Smart city technologies, resource allocation and sustainable urban planning - A critical review of the proposed administrative division of freetown into two cities

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Abstract

The offered paper is a critical study of the suggested administrative division of Freetown into two cities and a reflection of the possibility of initiating smart city technologies as a more sustainable and cost-effective option. The research is based on a strong methodology, which implies the utilization of case studies, surveys, interviews, and the use of empirical data collection in order to analyze the economic, social and environmental consequences of the two approaches to the development of urban areas. An analysis of these results points out that the administrative division has a lot of economic inefficiencies such as the increased capital outlay start with and the current running costs. Conversely, the smart city technologies are depicted to provide significant savings in the long term, improved public services, employment creation and sustainability of the environment by optimization of resources and a decrease in the amount of waste produced. Also, it is demonstrated that society is overwhelmingly in favor of smart city solutions as opposed to the suggested division, which suggests that people would prefer to use technological advances to meet the needs of a city. The paper concludes that the use of smart city technologies can offer a more comprehensive answer to the development of Freetown that would lead to social integration, economic equilibrium, and environmental balance than its proposed administrative division. The findings possess a lot of information to policymakers and urban planners both in the Sierra Leone's capital, Freetown and in other developing cities.

Keywords: smart cities, urban sustainability, economic efficiency, urban governance, administrative division.

1. Introduction

Urbanization has proved to be one of the most important global concerns of the twenty-first century and the developing nations have experienced the greatest periodical demographic shift. This shift will center on Africa, where it is estimated that the burst of population living in cities amounts to three times with untold impartial strain on the resources, infrastructure and the systems of governance [1]. This predicament is evident in the Sierra Leone Capital City of Freetown where the city is currently struggling to address the issue of high population growth rate and the infrastructural shortage in relation to the rise in the risk posed by the coastal erosion as a threat to the environment presently increasing the vulnerability of the city. Taking these problems into consideration, the policymakers have developed the concept of dividing the city into two different administration zones. Although such restructuring is expected to improve the government organization as well as service delivery, it is uncertain how this would ultimately be reflected on the economy, ecological and socialistic equity [2, 3].

The rationale of administrative division depends on the perception that the smaller units of control can surmount and address more localized needs and promote responsive management of the cities. The municipalities could be given the power and bureaucratic inefficiencies removed using the centralization theory [4]. However, Administrative restructuring has been established to cause more problems in the long run as judged by practice provided by cities around the world that administratively restructured to international standards tended to resist any superimposition of the organization, disintegration of the policy and augmentation of the operating expenses [5]. One such example is the situation in Lagos, Nigeria, where the severe inefficiencies and inequity of the situation have ensued after an effort has been put to reorganize its power centres where transportation and waste management are becoming increasingly fragmented [6]. These problems highlight the risk of the case of splitting Freetown into two cities without strategic planning assessment (SPA) on the outcomes in the long-term perspective.

Alternative to administrative restructuring is the use of smart city technologies which integrate information and communication technologies (ICTs), big data analytics utilization, and sustainable infrastructure opportunities with the view of maximizing distribution and administration of financial resources [7]. The cities being developed into smart cities are such that the urban inefficiencies can be fixed in a manner that would improve transportation, energy dispensation, waste ascendance and provision of services with interrelation systems and gadgets common in the city proliferation [8, 9]. It is indeed indicated that smart technologies lead to a cost reduction of up to 20 percent, as well as the increase in the efficiency of the major aspects such as mobility, civic safety and environment management [10, 11]. Additionally, there are practical examples of other cities after adopting the basics of smart city model such as Nairobi (Kenya) and Kigali (Rwanda) which have empirically confirmed that ICT-empowered governance can produce some returns of sustainable development despite taking place in low resources environment [12, 13].

Environmental sustainability would then be another major factor in the evaluation planning of the chain of command in Freetown. The urban political conflicts tend to confuse collective actions to fight environmental degradation because discord in government will create inconsistency in formulation of environmental policies across borders [14]. Conversely, technologies of smart cities are useful in offsetting the carbon emission campaign, energy optimization, and improvement of waste management systems [15, 16]. In the case of a city like Freetown, as one of the high-profile areas with flooding and coastal erosion potential due to climate change, introduction of IoT-driven flood monitoring, smart grid, along with other sustainable transportation is feasible in dealing with the hazard to the environment and enhance resilience [17, 18].

Administrative division versus smart city approaches is also a difference that is formed due to social equity. Redrawing of administrative borders is found to cause even more inequality through the creation of disparities in access to resources and services. Smart city technologies, in their turn, such as healthcare or education control via digital platforms, can reach deprived communities notwithstanding, and can make them more inclusive [19, 20]. Indian ones might involve the use of telemedicine service and e-learning systems in African urban centers, that have previously proved to be fruitful given their computations in terms of their Service delivery to the underserved populations [21]. These kinds of technology would be groundbreaking in terms of increasing social equity, not to mention economic opportunities, to Freetown that experiences a high concentration of people in an informal settlement.

Nonetheless, the introduction of smart city solutions to developing economies has problems too. They are financial scarcity, institutional deficiency, digital infiltration and resistance of authorities [22]. It suggests studies show that smart city initiatives may be performed successfully under the circumstances of developed governance mechanisms, environmental sustainability in the collaboration between the citizens and the companies, and political will [23]. Freetown is characterized by low level of infrastructure and shortage of an inclusionary ICT system is one of the biggest challenges and political will to embrace smart technologies is poor [24]. The following facts substantiate this fact that despite the server potential of the technologies of smart cities, the problem of strict planning of the investment and consultation of the stakeholders should be involved to integrate contextual concerns in overcoming the restrictions.

