep-water Port proposed site
5. Takwa Bay Petroleum Jetty
6. LADOL Special Fabrication Port
7. Third Mainland Bridge
8. Fourth Mainland Bridge proposed site
9. Oko-Baba Sawmilling Industry Makoko
10. Makoko Waterfront City (under reclamation)
11. Falomo Mega Jetty
12. Lekki Phase 1 Jetties and Estate
13. Ikate Elegushi Imperial Waterfront City
14. Banana Island Estates, Orange Island Estates
15. Victoria Garden City Ajah
16. Badore Jetty
17. Ado Road Sandmining sites
18. Sangotedo Sandmining sites

21. Lakwe Sandmining sites
22. Ikorodu Sandmining sites
23. Ibeju Lekki Sandmining sites
24. Epe Sandmining sites
25. Ikorodu Independent Power Plant
26. Ikorodu Lighter Terminal
27. Itoikin Ginmakers industry
28. Dangote Refinery an Dangote Port
29. Lekki Deep Sea Port
30. Lekki Free Zone Area
31. Pinnacle Oil Jetty and Tank Farms
32. Imota Rice Mill
33. Imota Saw-Millers Industries
34. Lagos Port Complex Apapa
35. Tin-Can Island Port Apapa
36. Niger Dock ship building and repairs industry
37. Private Tank Farm Industries Olodi Apapa

Source: Authors' compilation using secondary data

Conclusion

The Lagos lagoonal economy benefited immensely from the 130 years when the seat of Nigeria's government and politics was based in the city from 1861 to April 1990 when General Ibrahim Babangida moved it to Abuja after the shock of the failed coup d'etat by Major Gideon Orkar that year. From accelerated maritime trade to the siting of seaports, flyovers, airports, inter-state expressways, the highest number of industries vis-à-vis other cities and, by far, the highest population density orchestrated by the search for the golden fleece, the Lagos Lagoonal system proved to be a fertile ground for accelerated socio-political and economic development based on high population density. The return to civilian rule in 1999 after many years of military interregnum kickstarted such a flurry of economic activities that the lagoon shores resonated with greater prosperity inherent in local and foreign direct investments. Overall, however, some exigent management options for the Lagos State Government include the introduction of a robust and futuristic lagoon-basin-use policy that is green, futuristic, multimodal for transportation infrastructure, and sustainable per the sand mining industry. The exigency arises from concerns expressed in the past about the unsustainable depletion of the natural river sharp sand quantity of the lagoonal system (Adebayo 2017).

More importantly, the launch of better-managed high-capacity mass transport ferries to link up the urban areas along the banks of the lagoon is long overdue. With the demobilization and abandonment of *Baba Kekere* as noted above, there is an urgent need for its replacement with many more to cater for more than the 800,000 passengers LASWA claimed to have been ferried in three years. The sense from available data is that water phobia by potential passengers is due to the rickety and apparent unseaworthiness of the watercraft now in use. If modern ferries were to be provided, such challenges to develop inland water transportation would be overcome. If the government abhors direct intervention in commercial water transportation, financial and fiscal incentives such as tax breaks could be set up to incentivize private sector operators and investors.

Secondly, the impact of political push factors such as electoral jostle for power and the persistent indigene-foreigner controversies are likely to show an impact on the future of the economy and industrial base of the megacity from the 2030s if present trends continue (Olakunle et al, 2016; Aworawo 2003). As the city was originally energized by political factors from the 1861 Treaty of Cession which galvanized citizen confidence in the safety of its inhabitants against slave raiding and the security of its cosmopolitan business community, doubts and heightened erosion of confidence were caused by recent opaque policies of the Lagos State Government, especially the demolition of non-Yoruba property developments and other discriminatory measures that affected mostly Igbo traders and developers (Ehigiator 2023; Alex 2024; Opejobi (a) 2023). Moreover, the electoral violence and threats against non-indigenes during the 2023 general elections were unprecedented since the end of the Nigerian civil war. In retrospect, the confidence-building measures of the 1861 Treaty that consolidated the colony are now replaced by new legislation announced by the Speaker of the Lagos State House of Assembly "to protect indigenes' property" (Oluwafemi 2023). Deemed as punitive by non-indigenes, many responded to the open admonition to transfer their wealth and assets out of the city (Duruebube 2023; Opejobi (b) 2023). With the continued implementation of such parochial policies, the forecast of future tendencies for the megacity's growth, political and economic importance can only be dire.

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