TELECOMMUTING BEYOND COVID-19 IN LAGOS STATE NIGERIA AS AN EMERGING SMART CITY: IMPACTS, BENEFITS, AND CHOICES

Dickson Olayemi Funmilayo[1], Ogochukwu Ugboma [2]
[1] National Centre for Technology Management (NACETEM), Ile-Ife, Osun State, Nigeria.
olayemidickson@yahoo.com
[2]School of Transport and Logistics, Lagos State University, Ojo, Nigeria.
ogochukwuugboma@gmail.com

ABSTRACT

This paper sought to establish the role of Telecommuting beyond the COVID-19 pandemic in Lagos State, Nigeria, and its transition from a megacity to a smart city using a qualitative descriptive approach. The study adopted a descriptive research design. A sample size of 54 teleworkers in Lagos and 150 daily commuters working in Lagos was randomly selected to participate in the study. The findings indicate that almost all (100%) of Lagos teleworkers during the COVID-19 crisis cited "relief from Lagos traffic congestion" as a major impact of telecommuting. 80% of daily work commuters who participated in the study indicated a willingness to telework if given the offer, again citing "Lagos Traffic congestion" as the major reason. Other reasons cited by Lagos daily work commuters include the Cost of transport to work, health and stress, hours of transport to work, and reduced risk of accidents. The findings have been summarized systematically to answer the research questions and objectives using descriptive statistics.

Findings of the study reveal that: Lagos workers are willing to accept Telecommuting as an alternative to daily work commute; Telecommuting will save costs both for Lagos workers and for Lagos as a community and Telecommuting will save residents of Lagos from premature death linked to air pollution through carbon emission reduction.

The study concludes that; Telecommuting is one of many solutions to the continued congestion of Lagos. Telecommuting will also reduce the increasing pollution of Lagos's environment and is pivotal to the achievement of Lagos' smart city objectives.

Keywords: Keywords: Telecommuting, Covid-19, Lagos State, Smart City.

1. Introduction

The year 2020 has seen enormous shifts in the global economy and the workplace. On March 11, 2020, the World Health Organization (WHO) declared the novel coronavirus outbreak a pandemic and urged governments worldwide to take decisions seriously and prepare for the first wave of the public health crisis with serious emergency measures, including in many countries, nationwide lockdowns (WHO, 2020). As the lockdowns or stay- at-home emergency decisions took effect, a significant portion of the workforce was instructed to stay home and work remotely if their jobs permitted it. As a result,

companies that had previously used teleworking and never used teleworking were sending their employees home, laying the groundwork for the largest, most extensive teleworking experiment in history. Although the number of part-time and full-time teleworkers has steadily increased over the years (Eurostat, 2018), the pandemic has accelerated employer adoption of teleworking modes. Moreover, Teleworking has been integral to ensuring business continuity in situations such as the COVID-19 epidemic.

In the modern workplace, telecommuting and teleworking mean the same thing and can be used interchangeably: they both refer to the practice of working from home or off-site, using the internet, email, chat, and phone to perform tasks that were previously acted only in the office. The term "remote workers" now refers to the same concept. In this study, the terms 'Teleworking' and 'Telecommuting' will be used interchangeably to refer to the same concept. According to the Telework Enhancement Act of 2010, "telework" or "teleworking" relates to work flexibility arrangements in which employees perform the duties and responsibilities of their position and other approved engagements from a location other than their usual place of work. Telecommuting is an example of working from a site other than an organization's physical location. Typically, you rely on technology to complete your tasks and communicate with your supervisor and coworkers.

Innovative work (telework, e-work, mobile work) — working independently of time and place using ICT — dates back to the nineteenth century, when Nilles coined the term "telecommuting." Jack Nilles, co-founder and president of JALA and the "father of telecommuting," coined the terms "telecommuting" and "telework" as an alternative to commuting to the workplace in 1973, before the advent of personal computers. Since Jack Niles coined the term "telecommuting," teleworking's history has changed for the better (Niles 1975, Bailey and Kurland, 2002; Pyoria 2003).