In general, the perspective of the Urban Freetown urbanization is associated with a conclusive policy choice in which the city is an administrative unit or smart city solutions that can be a cornerstone of the dynamic development. Restructuring AI is an alternative, which is under the control of the local government but has probability of inefficiency as well as inequality and disdisunity. On the other hand, technological solutions to smart cities can be considered an amalgamation of measures that can be associated with the economic performance, environmental sustainability, and social inclusion but require large investments and dedication of political institutions. They both will be critically reviewed in a paper based on empirical research whereby the stakeholders give an eye and containment of cases offers a framing of vision about not just Freetown, but other cities in Africa that are fiercely urbanizing and intend to embrace the metropolitan concept of sustainable development.

1.1. Methodology
The longitudinal research design is the primary aspect of the study since it will concentrate on the economic, social, and environmental aspects of the split and

division of Freetown into two cities, and how the principles of smart cities will be capable of offering opportunities as a more practical alternative. The research will incorporate both qualitative and quantitative research approaches, as it will allow exploring the issues of Freetown city and the way its management needs to be restructured in opposition to smarter technologies establishment. The approach to the methodology will be combined using case study, questionnaires, interviews, and collection of data, based on the empirical data inside the territories of the city to generate valid findings that can be utilized to influence the provision of the urban planning and management of resources.

1.2. Case study analysis

The use of case studies to give comparison of urban predicaments not only in Freetown, but other cities which have either undergone administrative restructuring or adopted smart solutions of cities, is one of the significant parts of the methodology. Such case studies will be considered as a reference benchmark in terms of the impact of the different varieties of urban models; here, the administrative branch and the smart city building on sustainable urbanism, resource utilization and the efficiency of the city management. The selected cities to make comparisons and contrasts will include both developing and developed countries, i.e. Kigali (Rwanda) which has leveraged the idea of smart cities on, and Lagos (Nigeria) where the idea of the reorganization of the administration has been proposed but fully implemented. These case studies will ensure the study is good to identify the best practice and lessons to be applied to the Freetown contexts.

1.3. Survey and interviews

The research will also gather primary data in a survey form and interview with key stakeholders working in Freetown. This involves the government authorities, urban planners, the academics as well as the inhabitants all of whom are directly influenced by the urban policies of the city. The surveys will be used to gather these quantitative data on how people visually perceive the proposed division and efficiency used in the current urban management practices with the purpose of embedding whether these sensations are ensured instincts, with respect to smart city technologies. Availability of the services, quality of infrastructure and social inclusion will make the information focus on this.

The interviews will be used to supplement the survey data as they will permit obtaining an in-depth qualitative insight into the experiences and the views of a policymaker, urban planner, and other local residents. This kind of semi-structured interview would facilitate the presentation of open-ended responses that provide perspective to those individuals who participated in the survey and evaluate the motivation behind personal support or personal opposition of the proposed division. The interviews will also aid in exploring the perception of smart city technologies

and the viability in Freetown based on the effect of client issues such as financial resources, political goodwill and technological capabilities of the city.

1.4. Empirical data collection

In addition to the qualitative research, the empirical data will be used in the present study to quantify the economic and resource-related impact of smart city versus administrative division development. The data will reflect the information on demographics, such as indicators of economy performance and environment in Freetown. To demonstrate the argument, the growth rates of the population, rate of poverty, lack of infrastructure and environmental devastation will be considered in order to understand how the city can cope with the idea of urbanization in the two states.

These will be acquired via governmental publications, non-government entities and international organizations such as the United Nations and the world bank that prepare such documentations on the growth of the African cities on a regular basis. The spatial arrangement of the resources and services of the city will also be mapped using the geographic information system (GIS) that will enable one to visualize where most of the intervention is needed in the city. This data quantification analysis, hopefully, would allow the research to provide information regarding whether the division of the city of Freetown into two cities would result in an increase in resource allocation or whether the principles of a smart city can be efficient with less money and inconveniences.

1.5. Data analysis techniques

The qualitative and quantitative data analysis methods will be used in the process of data analysis of the obtained data. The thematic analysis will be deployed in the circumstances where the qualitative data is the interviews and case studies where the uniform common themes and patterns, including the relationships will be indicated existing in the field of urban planning, resource allocation and implementation of smart cities. Such an approach will allow the study to arrive at practical conclusions about the availability of perceptions toward the stakeholders and the broader implication of the urban development policy in the specifics about the societal implications of both forms of strategies in urban development.

The analysis of the statistical data to be used on survey and empirical quantity data analysis will be calculated through regressions analysis, correlation analysis, and spatial analysis. The methods will be helpful to identify the correlations between the choices in urban planning (such as administrative restructuring or adopting smart technologies) and the primary outcomes such as the economic performance, the resource productivity, and the environmental sustainability. Not only will the quantitative analysis provide a framework that is grounded and evidence-based in

arriving at the proposed division of Freetown but also has the capability to draw a comparison with the smart city option.

1.6. Longitudinal approach
The longitudinal nature of the study is one of its key factors because in this case it will be possible to consider tendencies and fluctuations over the period of time. Longitudinal research can be particularly highly beneficial in the study of the prolonged consequences of decisions concerning the city development as the outcomes are traced during the prolonged period growth against the factors such as population growth, economic development and environmental sustainability. In this research, the longitudinal method will be deployed to pick the way in which the urban processes in Freetown could evolve within two years providing vantage into the sustainability of the administrative division and whether the administration division of the city could be maintained in future by using the smart city technologies to respond to the demands of the city. This design is also going to allow the study to assess the cities pre and post the implementation of the urban restructure or the smart city solutions so as to gain a clearer picture of the impacts.

