



RESEARCH METHODOLOGY - ARC 451

**STRATEGIC PLANNING IN THE DEVELOPMENT OF LAGOS AS A SMART
CITY**

A THESIS

**SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE, CALEB
UNIVERSITY IMOTA LAGOS**

BY

OGUNMILORO MODUPE, 18/4723 OLATUNJI

AYOMIDE, 17/4105 UKWUJEDE JOHN

GEORGE, 17/3745

FEBRUARY, 2021.

DECLARATION

We hereby declare that this dissertation is our work. All citations, references, and borrowed ideas have been duly acknowledged. It is being submitted to the Department of Architecture, College of Environmental Science and Management, Caleb University, Imota for the degree of Bachelor of Architecture, and has not been submitted before for any degree or examination at any other university before now.

.....
OGUNMILORO MODUPE

.....
OLATUNJI AYOMIDE

.....
UKWUJEDE JOHN GEORGE.

February 2021

CERTIFICATION

We hereby certify that this project titled: *Strategic Planning in the Development of Lagos as a Smart City* was done by us; **OGUNMILORO MODUPE 18/4723, OLATUNJI AYOMIDE, 17/4105, UKWUJEDE JOHN GEORGE, 17/3745**. It is submitted to the department of Architecture, Caleb University, under supervision, for the award of B.sc Architecture.

.....

.....

SUPERVISOR

Date

ARC. STEVE JAYEOBA

.....

.....

SUPERVISOR

Date

ARC. EJIGA OPAOLUWA

.....

.....

HEAD OF DEPARTMENT

Date

DR. OLUDARE OBALEYE

DEDICATION

This project is dedicated to God and our ever-supporting lecturers. Thank you all for your continuous guidance.

ACKNOWLEDGEMENTS

We would like to give all glory and honor to the Almighty God for his unending grace to us during this degree, we could have not made it this far without His help.

We wish to say a very big thank you to both our supervisors, Arc. Steve Jayeoba, Arc. Ejiga Opaoluwa, also the head of the department, Dr. Oludare Obaleye, and the dean of the faculty, Dr. Dare Abel for providing us with the necessary support and advice which made this thesis easier to finish. We are extremely grateful to the entire teaching and nonteaching staff of the Department of Architecture for imparting knowledge and ethics in us throughout our stay at Caleb University.

LIST OF TABLES

Table 4.1	49
Table 4.2	50-53
Table 4.3	56
Table 4.3.1	56-57
Table 4.3.2	57
Table 4.3.3	58
Table 4.3.4	59
Table 4.3.5	60
Table 4.4.0	62
Table 4.4.1	62-63
Table 4.4.2	63-64
Table 4.4.3	65-66
Table 4.4.4	68-69
Table 4.4.5	71
Table 4.4.6	74

ABSTRACT

Smart cities are urban settlements that deplore advances in Information and Communication Technologies to solve everyday problems. A city that has achieved environmental sustainability, resolved mass transportation problems, improving the quality of lives of its residents, and generally has functional urban systems, all based on technology. This study will examine the research gap in the strategic planning and development of the smart city concept. Find out if there are any divergent hypotheses in the principles considered for strategic planning, it will seek ways by which such dichotomies can be resolved and also propose better, in-depth, and collaborative ways of planning a smart city. This study will review the available literature on smart cities, as well as the weaknesses of the strategic guidelines of the major smart city programs around the world. The quantitative and qualitative analyses of these programs will be examined to assess the degree of success of the smart city proposed. These analyses will offer critical insights into specific strategic principles that influence smart city development in Europe. There is a paucity of research into the strategic planning needed to make Lagos a smart city and this research study seeks to bridge that gap. This study will attempt to generate scientific knowledge that will help in planning a smart city in Lagos Nigeria.

Keywords: Concept, Development, Hypotheses, Planning, Smart-City, Strategy, Technology.

PREFACES

- Title Page
- Declaration
- Certification
- Dedication
- Acknowledgements

TABLE OF CONTENTS

Title Page	i
Declaration	ii
Certification	iii
Dedication	iv
Acknowledgements	v
List of Tables	vi
Abstract	vii

CHAPTER ONE: INTRODUCTION

1.1 Background of the study	1-4
1.2 Statement of Problem	4-5
1.3 Aim	5
1.4 Justification for the study	5-6
1.5 Objectives of the study	7
1.6 Research Questions	7
1.7 Scope of the study	7-8
1.8 Definitions of terms	8-10
1.9 References	11-12

CHAPTER TWO: LITERATURE REVIEW

2.1 Definition and description in the field of research	12-20
2.2 Historical Overview	20-23
2.3 Previous studies conducted in the field of research	24-28
2.4 Research gap	28-30
2.5 Theoretical framework in the field of research	30-32
2.6 Conceptual framework in the field of research	32-33
2.7 References	33-39

CHAPTER THREE: METHODOLOGY

3.1 Level of research	39-40
-----------------------	-------

3.2	Type of research	40
3.3	The research questions	40
3.4	Measurement	40-41
3.5	Measurements used	42
3.6	Establish validity and reliability	43
3.7	Research sample	43
3.8	Sample size	43-44
3.9	Sampling technique	44-45
3.10	Method of execution	45
3.11	Steps to improve survey response rate and limit bias	46
3.12	Measurement instruments to be used	46
3.13	Research experimental setup	46-47
3.14	Ethical constraints of research area	47
3.15	References	47-48

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1	Introduction	48-49
4.2	Data analysis and presentation	49
4.2.1	Background of the respondents	49

4.2.2	Demographics characteristics of respondents	50-55
4.2.3	Descriptive analysis of data and interpretation	55
4.2.4	Ability of the respondents to understand questionnaire	62
4.3	Discussion of findings	77-78

CHAPTER FIVE: CONCLUSION, RECOMMENDATIONS AND CONTRIBUTION TO KNOWLEDGE

5.1	Summary of findings	79
5.2	Conclusion and recommendations	80
5.3	Contribution to knowledge	81
5.4	References	82-86

CHAPTER ONE

INTRODUCTION

1.1 Background of the study:

From the start of time, human development or civilization has continuously injured the earth's system, piecemeal destruction of the surroundings. Steffen et al (2011) termed it, the harmful actions of human society. As industries increase, the population also increases, which brings about the need to develop sustainable cities. A sustainable city is a city that's established or designed with the socio-economic and environmental impact prime of the agenda. A city whose natural resources won't be depleted by its initial habitats, however with consideration for future generations.

Caragliu, Del Bo, and Nijkamp (2011) outline smart cities as cities where investments in human and social capital, ancient and modern communication infrastructure propel property economic process and prime quality of life via wise management of natural resources through democratic government.

The apotheosis of smart cities is sustainability, that entails citizen or people engagement, careful resource management, and renewable energy potency.

These aspects of sustainability should be properly aligned and strategically placed in an orderly, efficient, and deliverable method so that the smart city concept can be developed. Given the current method of the smart city concept of Lagos,

it's unclear whether or not it holds the mandatory characteristics to make sure that sustainable development will occur within the state.

Smart cities are extremely advanced, multifarious however mutualist structures that are engineered from large, interconnected systems. To achieve a smart city, one needs an approach that works well in complexness. A strategically sustainable development approach, one that ensures the participation of all interconnected partnerships.

"Strategic sustainable development approach will be outlined as a coordinated, democratic and reiterative method of thoughts and actions to attain economically sustainable and environmentally friendly city". (UNDESA, 2008)

"A smart city where social activities are done in a balanced and integrative manner. Integrated economic, social and environmental policy and actions across sectors, territories. This concerns broad participation and effective partnerships to develop the mandatory capability and specialize in outcomes and means that of implementation". (UNDESA, 2008)

A smart town is a geographic region that has comprehensive development within the following areas - institutional, physical, social, and economic infrastructure. The long-run development of such cities will be done incrementally, adding on layers of 'smartness'. Initiatives to revamp cities in order to make them smarter and sustainable are increasing worldwide. A wise town (otherwise referred to as a smart city will be understood as a community within which voters, business companies, data establishments, and municipal agencies collaborate to attain systems integration and potency, subject engagement, and a frequently up quality of life. Snow et al, (2016)

Lagos, Federal Republic of Nigeria may be a town that's lacking within the crucial infrastructure required to sustain its growing population. The methods

which will be developed during this study will facilitate certain components, if not the total town a smarter place.

1.2 Statement of Problem:

There is no broad-based, panoptic strategic planning within the organic process conception of Lagos as a wise town. The productive development of a wise town is thanks to flawless planning. Strategic planning is vital to the event of a wise town as a result of it providing direction and measurable goals.

There is a scarcity of strategic planning within the proposal to maneuver urban center from a megacity to a wise town. What's presently in progress is broadband enlargement, fiber optic cable parturition by mobile network suppliers, and this cannot substitute planning – that entails specific, measurable cooperative goals to be done by all the stakeholders concerned within the development of the wise town. The wise town conception should develop an operating strategy for urban centers like Lagos. To be smart, the town needs to become consistently advanced through

interconnected frameworks, and judiciously utilize the Information and Communication Technology [ICT] to satisfy the wants of its citizens.

This study will examine the analysis gap within the strategic planning wise town concept. Verify if there are any divergent hypotheses within the principles thought-about for strategic planning. It'll look for ways in which such dichotomies will be resolved and propose better, in-depth, and cooperative ways of designing a wise town. This analysis study will analyze all in progress and proposed smart cities within the world, value their strategic plans and implementation.

1.3 Aim;

This study seeks to analyze the strategic planning techniques necessary within the development of a smart city (wise town) concept.

1.4 Justification for the study:

Lagos state needs a strategic plan encompassing all aspects of development that is needed to turn it into a smart city from a megacity. According to its governor, Lagos state wants to become a full-fledged smart city by

2030. (Owolabi, 2021). There is a paucity of research into the strategic planning needed to make Lagos a smart city. This research study seeks to bridge that gap.

There is a need to analyse the smart city concept developmental templates used in other parts of the world. The findings from such data will help determine specific planning strategies to adopt to migrate Lagos from a megacity to a smart city.

This study will examine the researches done on the development of smart cities. It will review some of the theories that have been proposed and the hypothesis made. This study will seek to bridge the research gap in the strategic planning needed for the development of the smart city concept. This study analyses the factors that affect the development of a smart city, the challenges, and technological advancement that will help aid the planning of a smart city.

The importance of this study is to develop theories on strategic planning in the development of a smart city using Lagos as a case study. This research will make conclusions and recommendations on how to effectively migrate Lagos from a megacity to a smart city.

1.5 Objectives of the study;

- To identify the planning techniques that are necessary for the development of a smart city.
- To examine the planning techniques already identified.
- To analyse the strategies used in the development of a smart city.
- To evaluate the current level of smart city development of Lagos and what is needed to complete it.

1.6 Research Questions.

- What are the planning techniques needed for the development of a smart city?
- How effective are the planning techniques identified?
- What are the developmental strategies necessary for a smart city?
- How smart is Lagos city presently and what is needed to be done?

1.7 Scope of the study:

The scope of this study is limited to the principles that determine the concept of a smart city. The philosophy, the assumptions, the theory that shape, govern, regulate, and influence the developmental concept of a smart city.

The study will add to the body of research on Strategic Planning in the Development of a Smart City. It will propose hypotheses based on existing theories of strategic planning. This study will analyse the planning of

a smart city from the perspective of an architect. It will contribute to new knowledge in the realm of planning of cities and help formulate a working template for the planning of a smart city.