During the 1973 oil crisis, Niles had a simple idea: if people didn't come to work, the office would go to them, reducing energy costs and mobility issues at the time. Since then the use of telecommuting has steadily increased over the past two decades, but it has always been accompanied by a sense of mistrust, caution, and fear, which has prevented widespread adoption of this flexible solution.

The emergence of interactive digital networks, in which revolutionary network technologies have governed network business characteristics, has significantly impacted the transformation mentioned above. The potential for decentralization of labor is increasing through various teleworking schemes and time-independent working arrangements. Telecommuting as a business practice has increased dramatically due to the increasing pressure on businesses to reduce expenses and boost employee productivity. Companies must now adopt a more flexible mindset for the new "corporate office" In addition, the extension of broadband Internet services to employees' homes and the convergence of voice, data, and video over a shared IP framework have made telecommuting a viable option, if not a necessity, for medium- to large-sized businesses in the current business climate. Traditional work environments are being replaced by telecommuting. The accelerated growth of the internet and telecommunications tools, combined with the increasing speed of information

exchange, has had a significant impact on the trend for businesses to permit alternative working environments in which employees perform their duties remotely, away from the office, as long as the company's regulations allow it (Ye, 2012).

As telecommunications and IT technology advance, network structures are becoming more feasible for most businesses, as opposed to the early days when "network business" was only viable for a handful of large corporations. In this setting, teleworking is possible, which creates new employment and business growth opportunities. In addition, whereas telecommuting first gained popularity as a means to optimize traffic patterns, reduce energy consumption, and recruit highly skilled professionals, it is now available to a wide range of individuals, typically as a means to balance work and non-work obligations (Allen et al., 2015; Bailey & Kurland, 2002).

Although teleworking has existed and been practiced throughout the world, particularly in developed nations with adequate supporting technical infrastructure, it was the outbreak of the COVID-19 epidemic in Lagos, Nigeria, that brought it to the forefront of public consciousness. As a result, the Lagos State government had inevitably begun implementing project deliverables to transform Lagos into a "Smart city" by installing fiber optics cables throughout the city to provide residents with high-speed internet connectivity.

The global population has exploded in recent decades as people expect higher living standards. It is estimated that approximately 70% of the world's population will reside in urban areas by 2050. Currently, cities consume 75 percent of the world's resources and energy and emit 80 percent of greenhouse gases. In the coming decades, the environment may suffer catastrophic consequences. This calls for the concept of intelligent cities. Establishing smart cities is a logical response to the problems caused by rapid urbanization and population growth, once implemented, intelligent cities can reduce energy use, water consumption, carbon emissions, transit needs, and municipal waste, despite the associated costs. The world's cities are under tremendous stress as the available resources are stretched to meet the needs of an ever-growing urban population. According to Ismail (2016), it is becoming increasingly difficult to control the ever-increasing pressure on existing resources in the urban core; consequently, the focus has shifted to inventing new solutions to address the megacity dilemma. Therefore, merging cities with intelligent technology solutions has become an expectation in the digital age.

The global situation is unfolding, and the same issue is developing in the megacity of Lagos. Lagos is the most populous city in Nigeria and the second largest in Africa. Yet, according to a CNN Travel article, the city's population density is unhealthily high. Despite being the smallest state in the country, it has the most significant urban population, with an estimated 22 million people and counting, which is more than double that of New York or London.

Every day, more than eight million people and five million vehicles jam into a network of just 9,100 roads. This is why Lagosians spend an average of 30 hours per week, or 1,560 hours per year, in traffic, whereas Los Angeles and Moscow drivers spent only 128 and 210 hours in traffic in 2018, respectively. This situation has negatively impacted mental health and productivity.

According to the NCDC's daily update website, the hazardous traffic in Lagos made it easy for the state with the highest incidence of COVID-19, which was twice as high as in any other form in Nigeria. To flatten the COVID-19 curve until the delivery of vaccines and ensure the survival of both government and private organizations in Lagos, telecommuting with any technology and at any level conceivable became necessary. Given that Information and Telecommunication Technology enable Telecommuting, the Lagos state government's plan to implement city smartness is a step in the right direction.