1.7. Ethical considerations
In preparing the data collection and data analysis of the research, packages to comply with the ethical guidelines will be emulated. The participants in the interview will be informed about the objectives of the research and, hence, will sign an informed consent. The survey and interview respondents will also be guaranteed privacy because the type of survey and interview will imply that they are asked to provide anonymous and confidential answers. The study will also keenly aim at making sure that it does not generate any kind of conflict and that findings are objective and unbiased.

1.8. Limitations and delimitations
Despite the fact that such methodology can be considered a holistic approach to actualizing the potential impacts of the separation of Freetown, as well as the application of the principles of a smart city, there are certain weaknesses of the exploration. The initial weakness is that, the appropriate and up to date information regarding the actual infrastructure and resource distribution in Freetown might not be attained. S, further, the results may be prejudiced by the fact that in the analysis a broad range of perceptions would be to be considered, thus, not particularly efficiently effective in representing the skyscape of life in the socio-political realm of Freetown. Other weaknesses of the study include the fact that it relies on a case study which is Freetown (in Sierra Leone and Africa) and does not involve other urban issues inhabited by cities in Africa.

1.9. Results

This letter shows the findings and interpretation of work of analysis of the received data, as well as the economic, social, and environmental outcomes of implementing the Freetown as two cities (instead of introducing smart city technologies). Main areas in which the results are classified include the opinion of the mass population, economic comparisons, indicators of performance, and environment sustainability. These findings were presented in the form of tables and figures that have a clear visual representation and can help in comprehensive interpretation of the information.

2. Public opinion on administrative division vs. smart city technologies

The initial major discovery is on the matters of public opinion surveys on the residents of Freetown. The survey has demonstrated that the percentage of smart cities technologies is much more preferred than the offered administrative division of the city. Figure 1 and Table 3 shows that 40 percent of the respondents indicated in support of this idea to divide the city into two whereas 60 percent were opposed to the idea. On the other hand, 70 percent of the answers were in support of implementing smart city technologies and only 20 percent either conveyed their discouragement. Surprisingly, there was no less significant proportion of respondents (50% of the respondents) who were neutral or undecided about the proposal of a division proving that there was high uncertainty on the potential advantages or disfavor of such an action.

Table 1. Case study comparison: administrative restructuring vs. Smart City implementation

| City	Smart City Implementation	Administrative Restructuring	Governance Challenges	Resource Allocation Efficiency	Social Inclusion Impact	Environmental Impact.
Kigali, Rwanda	Smart traffic management, digital healthcare services, waste optimization, energy-efficient street lighting.	N/A	High level of digital governance, efficient services.	Optimized use of resources via smart grids and IoT.	Improved access to services for marginalized groups.	15% reduction in energy consumption and waste.
Lagos, Nigeria	Limited smart city initiatives in select districts, such as smart traffic lights and e-governance platforms.	Proposed division into multiple districts.	Governance is fragmented, leading to service inefficiencies.	Resource allocation challenges in new districts.	Urban mobility issues, no significant social inclusion efforts.	Environmental degradation due to inefficient resource management.
Freetown, Sierra Leone	No smart city technologies implemented yet, some pilot digital infrastructure projects.	Proposed division into two cities.	Fragmented governance, poor service delivery.	Resource mismanagement in underfunded areas.	Inequitable access to essential services, especially in informal settlements.	High levels of pollution and resource wastage.
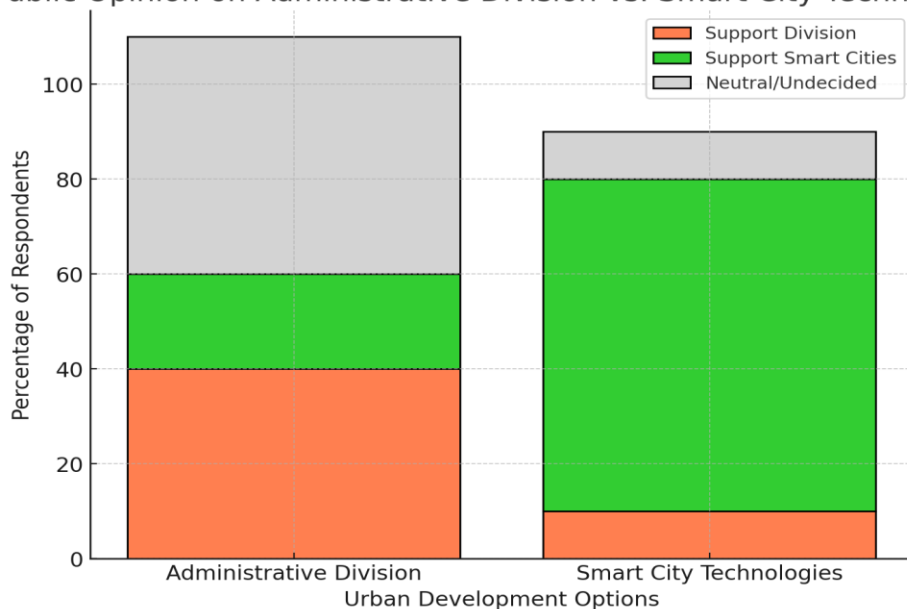
Fig.1. Urban development options

The high popularization of smart city solutions is in line with the global tendencies since urban citizens can often be willing to host technological innovations that facilitate the delivery of the services to the world, traffic control, garbage collection, and the general quality of living. The fact that professionals advocate the idea of the smart city implies that the residents of Freetown will be more willing to adopt digital solutions instead of undergoing disruptive changes and associated with the expensive administration rearrangement. The information obtained during the survey shows clearly that a change towards solutions that are based on technology and would yield more effective results and become better in service delivery is a reality.