Below are the possible limitations to this study:

Possible Methodological Limitations

- Sample size – there is a limited number of proposed smart cities available locally in my state and nation. This will affect generating some sample size locally.
- Lack of a limited number of available data locally – a limited number of data available locally, however, this suggests the need for more research in this field.

Possible Limitations of the Researcher

- Access -- having access to people, organizations, or documents physically at this time is a problem. This study will rely on online data and access.

1.8 Definition of Terms.

i. Smart City.

"The smart city is an umbrella concept, consists of several sub-themes such as smart urbanism, smart technology, smart economy, smart environment, smart energy, smart mobility, smart health, etc." (Trindade et al, 2017)

ii. Strategy.

"Strategy is the blueprint of decisions in an organization that shows its objectives and goals, reduces the key policies, and plans for achieving these goals. It defines the business a company is to carry on, the type of economic and human organization it wants to be, and the contribution it plans to make to its shareholders, customers, and society". (Prachi, 2015

iii. Planning.

"Planning is a pre-decided course of action, which will be taken in future. Planning is looking forward, anticipating the future and deciding the appropriate course of action to take". (Riya, 2016)

iv. Development.

"Development is a process that creates growth, progress, positive change or the addition of physical, economic, environmental, social and demographic components. The word development originated from the French word "developer" which means unfold or unwrap". (Tripathy, 2020)

v. Concept.

A concept is a theoretical plan, intention, thought, or idea. It connotes when an intention is conceived in the mind and deliberated upon for physical delivery.

1.9 References

Andrea Caragliu, Chiara Del Bo & Peter Nijkamp (2011) Smart Cities in Europe, Journal of

Urban Technology, 18:2, 65-82, DOI: 10.1080/10630732.2011.601117

Owolabi, O. (2021). How Lagos Will Become Smart City in 2030 by Sanwo-

Olu. The Nation Newspaper. Available at: [https://thenationonline.net/how-](https://thenationonline.net/how-lagos-will-become-smartcity-in-2030-by-sanwo-olu/)

[lagos-will-become-smartcity-in-2030-by-sanwo-olu/](https://thenationonline.net/how-lagos-will-become-smartcity-in-2030-by-sanwo-olu/) [Accessed 21 February 2021]

Prachi, J (2015) Strategy – Definition and Features. Management Study Guide.

Available at <https://www.managementstudyguide.com/strategy-definition.htm> [

Accessed 28 January

2021]

Riya, K. (2016) Planning Definition. Business Management Ideas. Available at

[https://www.businessmanagementideas.com/management/planningmanagement/planning-](https://www.businessmanagementideas.com/management/planningmanagement/planning-definition/20529)

[g-definition/20529](https://www.businessmanagementideas.com/management/planningmanagement/planning-definition/20529) [Accessed 28 January 2021]

Snow, Charles & Håkonsson, Dorthe & Obel, Borge. (2016). A Smart City Is a Collaborative

Community: Lessons from Smart Aarhus. California Management Review. 59.

92-108.

10.1177/0008125616683954.

Trindade, E.P., Hinnig, M.P.F., da Costa, E.M. Sustainable development of smart cities: a systematic review of the literature. *J. open innov.* 3, 11 (2017).

<https://doi.org/10.1186/s40852-017-0063-2>

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition and Description in the field of research

Smart cities are the desired goal for future planned urban development. There are several definitions or concepts of what a smart city should look like. Some professionals believe a smart city is that which should adopt specific, measurable, and sustainable development strategies to foster innovative advancements in infrastructure and technology, whilst also increasing energy efficiency. This will ensure that all local provinces cities can influence the challenges of sustainability. Several challenges will be surmounted when birthing a smart city. The implementation of a smart city is carried out by all forms of government. Bulkeley and Betsill (2005) argue for long-term approaches that center on sustainability, to ensure that cities can better anticipate and cope with rapidly changing conditions.

Unlike metropolisation, Rożałowska, B. (2020), stated that the smart city concept is rarely considered in a wider context, regional or national. One can notice, though, that the cities that have implemented development strategies using ICT more often become a model to be followed, as they influence the preferred development directions in urbanised areas.

Cowley, Joss, and Dayot (2018), as quoted in Rożałowska, (2020) wrote that a Smart city may be a minor town, as in the case of Milton Keynes, England, that competes for the position of the smartest city with other places leading the way in the United Kingdom. "Cities can be seen as motors used to move towards sustainable development, and the management of these complex

systems requires innovative and sophisticated planning tools and concepts". (Rotmans, Asselt, and Vellinga 2000). Rather than being independent of one another, Nam and Pardo (2012) state that the existing planning tools and concepts are mutually connected and overlap with each other. This can result in vast confusion in terms of definitions, which in turn complicates the application and usage of such tools and concepts.

Schatz (2007) identifies the three types of developments within our increasingly urbanized habitats as being the digital city, the intelligent city, and the smart city. Murray, Minevich, and Abdoullaev (2011) identify three solutions for cities moving towards sustainability: knowledge cities, which focus heavily on education, lifelong learning, and personal growth; digital cities or cyber-cities, driven primarily by investments from large information and communications technology vendors aiming to enable vast interconnectedness; and eco-cities, which focus on environmental sustainability through the widespread adoption of renewable resources. Murray, Minevich, and Abdoullaev further state that a holistic and systemic integration of these three city types results in a new urban planning approach, namely, the smart city. Batagan (2011) states that this systemic approach can address the sustainability challenges in the urban context.

Smart City

It is estimated that more than 100 smart city definitions – (International Telecommunication Union, (2014)), or it might be said that they are not

the standard definition of a smart city (Economic and Social Council, United Nations, (2016). The definition of a smart city may be linked to many issues, such as technology, economy, society, environment, governance, etc. (Yigitcanlar, T., et al., 2017). However, Smart Cities Council (Ekachai Sumalee, 2015) defined that smart city is a city that uses information technology to help improve quality of life, to operate and coordinate urban services, to save costs and reduce resource consumption, and to help connect relations between citizens and the public sector. For Thailand, the National Smart City Committee of Thailand has defined that "Smart City" is a city that takes advantage of modern technology and innovation to increase the efficiency of the city service and management, reduces the cost and resource usage of the target city, and citizen. It focuses on good design and participation of business and public sectors in urban development, under the concept of modern and liveable city development, for people in the city to have a good quality of life and sustainable happiness.

The hypothesis of a smart city is difficult to define. "While the description of a smart city is often context-dependent, it is commonly understood that a city is not smart when:

- (1) There is too much of everything in it; exemplified by an excess of vehicles, food, water, and energy consumption.
- (2) the various networks within a city are unable to communicate and function as a whole system.
- (3) the networks within a city are static and inflexible.
- (4) the stakeholders within a city are not involved at all levels of decision-making and planning processes that develop and evolve a city towards its vision” (Copenhagen Cleantech Cluster 2012). However, identifying an operational definition for the scope of this thesis requires a closer examination of context-specific definitions.

The conceptual components of a smart city can be divided into three categories: technology, people, and institution. (Colldahl et al, 2013). A city can therefore be considered smart when investments in these specific areas of development lead to sustainable growth and enhanced quality of life (Dawes and Pardo, 2002). According to Toppeta (2010), a smart city strives to combine Information and Communication Technologies (ICT) and Web 2.0 technology with other urban planning methods to find innovative, intelligent, and efficient solutions, contributing to increased sustainability and livability for its citizens.

However, it is important to recognize that the concept of smart cities is not just limited to technological advancements, but rather aims to promote socio-economic development (Nam and Pardo 2011). Social inclusion is a key characteristic of smart cities (Allwinke and Cruickshank 2011), and any opportunities for economic development need to be coupled with investments in social capital (Scott 2010).

Smart cities can be summarized as being places that are forward-thinking in the areas of people, living, economy, governance, environment, and mobility (Giffinger et al, 2007). For this thesis, we have therefore selected the definition put forth by Caragliu, Del Bo, and Nijkamp (2011, 6) which states that a city is smart "when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance".

"Smart City provides its users with a liveable, affordable, climate-friendly and engaging environment that supports the needs and interests of its users and is based on a sustainable economy" Neilsen, Ben Amer, and Halsnæs, (2013).

(Giffinger et al, 2007) classified smart cities. A smart city was categorized into six (6) distinct characteristics. The model evaluates cities in the areas of the economy, people, governance, mobility, environment, and living. Through this model, a city can examine its current state, and in turn identify the areas that require further development to meet the necessary conditions of a smart city (Giffinger et al, 2007). Cities can use this model to individually create goals based on their unique circumstances by following the vision outlined by the six characteristics (Giffinger et al, 2007; Steinert et al, 2011).

Economy refers to a city's overall competitiveness, based on its innovative approach to business, research and development (R&D) expenditures, entrepreneurship opportunities, productivity and flexibility of the labor markets, and the economical role of the city in the national and international market.

People means delivering a high and consistent level of education to the citizens, and also describes the quality of social interactions, cultural awareness, open-mindedness, and the level of participation that citizens hold in their interactions with public life.

Governance more specifically addresses participation at a municipal level. The governance system is transparent and allows for citizens to partake in decision-making. ICT infrastructure makes it easy for citizens to access information and data concerning the management of their city. By creating a more efficient and interconnected governance system, barriers related to communication and collaboration can be eliminated.

Mobility advocates more efficient transportation systems (e.g. non-motorized options) and promotes new social attitudes towards vehicle usage, ensuring that citizens have access to local and public transportation and that ICT again is integrated to increase efficiency. Smart cities seek to increase how efficiently people, goods, and vehicles are transported in an urban environment.

Environment emphasizes the need for responsible resource management and sustainable urban planning. Through pollution and emission reductions, and efforts towards environmental protection, the natural beauty of the city can be enhanced. Smart cities promote the reduction of energy consumption and the integration of new technological innovations that result in efficiency gains.

Living seeks to enhance the quality of life of citizens and does so by providing healthy and safe living conditions. Citizens in smart cities have easy access to health care services, electronic health management, and diverse social services.

2.2 Historical Overview

"The journey to smart cities goes way back to the 1970s when Los Angeles created the first urban big data project: "A Cluster Analysis of Los Angeles". The first smart city was arguably Amsterdam with the creation of a virtual digital city in 1994. Things then speeded up in the mid-2000s when IBM and Cisco launched separate initiatives. In 2011, the inaugural Smart City Expo World Congress was held in Barcelona, which has now become an annual event charting smart cities' development." (Internet of Things, 2020)

Listed below are the major milestones in the smart cities history as identified by Globaldata:

1974 – Los Angeles created the first urban big data project: "A Cluster Analysis of Los Angeles" report.

1994 – Amsterdam created a virtual ‘digital city’ – De Digital Stad (DDS)

– to promote Internet usage.

2005 – Cisco put up \$25m over five years for research into smart cities.

2008 – IBM Smarter Planet project investigated applying sensors, networks, and analytics to urban issues.

2009 – IBM unveiled a \$50m Smarter Cities campaign to help cities run more efficiently.

2009 – American Recovery and Reinvestment Act (ARRA) provided funding for US smart

grid projects.

2009 – EU Electricity Directive required EU states to roll out smart meters to 80% of consumers by 2020.

2010 – Japanese government named Yokohama as a smart city demonstrator project.

2011 – IBM named 24 cities as Smarter Cities winners from 200 applicants.

2011 – 6000 visitors from over 50 countries attended the first Smart City

Expo World Congress in Barcelona.