This paper examined Telecommuting in Lagos during the COVID-19 pandemic, its benefits to both employees and organizations, and most importantly, evaluated telecommuting opportunities and benefits to Lagos beyond COVID-19 as Lagos State continues to execute project deliverables for the successful transition to a Smart city.

2. Literature Review

2.1 Telecommuting and a Smart City: Roles and Contributions

The smart, sustainable city employs ICT infrastructure that is adaptable, dependable, scalable, accessible, secure, safe, and resilient for a variety of purposes. It raises the residents' standard of living. It increases living standards and employment opportunities. It enhances the well-being of its residents, for instance, through medical care, welfare, physical safety, and education. It simplifies infrastructure-dependent services, such as transportation and water. It enhances disaster prevention and management, including the capacity to deal with climate change's effects. It has robust, well-balanced regulatory and governance systems and suitable policies in place. (Nadia Chen, 2020)

Smart cities, with a particular emphasis on transportation, aim to improve the quality of life of their inhabitants while boosting the economy by promoting sustainable urban mobility and increasing the use of clean and energy-efficient vehicles. Nonetheless, its implementation is anticipated to address additional political concerns, including climate change, energy policy, air quality legislation, and the difficulty of addressing congestion (EC, 2020). Telecommuting has tremendous potential to contribute to the development of smart cities, given that its primary benefit is reduced transportation requirements. The fact that remote work reduces transportation fuel consumption and, consequently, CO2 emissions, air pollution, and traffic congestion contributes to the European Commission's goals of increasing urban mobility while decreasing congestion, accidents, and corruption (Kylili, Ilic, and Fokaides 2017).

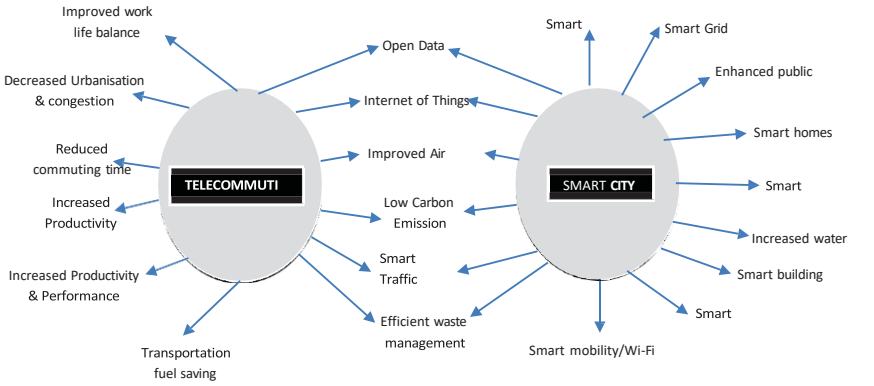

Figure 1: Contribution of Telecommuting to Smart City (Prepared by Author, adapted from Kylili et al).

2.2 Lagos as an Emerging Smart City

2.2.1 The Peculiarities of Lagos

Lagos is the most populous city in Nigeria and the second largest in Africa. CNN Travel published an article stating that the city is overpopulated. Despite being the smallest state in the union, it has the most significant urban population with an estimated 22 million people, which is more than double that of New York or London. Lagos is distinguished from other Nigerian cities by the following:

- **Lagos with the highest Traffic congestion in Nigeria**

Lagos is one of the most populated cities in the world. Lagos is home to 40 percent of all vehicles registered in Nigeria. As a result, commuters spend at least three hours per day sitting in traffic. According to a series of working papers produced by the Economic Intelligent Unit (EIU) of the Lagos State Ministry of Economic Planning and Budget (MEPB), traffic congestion causes many issues for Lagos residents because of the overall volume of vehicular traffic in many areas (as measured by aggregate measures of vehicle-kilometers of travel) continues to grow faster than the overall capacity of the transportation system. Congestion can have a variety of adverse effects on people and the economy, including implications on air quality (due to increased car emissions), quality of life (due to personal time delays), and economic activity (due to the additional costs and reduced service areas for the workforce, supplier, and customer markets).