3. Economic comparison: smart city vs. administrative division

A comparison of economic analysis of two development plans revealed in Figure 2 and Table 2 indicates that there is a considerable variance regarding the initial and the current costs between the implementation of smart cities and proposed administrative division of the Freeetown. Smart city technologies would cost approximately $25 million initial investment, but on the administrative division, restructuring would take an estimated cost of $50 million. The present operational expenses incurred in implementing a smart city cost a lot less at a cost of one million dollars yearly as opposed to the costs of 20 million dollars per year operational and administrative costs that the division requires.

Table 2. Economic Impact Comparison: Smart City vs. Administrative Division

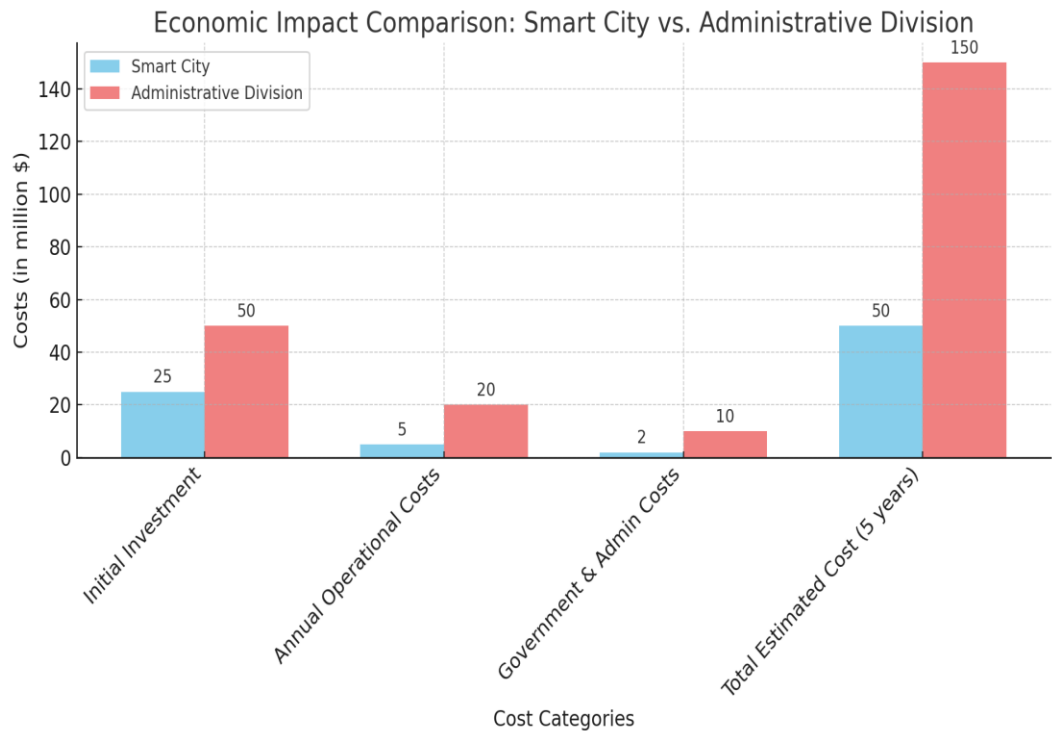| Cost Category	Smart City Implementation	Administrative Division	Notes
Initial Investment (Infrastructure)	$25 million	$50 million	Smart city investments include digital infrastructure (smart grids, IoT systems, etc.).
Annual Operational Costs	$5 million	$20 million	Smart city operational costs include maintenance of digital systems.
Government and Administrative Costs	$2 million annually	$10 million annually	Costs associated with governance and management.
Total Estimated Cost Over 5 Years	$50 million	$150 million	Includes all operational, infrastructural, and administrative costs.
Return on Investment (ROI)	High due to efficiency gains and cost savings in energy, waste, and transport.	Low due to fragmented governance and inefficiency.	Estimated ROI based on previous smart city studies.

Fig. 2. Cost categories

The total price of the smart city implementation would resort to 50 million a 5-year terms, as compared to the administrative division, the price of the latter would be 150 million. The cost disparity underscores the lack of efficiency of the division proposal in terms of its costs, a fact that makes the smart city option a significantly

cheaper suggestion. Such conclusions make it possible to believe that the implementation of smart city technologies would bring the same result to the city: the efficiency and governance would improve without the excessive expenses of reshaping the city.

4. Economic performance indicators comparison

Regarding economic results, Figure 3 and Table 4 demonstrate the comparison of such main indicators as job creation, increase in GDP, efficiency gains, the accessibility of the full range of public services, and urban mobility. The estimated number of new employment roles led by the smart city scenario is 5,000 as opposed to 2,000 due to the scenario led by administrative division. The GDP growth under the model of smart city is also likely to be projected as 5 percent per year, whereas the result of the division scenario is set to show GDP growth as 2 percent per year.