- 2012 – Barcelona deployed data-driven urban systems, including public transit, parking, and street lighting.
- 2013 – China announced the first batch of pilot smart cities, comprising 90 cities, districts, and towns.
- 2013 – Mayor of London created Smart London Board to shape London's digital technology strategy.
- 2014 – China launched the second batch of 103 pilot smart cities.
- 2014 – Vienna City Council launched Smart City Wien Framework Strategy until 2025.
- 2015 – China announced the third batch of 84 smart cities, comprising 277 in all.
- 2015 – India's Prime Minister Narendra Modi launched the "Smart Cities Mission" for 100 Indian cities.
- 2016 – Columbus won the US Dept. of Transportation's \$50m Smart Cities Challenge.
- 2017 – UK government launched 5G testbeds and trials program.
- 2017 – Hong Kong launched a smart city blueprint.

2018 – Toronto and Google offshoot Sidewalk Labs announced a plan to develop a smart waterfront area.

2018 – London updated 2013 plans with the launch of the 'Smarter London Together' roadmap.

2018 – IESE Business School Cities in Motion Index ranked New York, London, and Paris

as its top 3 cities.

2018 – Singapore won the Smart City of 2018 award at the Smart City Expo World Congress.

2019 – Ford supporting to support Cellular Vehicle to Everything (C-V2X) standard.

2019 – Sidewalk Labs' Toronto planning document fiercely criticized over data privacy implications.

2019 – G20 nations picked World Economic Forum as secretariat for a G20 Global Smart Cities Alliance.

2019 – US Federal Communications Commission picked New York and Salt Lake City as 5G testbeds.

2020 – Vietnam to start work on new \$4.2bn smart cities close to Hanoi, with a completion target of 2028.

2.3 Previous studies conducted in the field of research.

There are numerous research publications into strategic planning in the development of the smart city. The world is anxious for sustainable cities, as the resources of the earth may be depleted soon if we continue to harness it the way we do now.

Prachi, (2015) traced the etymology of strategy - the word "strategy" is derived from the Greek word "stratēgos"; stratus (meaning army) and "ago" (meaning leading/moving). A strategy is all about integrating organizational activities and utilizing and allocating the scarce resources within the organizational environment to meet the present objectives. While planning a strategy it is essential to consider that decisions are not taken in a vacuum and that any action taken by a firm is likely to be met by a reaction from those affected, competitors, customers, employees, or suppliers.

“A strategy is a theory of success”. (Meiser, 2020). Strategy is an action that managers take to attain one or more of the organization's goals. Strategy generally involves setting goals and priorities, determining actions to achieve the goals, and mobilizing resources to execute the actions. A

strategy describes how the ends (goals) will be achieved by the means (resources). It is the general direction set for the company and its various components to achieve a desired state in the future. Strategy results from the detailed strategic planning process. It involves activities such as strategic planning and strategic thinking.

Prachi (2015) compiled the definition of strategy according to management experts; "Planning is deciding in advance what is to be done. When a manager plans, he projects a course of action for the future, attempting to achieve a consistent, coordinated structure of operations aimed at the desired results." – Theo Haimann. "Planning is selecting information and making assumptions regarding the future to formulated activities necessary to achieve organizational objectives." – Terry and Franklin. "The plan of action is, at the same time the result envisaged, the line of action to be followed the stages to go through, and the methods to use." – Henri Fayol. "Planning is fundamentally a mental predisposition to do things in an orderly way, to think before and to act in the light of the fact rather than of guesses." – L. F. Urwick. "Planning is a process whereby managers select goals choose actions to attain those goals, allocate responsibility for implementing actions to specific individuals or units, measure the success

of actions by comparing actual results against the goals, and revised plans accordingly." – Charles WL Hill Steven Meshane.

Koontz and O' Donnell, as quoted by Prachi 2015, define planning as "deciding in advance what to do, how to do it, where to do it and who is to do it. Planning bridges the gap from where we want to go. It makes possible for things to occur while would not otherwise happen". Planning means looking ahead and chalking out future courses of action to be followed. It is a preparatory step. It is a systematic activity that determines when, how, and who is going to perform a specific job. Planning is a detailed program regarding future courses of action.

Through the years, professionals and various researchers developed several definitions and emphases for the term "development." Amartya Sen, for example, developed the "capability approach," which defined development as a tool enabling people to reach the highest level of their ability, through granting freedom of action, i.e., freedom of economic, social, and family actions, etc. This approach became a basis for the measurement of development by the HDI (Human Development Index), which was developed by the UN Development Program (UNDP) in 1990. Martha Nussbaum developed the abilities

approach in the field of gender and emphasized the empowerment of women as a development tool.

There are many thoughts about development. One school of thought expresses that it is a stage or condition and the other says that it is a process. According to Todaro development is not purely an economic phenomenon but rather a multi-dimensional process involving reorganization and reorientation of an entire economic and social system. Where Mabogunje considers it as a pure economic growth and describes as too often commodity output as opposed to people is emphasized-measures of growth in GNP.

“To understand and communicate information about objects and events, there must be a common ground on which to do it. Concepts serve this purpose. A concept is a generally accepted collection of meanings or characteristics associated with certain events, objects, conditions, situations, and behaviours. Classifying and categorizing objects or events that have common characteristics beyond any single observation creates concepts. We abstract such meanings from our experiences and use words as labels to designate them. For example, we see a man passing and identify that he is running, walking, skipping, crawling, or hopping. These movements all represent concepts. We also have abstracted certain visual elements by

which we identify that the moving object is an adult male, rather than an adult female or a truck or a horse. We design hypotheses using concepts. We devise measurement concepts by which to test these hypothetical statements. We gather data using these measurement concepts. The success of research hinges on (1) how we conceptualize and (2) how well others understand the concepts we use. For example, when we survey people on the question of customer loyalty, the questions we use need to tap faithfully the attitudes of the participants. Attitudes are abstract, yet we must attempt to measure them using carefully selected concepts. The challenge is to develop concepts that others will clearly understand. We might, for example, ask participants for an estimate of their family's total income. This may seem to be a simple, unambiguous concept, but we will receive varying and confusing answers unless we restrict or narrow the concept specifically". (Leggett, 2011)

2.4 Research gap.

From the literature reviewed, research into strategic planning in the development of the smart city has been conducted. However, there is limited research into how these strategies can be domesticated in Lagos, Nigeria. This study will cover this research gap.

There are research studies into how mobility in Lagos can be improved and made smart. However, there are no broad-based researches into planning strategies that will incorporate these sparse academic discourses into a comprehensive, workable strategy to migrate Lagos from a megacity to a smart city.

"Mobility is one of the primary concerns for cities striving to become smarter and more sustainable; one of the hindrances to mobility is road traffic congestion. Lagos has a serious mobility issue that is estimated to be draining 40% of the income of commuters". (Richard, 2010). Mobility is crucial to the functionality of cities as it affects their socio-economic activities. (Aworemi, Abdul-Azeez, and Olaogun, 2009; Raji & Waziri, 2008). Lagos's city population is growing exponentially, aggravating urban challenges like congestion and pollution issues. The demand for transport especially in cities of developing countries has been on the increase following the rapid socio-economic growth and development of these countries. For instance, the rate of motor ownership and use is growing faster than the population in many places, with the vehicle ownership growth rate rising from 15 to 20 percent per year. (Odeleye, 2008)

Mobility is a primary concern for cities striving to become smarter and more sustainable. (Master, 2019); the World Bank (1999) stated that it constitutes about 54.5% of all noticeable urban transport externalities. This is as a result of the ever-increasing urbanization, human activities, and the resultant heavy dependence on road transportation that warrants an increase in the number of vehicles of different categories on the road. (Olagunju, 2015). City authorities worldwide are in search of every sustainable means to fend off congestion and increase the mobility of people. (Omoruyi and Okokpujie, 2018). Nigeria is a country at the forefront of urbanization with over 200 million people expected to live and work in the cities in the next 40 years, more than tripling the size of the current urban population. Only China and India surpass this rapid rate of urbanization and this presents a serious challenge for the country's transport system. (Aliyu and Lawal, 2017).

2.5 Theoretical framework in the field of research.

The following are the key concepts in the theoretical framework in the field of research into the strategic planning in the development of a smart city:

Smart city planning hypothesis

- [a] Impact of the smart city on ecosystem
- [b] Ongoing smart city programs worldwide
- [c] Principles guiding smart city conceptualization.

The planning of a smart city must be holistic; all angles must be covered. Planning of smart city is a collaborative work as it encompasses many fields of

endeavour. Collaboration is important and strategic to the realization of a smart city. It has been established that collaboration reduces risk, saves cost both short and long term, increases access to timely and relevant information, opens new vistas to hidden technology, and developing the market.

The environmental benefits of a smart city are enormous. The impact of the smart city on the ecosystem is positive. Smart-city solutions such as air quality monitoring, energy use optimization, and electricity, water, and waste tracking can produce results such as 10-15% fewer GHG emissions, 30-130 fewer kilograms of solid waste per person per year, and 2580 litres of water saved per person per day.

There are many ongoing smart city programs worldwide. In 2013 China announced the first batch of pilot smart cities, comprising 90 cities, districts, and towns. In 2013 the Mayor of London created Smart London Board to shape London's digital technology strategy. In

2014 China launched the second batch of 103 pilot smart cities. Same year Vienna City Council also launched Smart City Wien Framework Strategy until 2025. In 2015 China announced the third batch of 84 smart cities, comprising 277 in all. And in 2015 India's

Prime Minister Narendra Modi launched the "Smart Cities Mission" for 100 Indian cities.

2.6 Conceptual framework in the field of research.

Researchers use the conceptual framework in the field of research to explain the

hypothesis being proposed. The story is built up gradually until the summary or conclusion of the research is reached.

The progression of the conceptual framework is in the following sequence:

- [a] Research problems
- [b] Hypothesis
- [c] Conceptual framework
- [d] Literature review
- [e] Collation of received data
- [f] Processing of relevant data and statistics
- [g] Analysis of received data

- [h] Conclusions are drawn based on data
- [i] Recommendations.

2.7 References

- Angelidou, M. (2014). *Strategic planning for the development of smart cities* (Ph.D. thesis). The Aristotle University of Thessaloniki.
- Allwinke, S. & Cruickshank, P. (2011). *Creating Smarter Cities: An Overview*. Journal of Urban Technology 18 1-1
- Aliyu, A. and Lawal, A. (2017). Urbanization, Cities, and Health: The Challenges to Nigeria – A Review. Annals of African Medicine.
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5676403/>
- Batagan, L. (2011) *Smart Cities and Sustainability Models*. Informatica Economica 18: 1. 80-87

- Bulkeley, H. and Michele, B. (2005). *Rethinking Sustainable Cities: Multilevel governance and the ‘urban’ politics of climate change*. Environmental Politics 14: 42-63.
- Copenhagen Cleantech Cluster. (2012). *Danish Smart Cities: Sustainable Living in an Urban World*. Copenhagen Cleantech Cluster. 2-41.
- Colldahl, C., Frey, S. & Kelemen, J.E. (2013). *Smart Cities: Strategic Sustainable Development for an Urban World*. (MSc thesis). Blekinge Institute of Technology, Sweden.
- Economic and Social Council, United Nation. (2016). *Smart cities and infrastructure*. Report of the Secretary-General, Commission on Science and Technology for Development Nineteenth session.
Available at https://unctad.org/system/files/official-document/ecn162016d2_en.pdf [Accessed 28 January 2021]
- Ekachai, S. (2015). *Smart City: The Development and Deploy IT System to Urban Management*. Bangkok: King Prajadhipok's Institute. [In Thai]
- Giffinger, R., Fertner, C., Kramar, H., Kalasek, R., Pichler-Milanovic, N., and Meijers, E. (2007). *Smart Cities: Ranking of European Medium-Sized Cities*. Vienna, Austria:
Center of Regional Science (SRF). Vienna University of

Technology.http://www.smart-cities.eu/download/smart_cities_final_report.pdf
[Accessed 28 January 2021]

International Telecommunication Union. (2014). *Smart sustainable cities: An analysis of definitions*. Focus Group Technical Report, Available at <http://www.itu.int/en/ITU/focusgroups/ssc/Pages/default.aspx>. [Accessed 28 January 2021]

Leppink, J. (2017). *Revisiting the quantitative–qualitative-mixed methods labels: Research questions, developments, and the need for replication*. Journal of Taibah University Medical Sciences, Volume 12, Issue 2, Pages 97-101, ISSN 1658-3612,
<https://doi.org/10.1016/j.jtumed.2016.11.008>.