The most recent information on the costs of traffic congestion in Lagos comes from a study conducted between 2007 and 2009

by ROM Transportation Engineering. According to Olorunpomi (2010), the annual cost of traffic congestion is estimated to be $1 billion (approximately N160 billion). The state of Lagos has an official population of 17 million, which led to these results. The research also concludes that Lagosians collectively lose
3 billion hours annually due to traffic congestion. Reducing this time by 20% would save the state at least $1 billion (about N150 billion) annually.

- **Lagos with the busiest Airport in Nigeria**

According to a study published in Business News on January 2, 2020, the Murtala Muhammed Airport in Lagos State had the highest number of domestic air travelers during the specified period. Between January and June of 2019, the airport served 2.003 million passengers. This represents 31 percent of all airline passengers.

The total number of arrivals at the Lagos Airport during the period was 1.02 million, while the number of departures was 0.98 million. In conclusion, the Lagos Murtala Muhammed International Airport continued to be the busiest in Nigeria for international and domestic travelers.

- **Lagos with the busiest Seaport**

Premiere Port or Apapa Quays is Nigeria's largest and most active port complex. Apapa, located in Lagos, is Nigeria's primary commercial hub. A land, rail, and intermodal road connection connect the port. The chronic general congestion of the Ports has had a spillover effect on Lagos highways, making life especially difficult for Lagos workers traveling on the Apapa road network, resulting in decreased productivity, loss of life, income loss, and severe health consequences. According to CNN Travel's Shakir Akorede, while the bottleneck at Nigeria's principal seaport, Apapa costs the country $19 billion annually, the city is groaning under the weight of its enormous population.

- **Lagos with the highest incidence of COVID-19**

Lagos consistently recorded the highest incidence of COVID-19 in Nigeria, according to data published by the Nigeria Centre for Disease Control (NCDC) in their daily update of the incidence of COVID-19 in Nigeria. The figures recorded in Lagos State are at times more than twice that of the second-highest which is the FCT and considerably more than ten times that of some other states.

S/N	STATE	Number of Cases
1	Lagos	43,251
2	FCT	15,506
3	Plateau	7,251
4	Kaduna	7,176
5	Oyo	4,956
6	Rivers	4,745
7	Edo	3,461
8	Ogun	3,106
9	Kano	2,730

3.0 Methodology

This is a qualitative research study and a descriptive approach was used to present the results. The respondents comprised two groups; the telecommuters in Lagos during the COVID-19 crisis and the regular office workers at the time of this research. For the telecommuters, 54 people were selected based on recommendations using purposive sampling techniques, and survey questions were designed to capture research objectives related to telecommuting during the COVID-19 crisis.

For the regular office workers who commuted to the office daily since the lockdown was lifted in Lagos, 150 respondents were randomly selected from the following BRT corridors;

- Iyana Ipaja-Ikeja-Alausa. To include some Lagos state public workers
- Oshodi-third mainland bridge-Obalende-CMS. For the general Third mainland bridge users into Marina/Victoria Island Business headquarters in Lagos.
- Ikorodu-Funsho William Avenune-CMS/Victoria Island. For another heavily congested route which always serves as an alternative route to CMS/Victoria Island.

The research applied a structured questionnaire and used mainly the route plied by Lagos State Bus Rapid Transit (BRT). As Lagosians are always in a hurry (due to ever-present traffic congestion during work commuting) and would normally not even attend to requests to respond to research questions except, in a most relaxed atmosphere, the use of BRT routes enabled the researcher to guide respondents in more comfortable BRT seats and to facilitate immediate collection of questionnaires just before arrival at the end of the journey. Data obtained through the questionnaire were analyzed using a descriptive-analytical procedure involving the use of simple percentages.

4.0 Results and Discussions

4.1 Demography of Respondents

Table 4.1: Personal information of respondents

Items	Options	Teleworkers n=54	Daily office Commuters n=150
Gender	Male	30	87
	Female	24	63
Age	20 – 29 years	24	58
	30 – 39 years	16	62
	40 – 49 years	8	25
	50 years and above	6	5
Marital Status	Single	33	85
	Married	21	65
With Children	Yes	13	48
	No	9	17

Source: Field survey, 2021

30 of the teleworkers respondents (55.56%) are male while 24 (44.44%) are female. 87 of daily office commuters (58%) are male while 63(42%) are female. 21 (38.89%) of teleworkers are married while 33 (61.11%) are Single. 85(56.66%) of the daily commuters are still single while 65 (43.34%) are married. Of the married Telecommuters, 13 (61.9%) are already with children and 48(73.84%) of the married daily work commuters are already with children.