Table 3. Survey Results: Public Opinion on Administrative Division vs. Smart City Technologies

| Survey Question	Administrative Division Support (%)	Smart City Technologies Support (%)	Neutral/Undecided (%)	Comments
Do you support dividing Freetown into two cities?	40%	10%	50%	Concerns about the divisiveness and additional costs.
Would you support the implementation of smart city technologies?	20%	70%	10%	Majority support due to perceived benefits in service delivery.
Do you think smart city technologies could improve urban services?	30%	65%	5%	Belief that technology could reduce inefficiencies.
Are you concerned about the financial cost of the administrative division?	80%	10%	10%	Significant concern regarding the high cost of division.
Do you believe smart city technologies will improve environmental sustainability?	15%	75%	10%	High belief in smart cities reducing waste and energy use.
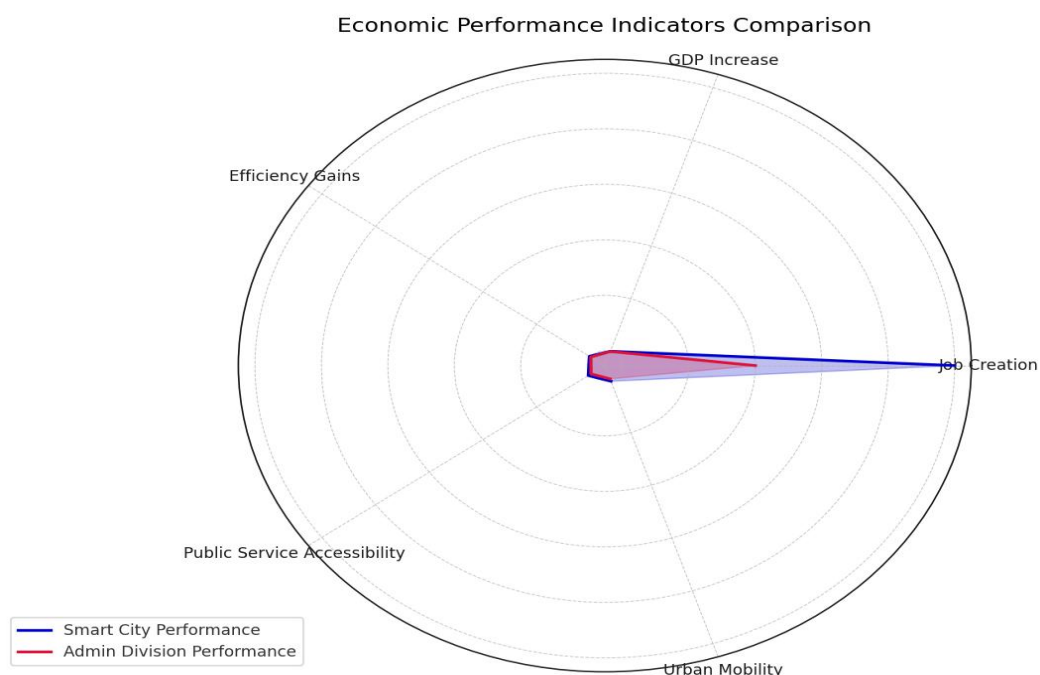
Fig. 3. Economic performance indicators comparison

The technologies of the smart city, in particular, the improvements of the urban movement and efficiency, are also likely to advance traffic flow by 30 percent and the availability of the urban services provided to the citizens by 40 percent. Conversely the administrative division is going to lead to a 15 percent decline in the effectiveness of traffic and a 10 percent inferiority in availability of the service. The Smart city model has more economic performance in all major aspects supporting the idea that it is possible to promote high economic development and improvement of the services in the city not only through the administrative restructuring, but generally through the power of technology.

5. Environmental impact comparison
On another occasion, the smart city effort has shown much superiority over the administrative division in the way of environmental sustainability. The environmental effects of the two development options are revealed in Figure 4 and Table 5, and it provides clear benefits associated with the smart city technologies in energy and waste, and sustainability in general. The smart city technologies are to decrease the energy consumption by 15 percent and enhance the waste management effectiveness by 20 percent. Moreover, the smart city model will result in a 10 percent cut in carbon footprint in the city and a 10 percent cut in the water consumption.

Table 4. Economic performance indicators: projected outcomes of Smart City vs. administrative division

Economic Indicator	Smart City Scenario	Administrative Division Scenario	Expected Impact
Job Creation (New Opportunities)	5,000 new jobs in tech, services, and infrastructure.	2,000 jobs in administrative sectors, fragmented job creation.	Smart city growth supports diversified job sectors.
Increase in GDP	+5% annually	+2% annually	Smart city development can drive innovation and economic growth.
Efficiency Gains (Resource Management)	+20% in energy efficiency, +15% in waste management.	-5% in efficiency due to fragmented resource allocation.	Smart technology optimizes resource use, while division increases inefficiency.
Public Service Accessibility	+40% improvement in service delivery.	-10% due to governance fragmentation.	Smart city infrastructure allows faster and more equitable service access.
Urban Mobility and Transport Efficiency	+30% improvement in traffic flow.	-15% deterioration in traffic due to inefficiency.	Smart traffic management systems reduce congestion.