(<https://www.sciencedirect.com/science/article/pii/S1658361216301482>)

Murray, A., Minevich, M., & Azamat, A. (2011) *Being Smart and Smart Cities*. The Future of Future October 2011: 20-23.

Meiser, J. (2020). *Want Better Strategists? Start with a Better Definition of Strategy*.

RealClearDefense. Available at https://www.academia.edu/43964729/Want_Better_Strategists_Start_With_a_Better_Definition_of_Strategy [Accessed 28 January 2021]

Mora, L., Deakin, M., & Reid, A. (2018). *Strategic Principles for Smart City Development*:

A Multiple Case Study Analysis of European Best Practices.

Technological Forecasting and Social Change. 142.

10.1016/j.techfore.2018.07.035.

Mistarihi, M. Z., & AlDeek, Z. A. O. (2020). *Towards a Modern Design of Undeveloped City Using a Spatial Modelling Analysis; a Case Study of Irbid City in Jordan*. International Journal of Sustainable Development and Planning. Available at

[https://www.academia.edu/44137477/Towards a Modern Design of Undeveloped City Using a Spatial Modelling Analysis a Case Study of Irbid City in](https://www.academia.edu/44137477/Towards_a_Modern_Design_of_Undeveloped_City_Using_a_Spatial_Modelling_Analysis_a_Case_Study_of_Irbid_City_in_Jordan)

[n](https://www.academia.edu/44137477/Towards_a_Modern_Design_of_Undeveloped_City_Using_a_Spatial_Modelling_Analysis_a_Case_Study_of_Irbid_City_in_Jordan)

[ed City Using a Spatial Modelling Analysis a Case Study of Irbid City i](https://www.academia.edu/44137477/Towards_a_Modern_Design_of_Undeveloped_City_Using_a_Spatial_Modelling_Analysis_a_Case_Study_of_Irbid_City_in_Jordan)

[n](https://www.academia.edu/44137477/Towards_a_Modern_Design_of_Undeveloped_City_Using_a_Spatial_Modelling_Analysis_a_Case_Study_of_Irbid_City_in_Jordan)

[Jordan](https://www.academia.edu/44137477/Towards_a_Modern_Design_of_Undeveloped_City_Using_a_Spatial_Modelling_Analysis_a_Case_Study_of_Irbid_City_in_Jordan) [Accessed 29 January 2021]

Nam, T., & Pardo, T. A. (2011). *Conceptualizing Smart City with Dimensions of Technology, People, and Institutions*. Proceedings of the 12th Annual International

Conference on Digital Government research. Available at

http://www.ctg.albany.edu/publications/journals/dgo_2011_smartcity.pdf [

Accessed 28 January 2021]

Owolabi, O. (2021). How Lagos Will Become Smart City in 2030 by Sanwo-Olu. The Nation Newspaper. Available at:

<https://thenationonlineng.net/how-lagos-will-become-smart-city-in-2030-by-sanwo-olu/> [Accessed 21 February 2021]

Prachi, J (2015) *Strategy – Definition and Features*. Management Study Guide. Available at <https://www.managementstudyguide.com/strategy-definition.htm> [Accessed 28 January 2021]

Richard, P. (2010). *Adoption of Singaporean Model in Achieving Smart Mobility in Nigeria: A case for Lagos State*. Academia. Available at: https://www.academia.edu/45088693/ADOPTION_OF_SINGAPOREAN_MODEL_IN_ACHIEVING_SMART_MOBILITY_IN_NIGERIA_A_CASE_FOR_LAGOS_STATE [Accessed 28 January 2021]

Riya, K. (2016) *Planning Definition*. Business Management Ideas. Available at <https://www.businessmanagementideas.com/management/planningmanagement/planning-definition/20529> [Accessed 28 January 2021]

Rożałowska, B. (2020). *The Functioning of Smart City in The Context of Global City Rankings*. Scientific Papers of Silesian University of Technology/Organization and Management Series. <https://doi.org/10.29119/1641-3466.2020.146.29>

Rotmans, J., Asselt, M., & Pier, V. (2000) *Assessment methodologies for Urban*

Infrastructure: An Integrated Planning Tool for Sustainable Cities.

Environmental Impact Assessment review 20: 265-276.

Snow, C., Håkansson, D., & Obel, B. (2016). *A Smart City Is a Collaborative Community: Lessons from Smart Aarhus.* California Management Review. 59. 92-108. 10.1177/0008125616683954.

Sasanapitak, A. (2020). *Smart City: The Role to Create Justice and The Promotion of*

Gender Equality. The 5th TICC International Conference 2020 in Multidisciplinary

Research Towards a Sustainable Society November 26th – 27th, 2020,

Khon Kaen,

Thailand.

Schatz, G, (2007) *Smart City: how much can we endure?* Available at

http://www.alpbachtechnologyforum.com/fileadmin/user_upload/Alpbach/2011/Arbeitskreise_7-12_SV/Abstract_Schatzx.pdf [Accessed 28 January 2021]

Scott, W. R. (2000) *Institutions and Organisations.* Thousand Oaks, CA: Sage Publications

Toppeta, D. (2010) *The Smart City Vision: How Innovation and ICT Can Build Smart*

“Livable”, Sustainable Cities. The Innovation Knowledge Foundation. Available

at

http://www.thinkinovation.org/file/research/23/en/Toppeta_Report_005_2010.pdf
_f [Accessed 27 January 2021]

Yingitcanlar, T., Sabatini-Marques, J., Costa, E. M., Kamruzzaman, M., & Ioppolo, G.
(2017). *Stimulation technological innovation through incentives: Perceptions of Australian and Brazilian firms.* *Technological Forecasting and Social Change*, 146, p. 403 – 412.

CHAPTER THREE

METHODOLOGY

3.1 Level of research.

Confirmatory Research is the level of this research study. In confirmatory research, which can also be called "Hypothesis Testing", the researcher has little understanding of the research topic and all the hypotheses relating to

it. The objective of confirmatory research is to confirm if the theory is supported by fact. The goal of confirmatory research is to discover relevant findings in the most efficient, reliable, replicable, applicable manner.

3.2 Type of research.

Confirmatory research is both quantitative and qualitative research. "Equating qualitativequantitative labelling with exploratory-confirmatory labelling facilitates the belief that qualitative research concerns hypothesis generation while quantitative research is about hypothesis testing". (Leppink, 2017).

3.3 The research questions.

- (1) What are the planning techniques needed for the development of a smart city?
- (2) How effective are the planning techniques identified?
- (3) What are the developmental strategies necessary for a smart city?
- (4) How smart is Lagos city presently and what is needed to be done?

3.4 Measurement.

Quantitative research is based on the measurement and is conducted in a systematic, controlled

manner. These measures enable researchers to perform statistical tests, analyse differences between groups, and determine the effectiveness of treatments. If something is not measurable, it cannot be tested.

This study will measure the effectiveness of the strategies used in planning the development of a smart city. How changes in strategy impact the deliverables and time of delivery of specific measurable goals.

3.5 Measurements used.

For research objective (1) which is to – "To identify the planning techniques that are necessary for the development of a smart city", the measurement instrument to be used is – Literature review. Literature relevant to planning techniques on the development of a smart city will be read. It will be analysed and relevant information will be extracted from it.

For research objective (2) – "To examine the planning techniques already identified". To examine planning techniques, there is a considerable array of analytic techniques available for us. These include; cost-benefit analysis, participatory method, risk assessment method, environmental assessment method, and program evaluation. The measurement instrument to use to

objective (2) is program evaluation. Program evaluation is used to assess the value and impact of each project/program. It is the examination of the worth, merit, or impact of a particular project on particular demography.

For research objective (3) – "To analyse the strategies used in the development of a smart city". The measurement instrument that will be used are

[a] Literature review.

[b] observation.

Relevant literature on development and strategies for the smart city will be read. These smart cities will then be observed, via internet searches, YouTube videos, and other social media platforms, to see how effective the strategies are.

For research objective (4) which is – “To evaluate the current level of smart city development of Lagos and what is needed to complete it”, the measurement instruments that will be used are, [a] questionnaires to focus group,

[b] observations.

3.6 Establish validity and reliability.

Validity is the degree to which an instrument measures what it purports to measure.

Invalid instruments can lead to erroneous research conclusions, which in turn can influence educational decisions. Reliability is the internal consistency or stability of the measuring device over time.

This study will establish validity by determining if the scores recorded by an instrument are meaningful, significant, useful, and have a purpose. To determine if construct validity has been achieved, the scores will be assessed statistically and practically.

3.7 Research sample.

This research study will be focus-group-based. Samples will be carried out on policymakers, city planners, top government officials, architects, cost consultants, residents of Lagos, and financial planners. This set of people have a direct impact in formulating strategies that will be used in planning the development of a smart city.

3.8 Sample size

The sample size will be small; this is because a large number of people are not always involved in strategy sessions.

Slovin Formula will be used to determine the sample size.

Slovin formula = $N / (1 + Ne^2)$. where:

$$N = \frac{\text{total population}}{\left(1 + \frac{\text{error margin}^2}{\text{margin of error}^2}\right)}$$

For this test, we desire a degree of confidence of 95%. Total population of Lagos in 2021 = 14,862,000

Therefore, sample size = $14,862,000 / (1 + 14,862,000 * (0.05)^2)$

$$= 399.989 = 400$$

persons.

3.9 Sampling technique

This study will use a stratified sampling technique. This involves dividing the population into subpopulations that may differ in important ways. It allows drawing more precise conclusions by ensuring that every subgroup is properly represented in the sample. The population is divided into

subgroups (called strata) based on the relevant characteristic (e.g. gender, age range, income bracket, job role).

Based on the overall proportions of the population, now calculate how many people should be sampled from each subgroup. Then use random or systematic sampling to select a sample from each subgroup.

3.10 Method of Execution.

This research study will make use of online surveys, interviews, and questionnaires. It will avoid negations as they can lead to mistakes and can be difficult to understand. In the questionnaires, simple questions will be asked. Double-barrelled questions, that is two questions in one, will be avoided.

In the online surveys and interviews, this research study will seek to use multiple questions to affirm the conviction of the respondent. Asking simple direct questions multiple times in different ways will help paint a better picture of the opinion of the participants.

3.11 Steps to improve survey response rate and limit bias.

This research study will do the following to limit bias and improve survey response rates:

- [1] Ask neutrally worded questions
- [2] Make sure the answer options are not leading
- [3] Make the questionnaire or test as anonymous as possible.