4.2 Impact of Telecommuting on Workers who telecommuted in Lagos during Covid-19 Crises

The interview and email sent to Telecommuters selected for this research allowed multiple choice selections under this section. The result is presented in Figure 4.1 below.

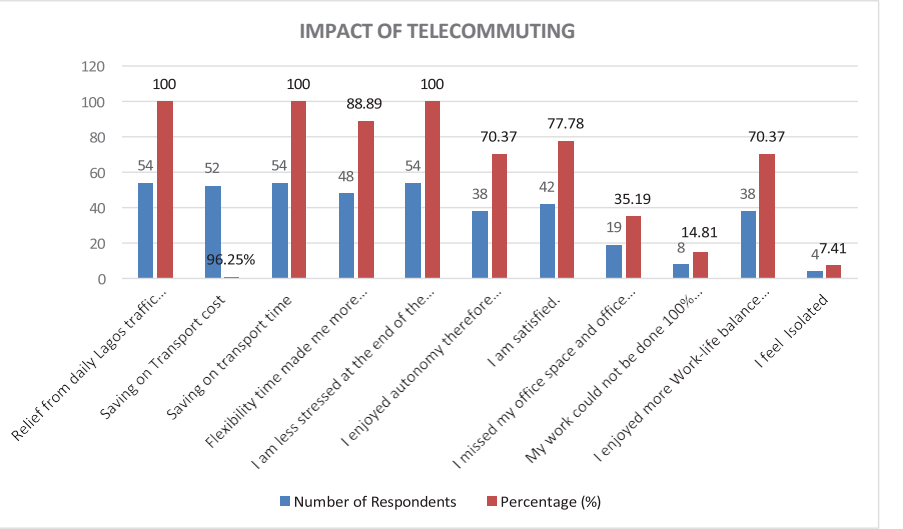

Figure 4.1: Impact of Telecommuting on Respondents (N=54)
Source: Field Survey 2021

All respondents (100%) interviewed/ emailed cited; relief from Lagos State traffic congestion, saving on transport time, and less stress as major impacts on their lives as a result of telecommuting occasioned by COVID-19, while 96.25% of the respondents cited saving on transport cost, 88.89% enjoyed the flexibility of time, 70.37% enjoyed autonomy for more creativity, 77.78% claimed job satisfaction, and 70.7% had more time for family. However, 14.81% indicated their work could not be done 100% remotely and 35.19% missed their office space and equipment. Only 7.41% felt isolated. Other impacts cited include; the opportunity to learn video conferencing tools and other ICT tools.

4.3 Willingness of Teleworkers to Continue with Telecommuting beyond Covid-19 in Lagos

Out of the 54 respondents interviewed/emailed for this research, 46 representing 85% are willing to continue Telecommuting in Lagos even after COVID-19. 4 out of the remaining 8 showed a willingness to telecommute but for a few days a week since their work could not be done 100% remotely.

4.4 Willingness of Daily Office Commuters to Accept Telecommuting If Given the Choice

Out of the 150 respondents who are daily office commuters, 120 representing 80% of the total sample indicated a willingness to telecommute if given the offer. The rest cited that their jobs cannot be done remotely.

When asked to choose between working at home completely as a form of telecommuting or a few days a week, out of the 120 who indicated a willingness to telework, 72 (60%) chose home working all through the week and 48 (40%) preferred few days a week as a form of telecommuting.

When asked about the major reason they would like to Telecommute, the reasons presented are categorized and summarised in Table 4.2 below.