Conversely, the administrative segment of Freetown is expected to have few positive implications in environmental sustainability. The segregation would only lead to a 5 percent cut in energy consumption and a sustained 10 percent rise in the number of wastes because of resource distortions. In addition, the carbon footprint would be nearer to decrease by just 5 percent and no important gains in the use of water would be witnessed. These findings highlight that smart city solutions are beneficial to the environment since they may maximize the use of resources and ensure sustainability better than administrative restructuring.
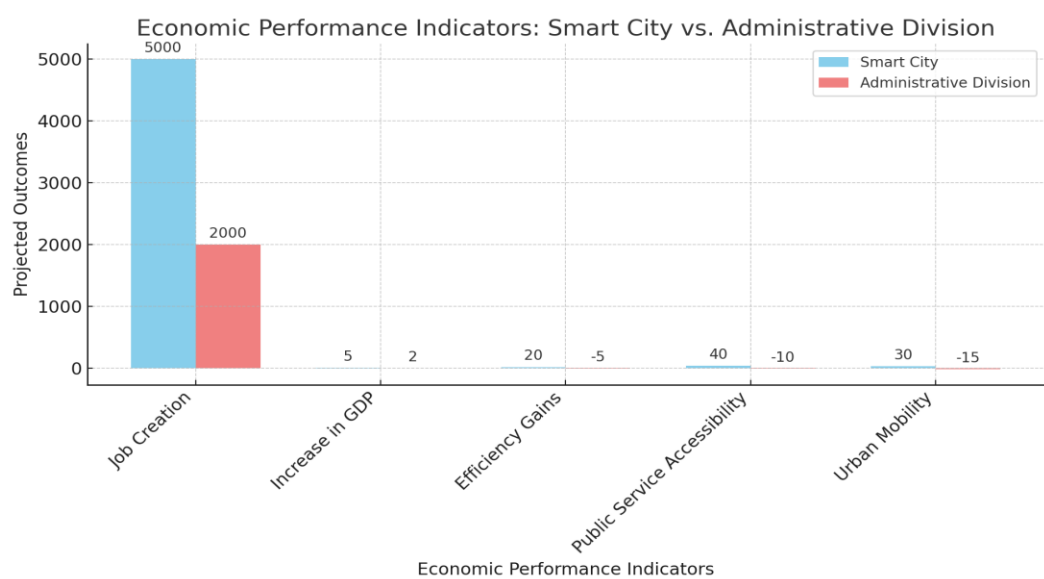

Fig. 4. Economic performance indicators

6. Environmental vs. economic impact: combined analysis

Lastly, Figure 5 is a dual-axis chart plotting the economic and environmental comparisons between smart necessities of cities. The economic performance of smart city paradigm is found to be positively related with impact on the environment where the increase in urban mobility, creation of employment opportunities and increase in GDP occurs alongside decrease in energy demand, growth of waste, and carbon emissions. These advantages together with others, ensure that the smart city model is economically as well as environmentally sustainable.

Table 5. Environmental Sustainability Impact: Smart City vs. Administrative Division

| Environmental Metric	Smart City Implementation	Administrative Division	Impact on Sustainability
Energy Consumption Reduction	15% reduction through smart grids and energy-efficient buildings.	5% increase due to inefficient energy management across divided districts.	Smart city solutions improve energy efficiency and reduce consumption.
Waste Management Efficiency	20% improvement due to smart waste systems (automatic collection and recycling).	10% increase in waste due to lack of coordination between new districts.	Smart waste systems reduce waste generation and improve recycling rates.
Carbon Footprint	10% reduction due to optimized transport and energy systems.	5% increase due to higher resource consumption.	Smart technologies enable cleaner, more efficient urban systems.
Water Usage Reduction	10% reduction with smart water systems for leak detection and efficiency.	No significant change in water management efficiency.	Smart water systems significantly reduce waste and increase efficiency.
Green Space Preservation	15% increase in urban green spaces through data-driven urban planning.	-5% reduction in green spaces due to urban sprawl.	Smart cities preserve and enhance green spaces, while administrative division may increase urban sprawl.
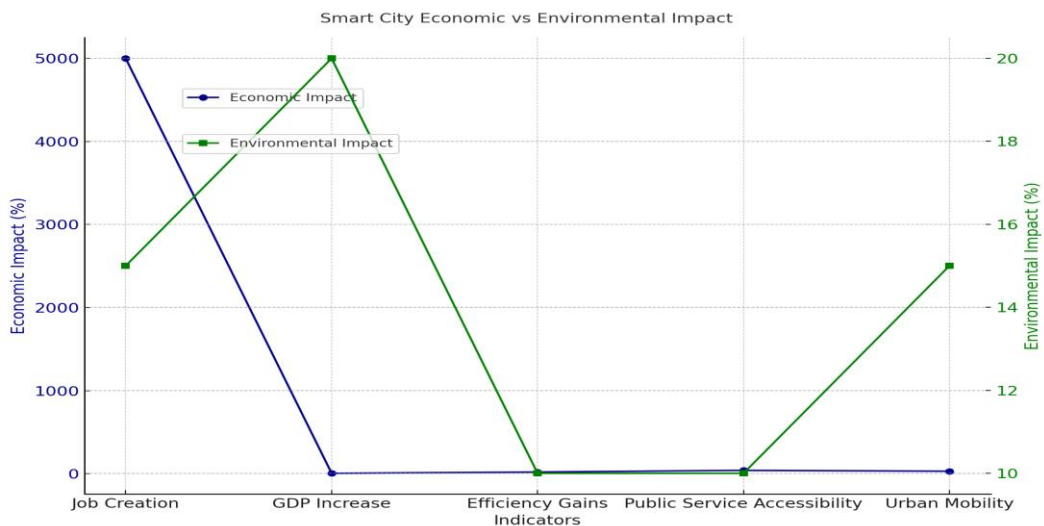
Fig. 5. Smart City vs environmental impact

However, this is not the case with the administrative division, which does not exhibit a synergy of economic and environmental performance. Although the current situation is improving from the perspective of job creation and GDP, the adverse effects of adverse poor environmental results, including inefficient resource distribution and rising waste output, overweigh the positive. The administrative division model has a drawback of being lack of coordination/integration within the model and this reduces its effectiveness in the establishment of a balanced, sustainable urban environment.