3.12 Measurement instruments to be used.

This research study will use one type of data, continuous data. Continuous data is the type of data that can be divided and reduced to a finer level. Since this research study is about finding the right strategy for development, this type of measuring instrument is important.

3.13 Research experimental setup.

This research will develop two experimental setups for this study.

- [1] Questionnaires - This is a common and effective technique for collecting data from respondents. This study will create online links to questionnaires.

[b] Tests – Neutrally worded questions will be asked in these tests and because of the Covid-19 pandemic, the tests will be conducted via Zoom and WhatsApp video calls.

3.14 Ethical constraints of the research area.

The following are the ethical constraints of the research study

[1] Anonymity

[2] Confidentiality

[3] Informed consent

[4] Voluntary participation.

3.15 References

Book Review Creswell, J. W. (2014). Research Design: Qualitative, Quantitative and Mixed

Methods Approaches (4th ed.). Thousand Oaks, CA: Sage

Copstake, J. (2014). Credible impact evaluation in complex contexts: Confirmatory and exploratory approaches. *Evaluation*, 20(4), 412–427.

<https://doi.org/10.1177/1356389014550559>

Ishtiaq, M. (2019). Book Review Creswell, J. W. (2014). Research Design: Qualitative,

Quantitative and Mixed Methods Approaches (4th ed.). Thousand Oaks, CA: Sage.

Canadian Center of Science and Education. <https://doi.org/10.5539/elt.v12n5p40>

Kandel, B. (2020). Qualitative Versus Quantitative Research. Marsyangdi Journal, 1(1), 1–5.

Kılıç, A. (2016). The Language Teaching Methods Scale: Reliability and Validity Studies.

European Journal of Educational Research.

Wright, L. T. (2006). The Sage Handbook of Qualitative Research (3rd ed.)20062
The Sage

Handbook of Qualitative Research (3rd ed.). California, USA: Sage Publications Inc.

2005. xix + 1210 pp., ISBN: 0-7619-2757-3 (cloth) hardback Norman K.

Denzin and Yvonna S. Lincoln. European Journal of Marketing.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

4.1 INTRODUCTION

In this chapter, data collected are analyzed, the descriptive statistics of data used for the study. The research questions set out in chapter 1 are answered through the use of designed questionnaires. The data tables are used here to present the data. Data will be presented in Tables and analysed using frequencies and percentages, Spearman rank correlation, and regression analysis to examine the degree of the relationship existing between variables and to explain the data.

4.2 DATA ANALYSIS AND PRESENTATION

4.2.1 Background of the respondents

A total of 421 questionnaires were sent out via electronic means. 421 persons responded.

The characteristics of these respondents are summarized below in Table 4.1

Table 4.1: Response Rate of Respondents

Total Number of Questionnaire Administered	Number of Questionnaires Retrieved	Response Rate
421	421	100%

Source: Research Survey, 2021

4.2.2 Demographic Characteristics of the Respondents

This section provides demographic information of the respondents of the study.

The characteristics include; gender, age group, discipline, educational qualification, work experience, and respondents' work level in the organization.

Table 4.2: Demographic Characteristics of the Respondents

Descriptive Statistics			
	N	Mean	Std. Deviation
Age	421	2.4276	1.03859
Gender	421	1.399	0.50464
Educational Level	421	3.7933	0.99883
Discipline	421	2.5986	0.75775

Source: Author's Computation using SPSS

Age			
	Frequency	Percent	Cumulative Percent

0-20	97	23	23
21-30	121	28.7	51.8
31-40	133	31.6	83.4
41-50	66	15.7	99
51-65	4	1	100
Total	421	100	

Source: Author's Computation using SPSS

Gender				
	Frequency	Percent	Valid Percent	Cumulative Percent
Male	257	61.1	61.1	61.1
Female	164	38.9	38.8	100
Total	421	100	100	

Source: Author's Computation using SPSS

Educational Level			
	Frequency	Percent	Cumulative Percent
Primary School Certificate	4	1	1
Secondary School Certificate	37	8.8	9.7
H.N.D. or BSc	127	30.2	39.9
MSc	127	30.2	70.1
PhD	126	29.9	100
Total	421	100	

Source: Author's Computation using SPSS

Discipline			
	Frequency	Percent	Cumulative Percent
Engineering	29	6.9	6.9
Sciences	152	36.1	43
ICT	199	47.3	90.3
Business Administration	41	9.7	100

Total	421	100	
-------	-----	-----	--

Source: Author's Field Survey, 2021

Remark: Table 4.2 presents the demographic characteristics of the respondents.

Q1: Age of the respondents:

Table 4.2 shows that 23% of the respondents fall within the age bracket of 0-20.

28.7% of the respondents fall within the age bracket of 21-30.

31.6% of the respondents fall within the age bracket of 31-40.

15.7% of the respondents fall within the age bracket of 41-50

1% of the respondents fall within the age bracket of 51-65.

This analysis revealed that most of the respondents were within the age bracket of 31-40.

Q2: Respondents were asked to indicate their gender.

Table 4.2 revealed that that 61.1% of the respondents were male.

38.9% of the respondents were female.

This implies the gender diversity of the survey respondents.

Q3: Educational Qualification:

Table 4.2 shows that 1% of our respondents had primary school certificates.

8.8%) of our respondents had secondary school certificates

30.2%) of our respondents were HND/BSc holders,

30.2%) of our respondents were MSc holders.

29.9% of our respondents had Ph.D. certificates.

This shows that the respondents to our questionnaire are knowledgeable, academically accomplished people who understand the topic and questions being asked.

Q4: Discipline of the respondents:

Table 4.2 shows that 6.9% of our respondents are in the engineering sector.

36.1% of our respondents are into the Sciences.

47.3% of our respondents are into ICT

9.7% of our respondents are into business administration.

This shows that the majority of our respondents were into Information Technology and this enhances the validity of their responses.

Summary

Table 4.2 provided information on the biodata section of the questionnaire. It consisted of the respondent's gender, age group, educational qualification, and discipline. In summary, the analysis revealed that most of the respondents were within the age bracket of 31-40. There is gender diversity of the survey respondents. The respondents to our questionnaire are knowledgeable, academically accomplished people who understand the topic and questions being asked. The majority of our respondents were into Information Technology and this enhances the validity of their responses.

4.2.3 Descriptive Analysis of Data and Interpretation

This section presents data retrieved from the respondents on where they live in Lagos, if they live in Lagos at all, how long have they lived in Lagos and which part of Lagos are they working at. Below in table 4.3 are the descriptive tables showing the frequency and percentage distribution of the respondents and the interpretations.

Table 4.3.0 – Descriptive statistics.

Descriptive Statistics			
	N	Mean	Std. Deviation
Do you live in Lagos	421	1	0
How long have you lived in Lagos	421	3.4252	1.01523
Which part of Lagos do you live in	421	3.0404	1.1066
Which part of Lagos are you working	421	2.9572	0.89606

Source: Author's Computation using SPSS

Table 4.3.1 – Statistics.

Statistics				
	Do you live in Lagos?	How long have you lived in Lagos?	Which part of Lagos do you live in?	Which part of Lagos are you working in?
Valid	421	421	421	421
Missing	0	0	0	0

Source: Author’s Computation using SPSS

Remark: Table 4.3.1: presents the statistics of our respondents. All of them live in Lagos.

Table 4.3.2.

Do you live in Lagos.			
		Frequency	Percent
Valid	Yes	421	100

Source: Author’s Computation using SPSS

Remark: Table 4.3.2: presents the statistics of our respondents, all of them live in Lagos.

Table 4.3.3.

How long have you lived in Lagos			
	Frequency	Percent	Cumulative Percent
0-6 months	13	3.1	3.1
6-12 months	47	11.2	14.3
1-5 years	178	42.3	56.5
6-10 years	124	29.5	86
<20 years	49	11.6	97.6
>20 years	10	2.4	100
Total	421	100	

Source: Author's Computation using SPSS

Remark: Table 4.3.3: presents the statistics of how long our respondents have lived in Lagos. This will validate their observation reportage.

Of all our respondents, 3.1% have lived in Lagos state between 0 -6 months.

11.2% have lived
in Lagos state between 6 – 12 months.

42.3% have lived
in Lagos state between 1 – 5 years.

in Lagos state between 6 – 10 years. 29.5 % have lived

in Lagos state for more than 20years. 11.6% have lived

in Lagos state between 10 – 20 years. 2.4% have lived

This shows that the highest percentage of our respondents have lived in Lagos between 1 – 5 years.

Table 4.3.4

Which part of Lagos do you live in			
	Frequency	Percent	Cumulative Percent
Ikorodu Division	50	11.9	11.9
Ikeja Division	71	16.9	28.7
Badagry	140	33.3	62
Lagos (Eko) Division	132	31.4	93.3
Epe Division	28	6.7	100
Total	421	100	

Source: Author’s Computation using SPSS

Remark: Table 4.3.4: presents the statistics of the part (division) in Lagos where our respondents live.

Of our respondents, 11.9% live within Ikorodu Division.

Ikeja Division. 16.9% live within

33.3% live within Badagry Division

31.4% live within Lagos (Eko) Division.

6.7% live within Epe Division

This shows that a large number of our respondents live within Badagry Division.

Table 4.3.5

Which part of Lagos are you working			
	Frequency	Percent	Cumulative Percent
Ikorodu Division	28	6.7	6.7
Ikeja Division	83	19.7	26.4
Badagry Division	200	47.5	73.9
Lagos (Eko) Division	99	23.5	97.4
Epe Division	11	2.6	100
Total	421	100	

Source: Author's Computation using SPSS

Remark: Table 4.3.5: presents the statistics of the part (division) in Lagos where our respondents work.

Of our respondents, 6.7% live within Ikorodu Division.

19.7% live within Ikeja Division.

47.5% live within Badagry Division

23.5% live within Lagos (Eko) Division.

2.6% live within Epe Division

This shows that a large number of our respondents work within Badagry Division.

Summary

Based on the analysis it can be concluded that all of our respondents live in Lagos, most of whom have lived in Lagos within the past 1-5 years. All of our respondents work in Lagos with the largest percentage working and living within Badagry Division.

4.2.4 Ability of the respondents to understand the questionnaire.

This section provides statistics on the ability of the respondents to understand the questionnaire. It will analyse their age, academic qualifications, and understanding of particular questions.

Table 4.4.0 – Descriptive statistics.

Descriptive Statistics			
	N	Mean	Std. Deviation
Age	421	2.4276	1.03859
Educational Level?	421	3.7933	0.99883
Tick as appropriate?	421	3.5226	1.29747
What are the features of a smart city that you see around you?	421	3.5938	1.36412

Source: Author's Computation using SPSS

Table 4.4.1. – Statistics showing the number of respondents.