TABLE 4.2 Major Reasons Daily Office Commuters in Lagos Will Like to Accept Telecommuting if Given the Offer

Reasons	Number of Respondents	Percentage (%)
Daily Lagos traffic congestion	120	100
Saving transport costs to work	118	93.3
Hours lost in commuting to work	120	100
More time with family	80	66.67
Daily stress and its impact on health	119	99.16
Reduced risk of accidents and getting robbed	78	65
Autonomy	32	26.67

Source: Field survey 2021

All respondents who indicated a willingness to accept Telecommuting, if given the offer, cited Lagos traffic congestion and hours lost in commuting to work as their reasons. 99.16% (almost all) cited daily stress and its impact on health as a reason. All these are related to the traffic congestion situation in Lagos. 93% cited money that will be saved from transport to work, 66.6% cited more time with family, 65% cited reduced risk of accidents and getting robbed and only 32% cited Autonomy.

5.0 Conclusion

The following conclusions can be drawn from the results of this survey.

i. Telecommuting was used as a survival strategy for both public and private organizations during the COVID-19 pandemic.

ii. Majority of Lagos workers (both public and private) will accept telecommuting if given the choice.

iii. Telecommuting has a major role in making Lagos a smart city.

iv. Telecommuting will solve Lagos's perennial traffic congestion with all its attendant losses.

v. Telecommuting will lead to a cleaner Lagos and save Lagos residents from premature death from air pollution.

5.1 Recommendations

The following recommendations are the drawn-up sequel to the conclusion reached:

i. Public and Private Organisations in Lagos should conduct an eligibility survey of all workers to determine work eligibility for telecommuting.

ii. It is imperative that Lagos state government should vigorously pursue the availability of the internet to homes by completing the ongoing fiber broadband that will offer cheap internet service to all areas of Lagos since majority of Lagos State workers according to this study will accept telecommuting if given the choice.

iii. Telecommuting policies and agreements should be drawn up by both public and private companies for successful telecommuting.

iv. Lagos state government should legislate Telecommuting adoption as a viable choice for organizations operating in Lagos State.

v. For a cleaner Lagos to be achieved through telecommuting, Thorough technology need for successful telecommuting should be carried out by companies in Lagos and approach Lagos state Government for partnership.

References

Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. Psychological Science in the Public Interest, 16(2), 40-68. doi:10.1177/1529100615593273.

Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. Psychological Science in the Public Interest, 16(2), 40-68. https://doi.org/10.1177/1529100615593273.

Bailey, D. E. & Kurland, N. B. (2002). A review of telework research: findings, new directions, and lessons for the study of modern work. Journal of Organizational Behaviour 23(4), pp. 383-400. Doi: 10.1002/job.144.

CNN Travel, https://edition.cnn.com/travel/article/traffic-stress-lagos-nigeria/index.html.

Eurostat. 2018. Working from home in the EU. 20 June.

EC (European Commission) (2020). EC's website: Smart cities. Available from: https://ec.europa.eu/info/eu-

regional-and-urban-development/topics/cities-and-urban-development/city-initiatives/smart-cities_en.

Kylili, A., M. Ilic, and P. A. Fokaides. 2017. Whole-building Life Cycle Assessment (LCA) of a passive house of the sub-tropical climatic zone. Resources, Conservation and Recycling 116:169–77. doi:10.1016/j.resconrec.2016.10.010.

Nadia Chen, Kurrant Talent. 2020. Rising to the challenge of remote productivity in the smart city space. Smart cities world, sharing ideas to solve urban challenges. https://www.smartcitiesworld.net/people-and-skills/people-and-skills/rising-to-the-challenge-of-remote-productivity-in-the-smart-city-space.

Nilles, J. M. (1975). Telecommunications and organizational decentralization. IEEE Transactions on Communications. COM-23(10), 1142-1147.

Nilles, J. M. (1994). Making Telecommuting Happen: A Guide for Telemanagers and Telecommuters. New York: Van Nostrand Reinhold.

Pyoria, P. (2003). Knowledge work in distributed environments: issues and illusions. New Technology, Work and Employment 18(3), 166-180. Doi: 10.1111/1468-005X.00119.

WHO (World Health Organization). 2020a. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020. 11 March.

Ye, L. R. (2012). Telecommuting: Implementation for success. International Journal of Business and Social Science, 3(15), 20–29.