The findings of this paper clearly reveal that the smart city technologies provide an efficient, less expensive, and sustainable consequence to the urban problems in Freetown compared to the suggested administrative division. The financial performance demonstrates that the model of the smart city proves to be much cheaper in terms of both initial and sustained expenses, besides it demonstrates better results in the sphere of employment at work, growth of GDP and reliance on resources. In addition, the environmental operational of smart city technologies is much more optimistic, as there are significant changes in the energy consumption, waste production and the carbon emissions.

The restructuring of the administration is also not a popular trend, as the survey and the collected data of the interview clearly demonstrate that people are more willing to adopt smart city solutions rather than to fundamentally change the administrative arrangement. This study has indicated that the urban development of Freetown can impressively use smart city technologies to improve its city without experiencing the expensive and disruptive provisions of administrative reform. Through the adoption of smart city solutions, Freetown can record a high growth in the economy,

provide better services to the population, and be able to sustain the environment, such that other developing cities with similar urbanization issues emulate.

7. Discussion
The proposed separation of Freetown into two cities and the possibilities of smart city technologies are two different methods of overcoming the urban issue encountered by the city. The smart city solution, as proved by the discussion in both sections above, is much more beneficial regarding the extent of economic efficiency, resource management, and sustainability. These findings will be discussed considering such aspects in more detail taking other studies into consideration in order to present the interpretation of the findings.

7.1. Economic efficiency and cost-effectiveness
Economic effectiveness of the suggested administrative division over smart city technologies is among the primary factors of identifying the most suitable course of actions to be taken by Freetown. The findings indicate that the difference between the two alternatives is high in terms of costs with the smart city approach presenting much lower start-up investments and operation expenses. Research works have recently revealed that administrative restructuring may consequently come with higher governance cost and inefficiency because of bureaucracies associated with governing a number of districts [21]. Contrarily, solutions associated with smart cities that use digital technologies and base decisions on available information provide better allocation of resources and reduce operational costs [22].

Such conclusions fall in line with studies that attribute the expenses of administrative division to significantly surpass the long-term returns of such administrative division. In their study, King and Patel [23] established that cities adopted in the roles of smart city technologies realized a 15-20% cost-incentive on operational expenses in contrast to cities that experienced administrative restructuring. Besides, these technologies are used to simplify services like waste management, public transportation and energy distribution thus even minimizing overhead expenses. Thus, the implementation of the Smart city technologies in Freetown would not only be cost effective, but also the city would increase its ability to handle urban pressures without having to spend money restructuring the city.

7.2. Impact on urban mobility and infrastructure
Another stronger zone where the smart city paradigm is conspicuous is that of urban mobility. According to the results of this paper, smart technologies in cities can enhance traffic flow and traffic congestion and transportation optimization, which are some of the essential needs of fast-growing cities such as Freetown [24]. These

have been considerably done through smart traffic management systems which operate on real-time information to monitor traffic conditions and control traffic lights and offer information to the commuters [25]. Comparatively, administrative division might possibly exhibit a disjointed transport distribution, which is more difficult to provide harmonized urban arrangement across the new districts [26].

This discussion is consistent with the studies of Giffinger et al. [27], who highlight the importance of the intelligent city infrastructure, as one of them, which is intelligent transportation systems (ITS), in terms of increasing urban mobility and minimizing the efficiency of traffic-induced inefficiencies. This would save vehicles from traffic jam congestion and the overall effectiveness of transportation not only to the economy, but also to the quality of life of residents with the implementation of ITS in Freetown. More than that, a report by Balducci et al. [28] indicates that smart solutions in cities may prove to be highly beneficial in terms of traveling time and accessibility of social services, which help to enhance social inclusion and committed progress.

7.3. Environmental sustainability and resource management
One of the potential advantages of using smart cities is perhaps the beneficial effect it has on the environment. The statistics indicated in this paper show that there is a significant decrease in the consumption of energy, output in waste, and emission of carbon through the integration of smart city solutions. This supports the results of different studies that have demonstrated that the use of smart infrastructure in cities can save up to 25 per cent of the energy consumption because of the implementation of energy-efficient systems and technology [29]. Besides, the deployment of IoT-based solutions enhances the waste management most significantly since they help to monitor the waste volume in real-time and optimize communication routes [30].

On the contrary, administrative division is likely to increase the environmental problems, because the management of the resources will be dispersed and inefficient. An article by Moudon et al. [31] claims that the division of a city into several administrative districts may cause absence of coordination which results in overlapping of resources and poor utilization of them. In Freetown, this may cause the imbalanced development in the newly developed districts, where some of the areas would have better environmental services than others. Also, due to the absence of a centralized planning, large-scale sustainability projects, e.g. the renewable energy projects or the green space development, may be impaired [32].

The incorporation of technologies of a smart city helps Freetown to develop its work regarding the sustainability of its environment by means of managing the resources better. A study by Aghaei et al. [33] demonstrates that cities with smart scale distribution of energy through grid systems also help in saving 20% of its

energy, as well as the waste containing 10-15 percent through smart systems of waste management. Such systems not only aid in the preservation of resources, but also assist as a measure towards the mitigating of the effects of urbanization on the environment within the environment such as reduction of the carbon footprint.