Statistics				
	Age	Educational Level	Tick as appropriate	What are the features of a smart city that you see around you?
Valid	421	421	421	421
Missing	0	0	0	0

Source: Author's Computation using SPSS

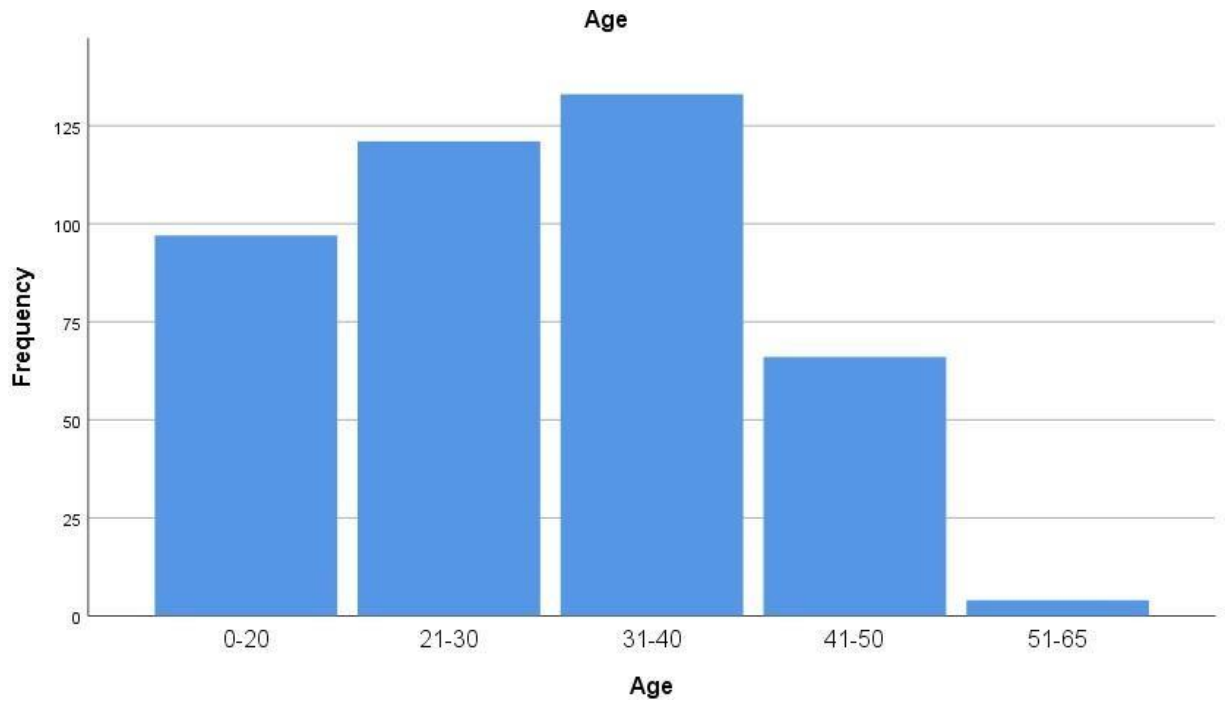
Remark: This statistic shows that all our respondents answered the particular questions that will be analyzed in this section.

Table 4.4.2. – Statistics showing the age of our respondents.

Age			
	Frequency	Percent	Cumulative Percent
0-20	97	23	23
21-30	121	28.7	51.8
31-40	133	31.6	83.4
41-50	66	15.7	99

51- 65	4	1	100
Total	421	100	

Source: Author's Computation using SPSS



Source: Author's Computation using SPSS

Remark: This statistic shows that all our respondents are adults. This means that they all have matured brain capacity to understand the questions and answer appropriately

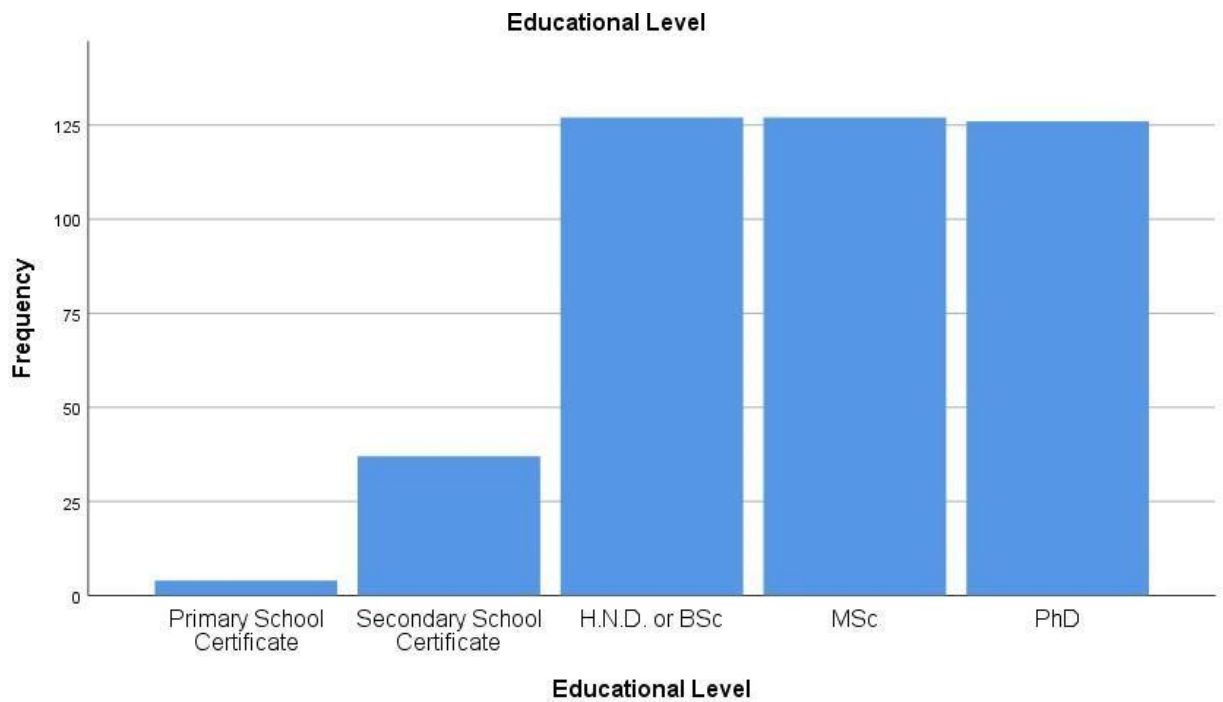
Table 4.4.3. – Statistics showing the educational qualifications of our respondents.

Educational Level			
	Frequency	Percent	Cumulative Percent
Primary School Certificate	4	1	1
Secondary School Certificate	37	8.8	9.7
H.N.D. or BSc	127	30.2	39.9
MSc	127	30.2	70.1
PhD	126	29.9	100
Total	421	100	

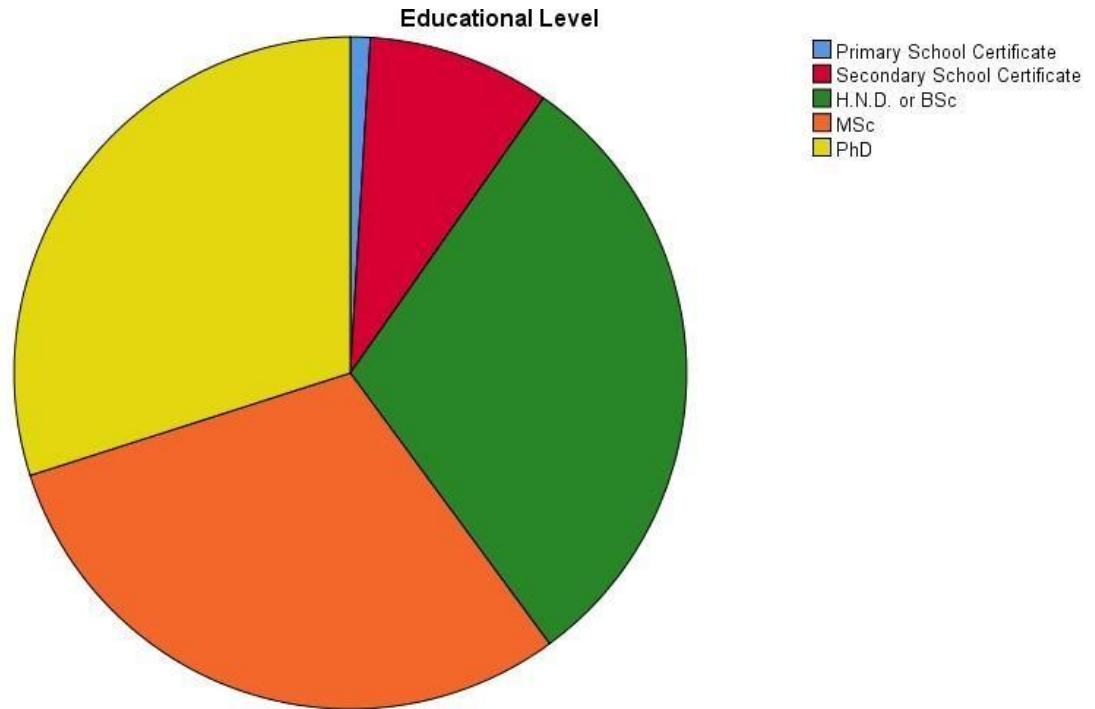
Educational Level

	Frequency	Percent	Cumulative Percent
Primary School Certificate	4	1	1
Secondary School Certificate	37	8.8	9.7
H.N.D. or BSc	127	30.2	39.9
MSc	127	30.2	70.1
PhD	126	29.9	100
Total	421	100	

Source: Author's Computation using SPSS



Source: Author's Computation using SPSS



Source: Author's Computation using SPSS

Remark: This statistic shows that all our respondents are educated. According to Eluozo (2018), "Today, almost 80% of Nigerians are WAEC and SSCE certificate holders, 70% are NCE and OND while about 65% are HND and first-degree graduates. 60% are master degree holders while about 45 to 55% are striving for Ph.D. certificates". Nigeria has a literacy rate of 75.029. (UNESCO, 2020). 87% of Lagos state residents are literate in English language. (Lagos State Literacy Survey, 2017).

Only 1% of our respondents have a primary school leaving certificate. 8.8% of our respondents have secondary school certificates. 30.2% have either

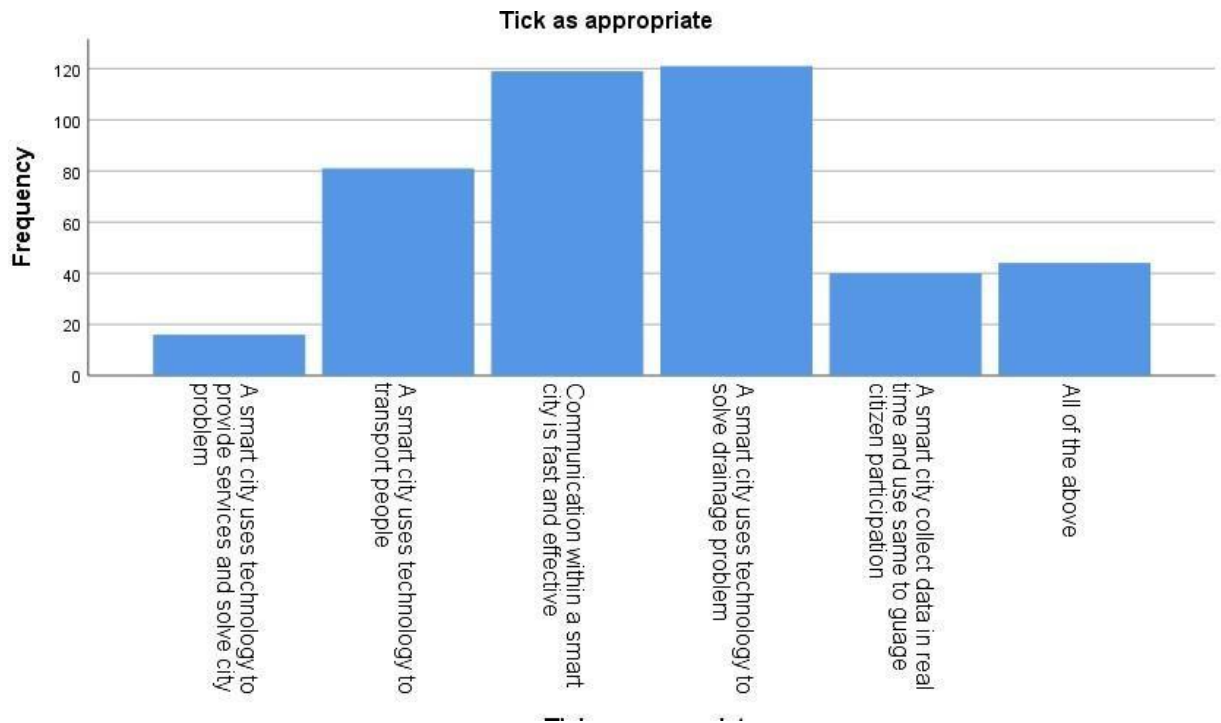
HND or BSc certificate. 30.2% of our respondents have MSc and 29.9% have Ph.D. certificates. This proves that all our respondents have the educational capacity to understand the questions, think logically and answer appropriately.

Table 4.4.4. – Statistics showing the multiple-choice questions given to our respondents.

Tick as appropriate			
	Frequency	Percent	Cumulative Percent
A smart city uses technology to provide services and solve city problems?	16	3.8	3.8
A smart city uses technology to transport people?	81	19.2	23
Communication within a smart city is fast and effective?	119	28.3	51.3
A smart city uses technology to solve drainage problems?	121	28.7	80

A smart city collects data in realtime and uses the same to gauge citizen participation?	40	9.5	89.5
All of the above.	44	10.5	100
Total	421	100	

Source: Author's Computation using SPSS



Source: Author's Computation using SPSS

Q1: A smart city uses technology to provide services and solve city problems.

This was the question posed to our respondents, 3.8% of them believe this statement is true.

Q2: A smart city uses technology to transport people.

This was the question posed to our respondents, 19.2% of them believe this statement is

true.

Q3: Communication within a smart city is fast and effective.

This was the question posed to our respondents, 28.3% of them believe this statement is

true.

Q4: A smart city uses technology to solve the drainage problem.

This was the question posed to our respondents, 28.7% of them believe this statement is

true.

Q5: A smart city collects data in real-time and uses the same to gauge citizen participation.

This was the question posed to our respondents, 9.5% of them believe this statement is true.

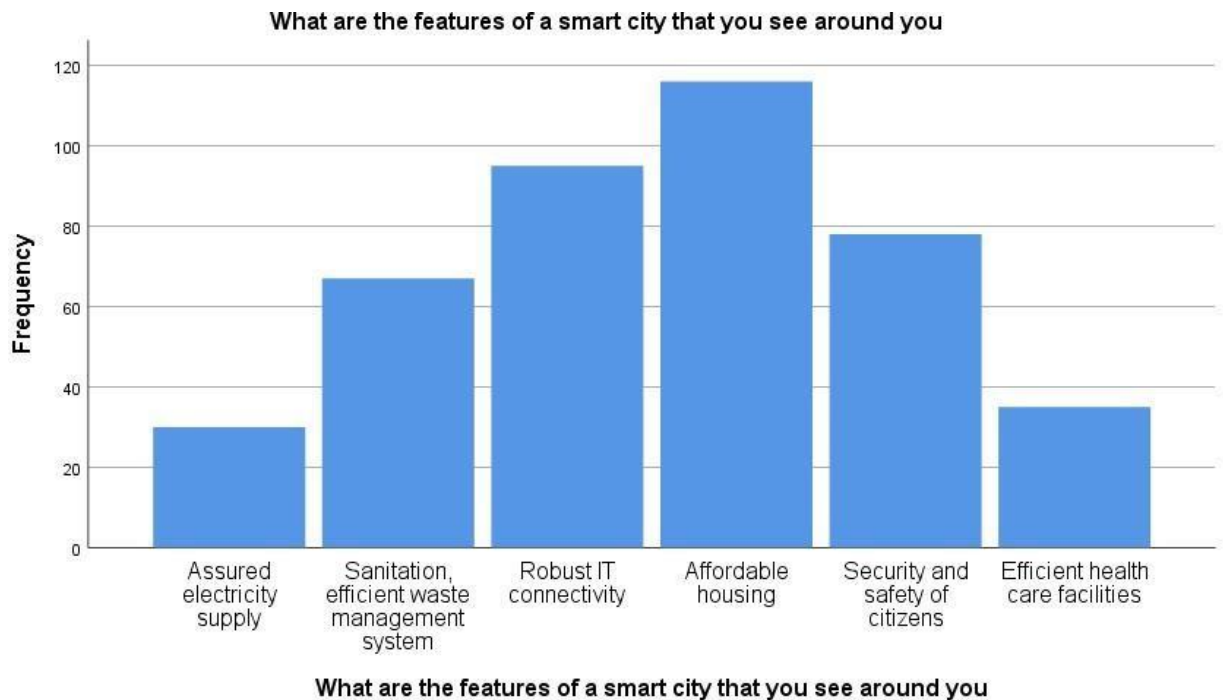
Remark: This statistic shows that all our respondents understand what Smart City means.

10.5% of them think that all of the questions appropriately describe what a smart city is.

Table 4.4.5. – Statistics showing our respondents' observation of the features of a smart city around them.

What are the features of a smart city that you see around you?			
	Frequency	Percent	Cumulative Percent
Assured electricity supply.	30	7.1	7.1
Sanitation, efficient waste management system.	67	15.9	23
Robust IT connectivity.	95	22.6	45.6
Affordable housing.	116	27.6	73.2
Security and safety of citizens.	78	18.5	91.7
Efficient health care facilities.	35	8.3	100
Total	421	100	

Source: Author's Computation using SPSS



Source: Author's Computation using SPSS

Q1: Assured electricity supply.

Of all our respondents, 7.1% of them agreed that within the part of Lagos they live and worked at, their electricity supply is assured.

Q2: Sanitation, efficient waste management system.

Of all our respondents, 15.9% of them agreed that within the part of Lagos they live and worked at, the waste management system is effective and efficient.

Q3: Robust IT connectivity.

Of all our respondents, 22.6% of them agreed that within the part of Lagos they live and worked at, there is robust IT connectivity.

Q4: Affordable housing.

Of all our respondents, 27.6% of them agreed that within the part of Lagos they live and worked at, housing is affordable.

Q5: Security and safety of citizens.

Of all our respondents, 18.5% of them agreed that within the part of Lagos they live and worked at, there is security, and all the citizens there are safe.

Q6: Efficient health care facilities.

Of all our respondents, 8.3% of them agreed that within the part of Lagos they live and worked at, there is an efficient health care facility.

Remark: This statistic shows the questions about the features of a smart city that we asked all our respondents. Smart cities are cities that work. (Government of India, 2020). To determine if our respondents know what a

smart city means and if the city they live in (Lagos) is smart, we asked them about the cities that worked.

Table 4.4.6. – Statistics showing our respondents' observation whether Lagos is a smart city or not and if it has the potential to be one.

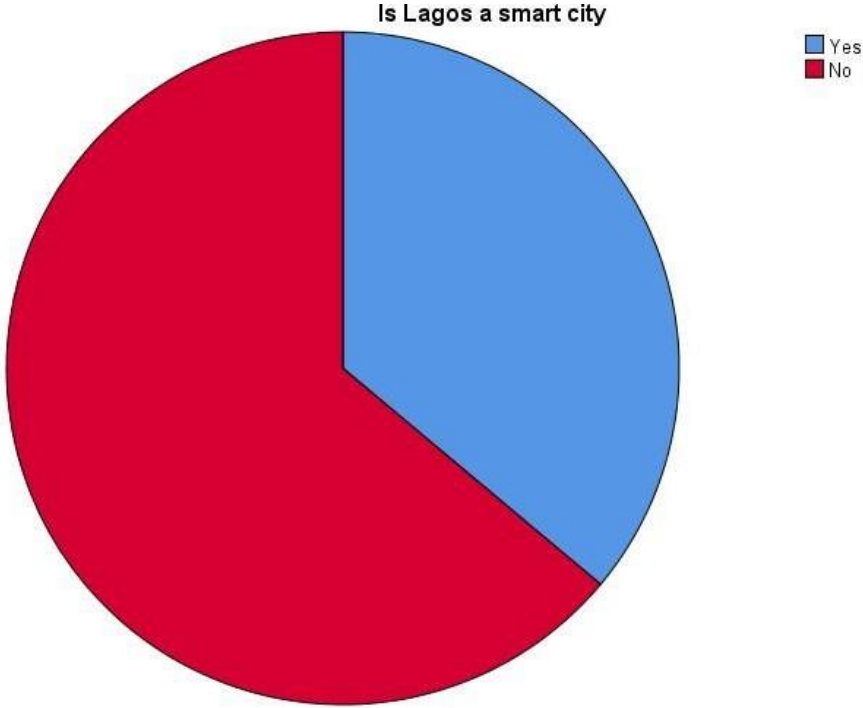
Is Lagos a smart city			
	Frequency	Percent	Cumulative Percent
Yes	152	36.1	36.1
No	269	63.9	100
Total	421	100	

Source: Author's Computation using SPSS

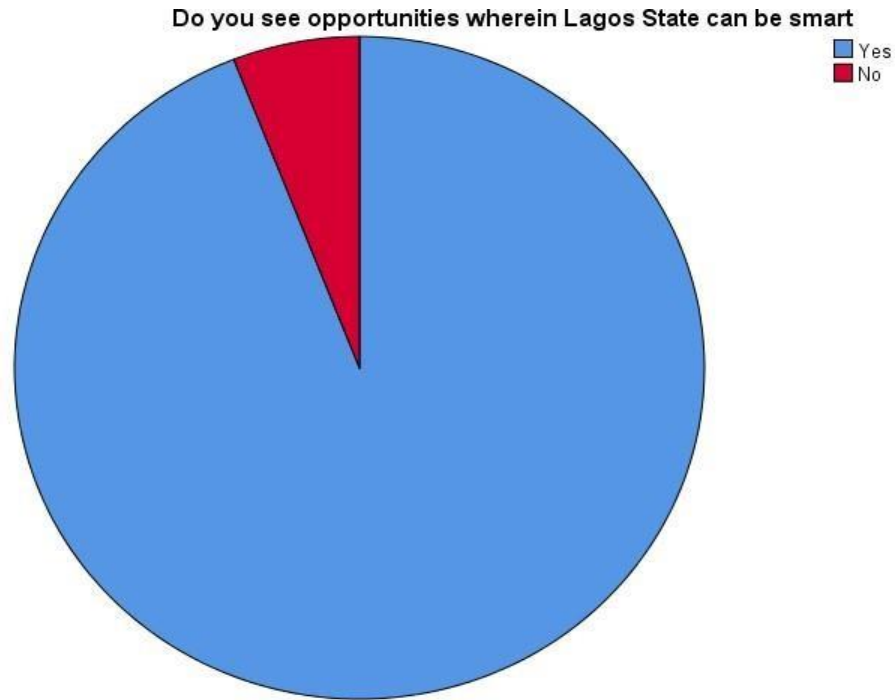
Do you see opportunities wherein Lagos State can be smart?			
	Frequency	Percent	Cumulative Percent
Yes	396	94.1	94.1

No	25	5.9	100
Total	421	100	

Source: Author's Computation using SPSS



Source: Author's Computation using SPSS



Source: Author's Computation using SPSS

Q1: Is Lagos a smart city?