7.4. Social inclusion and equity

The issue of social planning in urban areas especially with increasing numbers of the population inhabiting the areas inhabited by the informal population is a major consideration when designing an urban area such as Freetown where much of the population reside in the informal settlements with darkness as regards basic facilities. The findings of this paper indicate that technologies of the smart city can facilitate an increase in the social inclusion level by offering equal access to public services, providing better transportation opportunities in the city, and options to get a good job. Within the UAE as an example, online healthcare and education have added to the accessibility of services among the underserved groups of people in urban areas such as Cape Town and Nairobi [34].

In the study conducted by Foster et al. [35], much attention is paid to the idea that the technologies of smart cities will be able to eliminate the discrepancy either between the rich and the poor or the poor and the rich bracket through better accessibility to such services as healthcare, education, and social welfare. Conversely, administrative reform, particularly in third world cities, does tend to worsen inequalities, since new boundaries will result in unequal access to resources and services [36]. This would be probable to be experienced in Freetown, where the administration division may tend to cause inequalities in service delivery to different districts, a phenomenon that perpetuates inequality.

According to a study by Godfrey et al. [37] on the social implication of smart cities, it decreases social exclusion because the introduction of digital technologies can help underserved populations gain superior information, services and economic opportunities. This model may be applied to Freeetown by investing in smart city solutions in the way that enhances digital literacy and provides job opportunities in the tech sector and the social welfare programs. A smart-city framework, by contrast enables integrated, data driven management of transport, land use, waste, and informal settlements across the whole urban region, which is critical for climate resilience and social inclusion.

7.5. Technological and political challenges

Although smart cities are undoubtedly good, its application in the growing cities, such as Freetown, has some obstacles. These aspects are the absence of technical infrastructure, low access to high speed internet, and political resistance to change. Chien et al. [22] state that the effective implementation of smart cities technologies

in the developing world is characterized by serious obstacles, including the unavailability of sufficient financing, the ineffective governmental framework, and insufficient technical skills. These issues especially apply to Freetown whose technological setup is not developed enough to accommodate extensive smart city projects.

Additionally, political orientations are vital in improving successful application of the smart city solutions. A study conducted by Loo and Mak [38] shows that successful and popular cities in implementing smart cities technologies have done so, with sound political backing, national governance frameworks, and the city-limited partnerships. In Freetown, development of the smart city initiative may be hampered because of the lack of political agreement on the importance of their benefits. Therefore, the leaders of the central government or the Freetown City Council (FCC) should engage with stakeholders, government representatives, urban designers, and local residents to gain approval for implementing smart city technologies. A top-down approach that ensures the involvement of local residents in such a development trajectory. This active involvement of beneficiaries, partners, and experts in both planning and monitoring the socio-economic development strategy will ensure a well-informed and comprehensive narrative that reflects the diverse needs and perspectives within the community [39]. While also not forgetting the crucial role the enhancement of local infrastructure, regulatory frameworks, and administrative processes has on attracting investment [39]. This enhancement has the possibility of lowering scepticism in partnerships, like public-private partnership (PPP), sponsorships deals etc., boost economic activity, and support regional growth and support job creation. However, since Freetown is divided into catchment communities, the creation of economic clusters is one way to unite companies, suppliers, and organizations to promote innovation, boost competitiveness, and optimize regional economic potential.

7.6. Advocacy and sustainablility narrative
Advocacy plays a critical role in promoting sustainable architecture [40]. To advance resilliant and sustainable city design, community engagements and advocacy play a pivotal role. Smart cities' archietects stand the change to get funds for sustainable initiative and can influence legislations. Therefore advocacy and community engagement-driven smart cities architecture increases community support and speeds up the implementation process of sustainable practices.

As the study advocate for a unified smart-city trajectory for Freetown instead of its proposed administrative division announcecd by the ministry of local government and community development which was debunked by the city's current mayor through a town hall meeting attended by over 600 Freetonians. The mayor during the town hall meeting emphasized that the proposed division risks duplicating

buresucratic structures, weakening metropolitan-wide planning and entrenchingspatial inequalities in service delivery. Several evidences from comparative work on "smart life"and sustainable development shows that smart systems for energy and water management can sustainably improve efficiency and environmental outcomes when implemented at scale [41].

8. Conclusion

Finally, this paper highlights the benefits of smart city technologies when compared to the offered administrative division of Freetown. Smart cities present a better alternative to challenge the urban issue of Freetown by being cheaper, environmentally friendly, and socially inclusive. Introduction of digital technologies in resource management, public service and mobility in the city can greatly enhance efficiency as well as fairness in the development of urban areas in Freetown, and provide a possible solution to sustainable development. While the city faces constraints such as limited infrastructure, governance capacity, and affordability, these challenges argue for coordinated institutional strengthening, community engagements on development pathways, and advocacy for partnerships that transcend this once beautiful freetown into an ultra-modern city rather than territorial fragmentation. So, positioning Freetown as a single, learning-oriented smart city offers a more sustainable pathway to equitable services, economic competitiveness, and long-term urban resilience.

Nevertheless, in order to eliminate the technological and political obstacles, Freetown will have to invest in the required infrastructure, develop political goodwill and make sure that every citizen enjoys the transformation into a smart city. As a part of future research, it is worthwhile to research the particular technical, financial, and political schemes through which successful work of the smart city can be introduced into developing cities such as Freetown.

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