Of all our respondents, 36.1% agreed that Lagos is a smart city as it is now.

63.9% opined that Lagos is not as a smart city as it is now.

Q1: Do you see opportunities wherein Lagos state can be smart?

Of all our respondents, 94.1% noted that Lagos can be a smart city.

Only 5.9% think Lagos can't be a smart city.

Remark: This statistic shows that the larger percentage of our respondents see Lagos as it is presently not being a smart city. However, they also noted that improvements can be made to the city and it can become a smart city.

4.3 DISCUSSION OF FINDINGS

Summary of objective 1: the summary is to identify the planning techniques necessary for the development of a smart city. Research question one was to find out the planning needed for the development of a smart city. The result of objective one confirms the planning techniques needed. The findings revealed that government has to revamp its efforts at making Lagos state a smart city and must engage the citizens in this drive

Objective 2: the result of objective two also ascertains that there is a strong significant relationship between the formal and informal sector of the citizenry in the drive towards making Lagos a smart city. Radio call-in programs, gingles, TV adverts, Townhall meetings are some of the ways by which government can ensure the participation of the citizens in the drive to make Lagos a smart city.

Objective 3: the aim was to examine the developmental strategies needed to make Lagos a smart city. These strategies are to gradually provide the features of a

smart city in Lagos city. There should be an assured electricity supply. An effective and efficient waste management system should be implemented all over the city. Transportation within the city should be made smart and efficient.

Objective 4: the aim was to evaluate the current level of smart city

development of Lagos and what is needed to complete it. How smart is Lagos city presently and what is needed to be done? The findings showed that Lagos has all the tendencies to be a smart city. It just needs improvement in some areas. At the moment, Lagos is not a smart city but it can be.

CHAPTER FIVE

CONCLUSION, RECOMMENDATIONS, AND CONTRIBUTION TO KNOWLEDGE

5.1 SUMMARY OF FINDINGS

This research study has examined the broad-based, all-inclusive strategic planning in the developmental concept of Lagos as a smart city. The successful development of a smart city will be due to proper planning. Strategic planning is important to the development of a smart city because it provides direction and measurable goals.

The ongoing expansion of IT connectivity is a good way to move Lagos from a megacity to a smart city. Broadband expansion, fibre optic cable laying by mobile network providers are specific, measurable collaborative goals to be done by all the stakeholders involved in the development of the smart city. The smart city concept must develop a working strategy for Lagos. To be smart, the city will have to become systematically more complex through interconnected frameworks, and increasingly rely on the use of Information and Communication Technology [ICT] to meet the needs of its citizens.

5.2 CONCLUSION AND RECOMMENDATIONS

A major outcome of this study is the need for more collaborative measures between the government of Lagos state and the citizens of Lagos. Lagos is a city with a very large population that is confined to a small space, resulting in immense pressure on existing infrastructure and transportation systems. One of the immediate things the Lagos government can do is to construct an intricate rail network that would allow for much more efficient transportation of people and goods, along with remodelled roads, airports, and seaports.

The ongoing revamping of technological infrastructure in Lagos should continue. This will provide high-speed internet access to offices, homes, healthcare buildings, and schools. High-speed internet would increase productivity and allow for increased connectivity between organizations and the possibility of learning or working remotely, if necessary. Government should ensure active collaboration with citizens, both formal and informal sectors. The following provisions' will enhance the migration of Lagos to a smart city. Smart street lighting, drones for risk assessment, data-based crime prevention programs, predictive policing, and emergency apps. Green energy generation, lower energy consumption, generation with renewable sources. Smart metering will enhance the sustainability of smart energy.

5.3 CONTRIBUTION TO KNOWLEDGE

In almost all the research topics, there is not enough written on the topic. Without exception, all researchers want to add to their research topic by increasing the empirical phenomenon studied. This research topic is no exception. The authors of this research study fully understand the research topic. We can explain why and how the phenomenon occurs. We are confident that the evidence we have is valid and reliable. Our explanatory power of the body of knowledge is solid.

The contribution to the body of knowledge of this research study are the following:

- [1] Lagos state government should involve both the formal and informal sector in the drive towards making Lagos a smart city
- [2] Inter agency collaborations within the government of Lagos state bureaucracy should be expedited so as to ensure the delivery of the Lagos smart city mandate.
- [3] More private-public partnerships should be sought, so as to ensure full participation of the private sector in making Lagos a smart city.
- [4] Town hall meetings and street rallies should be done so as to get more people sensitized on how Lagos can be a smart city.

evidence reported in the literature about the

5.4 REFERENCES

- Aboullaev, A. (2014). Smart Cities Global Initiative 2014. World Smart Cities Award
- Agwor T.c. (2015). Promoting Transparency & Accountability for Sustainable Democracy in Nigeria
- Adebara, O., Adebara. I. Raji, O., Emmanuel, G., and Onigbogi, O. (2017). Knowledge, Attitude and Willingness to Use mHealth Technology among Doctors at a Semi Urban Tertiary Hospital in Nigeria. *Journal of Advances in Medicine and Medical Research*. 22(8): 110,2017;
- Chourabi, H., Nam, T., Walker, S., Gil-Garcia, J. R., Mellouli, S., Nahon, K., and Scholl, H.J. (2012). Understanding smart cities: An integrative framework. Paper presented at the System Science (I-IICSS), 2012 45th Hawaii International Conference on System Sciences
- Caragliu, A., Del Bo, & Nijkamp, P. (2011). Smart cities in Europe, *Journal of Urban Technology*, Vol. 18, o. 2, April 2011, pp.65-82
- Cisco (2014). Smart City Readiness: Understanding the Issues to Accelerate the Journey. Smart Cities Council
- Deakin, M., & Al Waer, H. (2011). From intelligent to smart cities. *Intelligent Buildings International journal*, 3(3), 140-152
- Deloitte (2015). Smart Cities: how rapid advances in technology are reshaping our economy and society Version 1.0, November 2015
- Egresi, I. (2017). Tourist satisfaction with shopping experience based on reviews on tripadvisor. *Journal of Tourism Research*, Vol. 65, no.3, Pp. 330-345
- EU-European Parliament (2014), "Mapping Smart Cities in EU", available at: www.europa.eu/rapid/press-release_IP-14-507480_en.htm [Accessed 25 June 2021]
- European Commission (2013a). Call - Smart Cities and Communities. Smart Cities and Communities solutions integrating energy, transport, ICT sectors through lighthouse (large scale demonstration - first of the kind) projects. European

Commission

Research Journal Falconer, G., & Mitchell, S. (2012). Smart City Framework: A Systematic Process/orEnabling Smart+Connected Communities. Cisco

Giffinger, R., Fertner, c., Kramar, H., Kalasek, R., Pichler-Milanovi, ., & Mcijers. E.(2007).

Smart Cities: Ranking of European Medium-Sized Cities. Vienna, Austria: Centre of Regional Science (SRF), Vienna University of Technology. Available at http://www.smartcities.eu/download/smart_cities_final_report.pdf.

Giffinger, R., & Gudrun, I I. (2010). Smart cities ranking: An effective instrument for the positioning of cities? ACE: Architecture, City and Environment, 4(12), 7-25. Available at http://upcommons.upc.edu/revistes/bitstream/2099/S550/7/A_CE_12_SA_10.pdf.

Hafedh (2012). Understanding Smart Cities: An Integrative Framework, 45th Hawaii International Conference on System Sciences

Hall, P. (2000). Creative cities and economic development. Urban Studies, 37(4), 633-649

Hollands, R. G. (2005). Will the real smart city please stand up? City, 12(3), 303-320.

IBM. (2010). Smarter Thinking/or a Smarter Planet. Available at http://www.ibm.com/smarterplanet/global/files/us.en.us.loud_ibmlbn0041transtasmanbook.pdf

Intercessional Panel of the United Nations Commission on Science and Technology for Development (CSTD) (2016). Contribution of the Federal Republic of Nigeria to the

CSTD 2015-16 priority theme on 'Smart Cities and Infrastructure'. Held in Budapest, Hungary, 11-13 January 2016
of finance and Accounting 6(6): 208-214.

Lagos Population. (2017). Retrieved 20 IS-07-04, from <http://worldpopulationreview.com>

Lee .J.. & Hancock M. (2012). Toward a framework for Smart Cities: J\ Comparison of Seoul, San Francisco and Amsterdam. Research Paper, Yonsei University and Stanford University

Lee, Y. (2013). Ubiquitous (Smart) City. Proceedings of EU Parliament Seminar on Smart (Ubiquitous) City Consortium, p.3.

Leem. Y., & Yigitcanlar, T. (2008). Towards ubiquitous city: Concept, planning, and experiences in the Republic of Korea. In T. Yigitcanlar. K. Velibeyoglu & S. Baum(Eds.). Knowledge-Based Urban Development: Planning and Applications in the Information Era (pp.145-169). Hershey, PA: IGI Global

Maccani, G., Donnellan, B., & Helfert, M. (2014). Action Design Research in Practice: The Case of Smart Cities Advancing the Impact of Design Science: Moving from Theory to Practice (pp.132-147): Springer

Mendoza G., Okoko L., Morgan G., Konopka S. (2011) MHealth compendium: African strategies for health project, management sciences for health. Arlington, A. 2013 ;2: 1- 80

Menninga, H., Ijckamp, P., Noll, M., & Polt, W. (2011). Joint Programming Initiative Strategic Research Framework. Urban Europe

Monzon, A. (2015). Smart Cities Concept and Challenges: Bases for the Assessment of Smart City Projects. Smart cities; Green technologies and Intelligent transport system.

Proceedings of 41st International Conference, SMART GREES, 2015 and ISI

International Conference, VEHITS 2015, Lisbon, Portugal, May 20- 22, 2015: Springer

Nam, T., and Pardo, T. (2011) Conceptualizing smart city with dimensions of technology, people and institutions. Proceedings of the 12th Annual International Digital Government Research Conference on Digital Government Innovation in Challenging Times

National League of Cities (2016). Trends in Smart City Development: Case Studies and Recommendations

Neirotti, P., De Marco, Cagliano. C; Mangano. G., & Scorrano. F. (2014). Current trends in Smart City initiatives: Some stylised facts. *Cities*, 38, 25-36

Nchuchuwe, F.F., & Ojo, A.D. (2016). Interrogating the application of e-governance for service delivery in the local government of Ojo and Alimosho local government areas, Lagos state. Covenant University Conference Proceedings on eGovernance in Nigeria. 268-299

Nwogwugwu, N., and Etareri, C.F. (2015). Accountability and transparency in local government administration in Nigeria during the fourth republic. *The International Journal of Humanities and Social Studies* 3(7): 453-460.

Osain, M. (2011). The Nigerian health care system: Need for integrating adequate medical intelligence and surveillance systems. *J Pharm Bioallied Sci.* 2011 Oct-Dec; 3(4):470-478. doi: 10.4103/0975-7406.90100

Quality of Life Index Comparison Table' (2018). Retrieved July 2, 2021, from <http://www.numbeo.com>

Setis-Eu. (2012), [se/is. ec.europa.eu/implementation/technology-roadmap](http://ec.europa.eu/implementation/technology-roadmap)

Wang H., Liu J. (2009) Mobile phone based health care technology: Recent patents *Biomedical Engineering*. 2009;2: 15-21

West, D. (2012) How mobile devices are transforming healthcare. *Issues in Technology Innovation*. 2012;18:1-14

World Health Organization (2011). mHealth: New Horizons for Health through Mobile Technologies. Global Observatory for Health Series. 2011;3: 1-111.

